Appendix 2BB GEOTECHNICAL BORING LOGS

APPENDIX 2BB-1 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	A-01	SHEET	1	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723879.2 N, 457603.8 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6 tri-cone bit

DRILLIN	G METH	OD AND	EQUIPM	ENT : Dietrich D-	50 S/N 232, mud rotary, ca	athead, NWJ rods, 6 tri-c	one bit		ORIENTATION : Vertical
WATER	LEVELS	: 2 ft bgs	on 03/15	5/07	START: 3/14/2007	END: 3/21/2007	LOGGEF	R : R.	Bitely
						OIL DESCRIPTION			COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPI F	INTERVA	J (ft)	STANDARD PENETRATION				SYMBOLIC LOG	
ON ELC	O WIII EE			TEST RESULTS	SOIL NAME, US	CS GROUP SYMBOL, C	COLOR,	일	DEPTH OF CASING, DRILLING RATE,
ATI		RECOVE	EKY (II)		MOISTURE CON	ITENT, RELATIVE DENS	SITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND
			#TYPE	6"-6"-6"	CONSISTENCY, S	OIL STRUCTURE, MINE	ERALOGY	Σ	INSTRUMENTATION
<u> </u>				(N)				S	"Water level is based on Ground Water
41.0							-		Monitoring at LNP site (FSAR Table
l _							_		2.4.12.08)"
									Water at 6' below ground surface
-							-	1	_
-							-	1	-
-							-	1	-
-							-	-	-
-	3.5				D 1.6 · · · ·	11474 04 (07 07)		ng Pro-	_
_				540	Poorly Graded San	d With Silt (SP-SM) orange to moderate yel	lowish -	H	
		1.0	SS-1	5-4-3 (7)	brown, (10YR 8/2 to	10YR 5/4), wet, loose	, very fine		
5	5.0			(')	\ to fine grained, 10-1	5% fines, nonplastic, <	10% root /]
36.6	0.0					material, trace concreti sand and silt in an iron		1	Few dense lenses from 5.0-8.5', thin,
-					1/4 , very line silica	sanu anu siil in an Iron	- IIIallix		relatively consistent drilling rate (moderately -
-							-		rapid)
-							-		_
l _							_		
-							-	1	1
-							-	1	-
-	8.5			0.50/5	_ Limestone Fragme	nts		\vdash	-
-		0.5	SS-2	9-50/5 (59/11")	⊢∖ 8.5-8.75' - very pale	orange, (10YR 8/2), st	trong HCI	ш	Van hard from 0.0.42 Elill- ilt
-	9.4			(39/11)	reaction, gravel-size	d, subrounded to angu	ılar, up to 📗		Very hard from 9.0-12.5', possible limestone lenses, light chatter, extremely slow
10					1"x1-1/2"				advancement rate
31.6					Silt (ML) 8.75-9.0' - gravish o	range, (10YR 7/4), mo	ist to wet		
I -					hard, nonplastic, rap	oid dilatancy, mild to me	oderate	1]
-					HCl reaction, 10-159	% very fine to medium	grained -	1	-
-					sand, all carbonate	uenvea		1	-
-							-		-
-							-		Delatively consists at firm 40.5.00.5!
-							_		Relatively consistent from 12.5-28.5', moderately rapid drilling rate
	13.5								gradianing fate
-					Silt With Limestone			\prod]
-		0.8	SS-3	27-17-4	13.5-14.3' - very pale	e orange, (10YR 8/2), i I to moderate HCl read	wet, very -	Ш	
	45.0			(21)	10-15% very fine to	fine grained sand, 3 lin	nestone / -	1	-
15 26.6	15.0				lenses (<1/2") at 13.	5', 13.7' and 14.0', all	carbonate		-
-0.0					derived				-
-							-		_
I _							_		
-							-	1]
-							-	1	-
-							-		
-	18.5							-	SS-4 actual sample depth is 18.5-20.0'
-				40-54-50			-		- 30-4 actual sample depth is 10.3-20.0
I _		1.3	SS-4	(104)			_		
20	20.0			(12.1)			_	Ш]
					1				



PROJECT NUMBER:	BORING NUMBER:					Т
338884.FL	A-01	SHEET	2	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723879.2 N, 457603.8 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6 tri-cone bit

JRILLIN	IG METH	OD AND	EQUIPM	ENT : Dietrich D-5	0 S/N 232, mud rotary, cathead, NWJ rods, 6 tri-cone bit ORIENTATION: Vertical
NATER	LEVELS	: 2 ft bgs	on 03/15	5/07	TART : 3/14/2007 END : 3/21/2007 LOGGER : R. Bitely
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
BEL Sel		RECOVE	ERY (ft)	TEST RESOLTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DEPTH OF CASING, DRILLING RATE, DEPTH OF CASING, DRILLING RATE,
YFA.			#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY
SUF			#1175	(N)	\(\sigma \)
21.6					Sandy Silt (ML)
-	1				18.5-19.75' - very pale orange, (10YR 8/2), moist, hard, nonplastic, rapid dilatancy, mild to moderate
-	1				HCI reaction, 35-40% very fine to fine grained sand,
-	-				all carbonate derived –
-	-				-
_					1 1
_					
_	23.5				
					Sandy Silt With Limestone Fragments (ML)
_]	1.5	SS-5	17-24-31 (55)	23.5-25.0' - grayish orange, (10ŸR 7/4), wet, hard, nonplastic, rapid dilatancy, moderate to strong HCl
25	25.0			(55)	reaction, 20% fine to coarse gravel, limestone
16.6	23.0				fragments are extremely weak rock (R0); similar to
-	-				-
-	-				1 1
-	-				-
_					4 1
_					
_					
	28.5				
		0.8	SS-6	34-50/3.5	Silty Sand With Limestone Fragments (SM) Slow advancement rate from 28.5-33.5' with
_	29.3	0.0	000	(84/9.5")	28.5-29.25' - Same as 23.5-25.0' except 72% fine to medium grained sand, interbedded with limestone several dense lenses <0.5' thick, associated with light chatter
30	1				lenses (<1/2") at 28.5-28.8' and intermittent
11.6	1				throughout
-	1				11
-	-				
-	-				- 1
-					- 1
_					
_					11
_	33.5 33.7		00 -		
_	55.7	0.2	SS-7	50/2.5 (50/2.5") /	Limestone Fragments 33.5-33.7' - grayish orange to dusky yellowish brown,
				(55,2.5)	\ (10YR 7/4 to 10YR 2/2), mild to moderate HCl
35					reaction, gravel-sized limestone fragments up 1-1/2"
6.6]				diameter, sample includes 1/2" thick iron cemented lenses that have no HCl reaction
_	1				11
_	1				11
-	-				1
-	1				1 1
-					-
-					4 1
_	38.5				
_		1.1	SS-8	28-35-50/1	
_	39.6	1.1	00-0	(85/7")	Extremely dense from 39.0-46.0', slow drilling with light to heavy rig chatter
40	23.0				drilling with light to heavy ng chatter
		1	1		1 1



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-01	SHEET	2	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723879.2 N, 457603.8 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232. mud rotary, cathead, NWJ rods, 6 tri-cone bit

DRILLIN	G METH	DD AND	<u>EQUIPM</u>	ENT : Dietrich D-5	S/N 232, mud rotary, cathead, NWJ rods, 6 tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 2 ft bgs	on 03/15	/07 S	TART: 3/14/2007 END: 3/21/2007 LOGGER: R. Bitely
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
BEL GE /		RECOVE	RY (ft)	TEOT REGOLTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DEPTH OF CASING, DRILLING RATE, DEPTH OF CASING, DRILLING RATE,
YFA YFA			#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
SUI			#111 L	(N)	δ
21.6					Sandy Silt (ML)
					\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
-					HCI reaction, 35-40% very fine to fine grained sand,
-					all carbonate derived
-					11
-					
-	00.5				-
-	23.5				Sandy Silt With Limestone Fragments (ML)
-		4.5	00.5	17-24-31	23.5-25.0' - grayish orange, (10YR 7/4), wet, hard,
-		1.5	SS-5	(55)	nonplastic, rapid dilatancy, moderate to strong HCI reaction, 20% fine to coarse gravel, limestone
25 16.6	25.0				¬ fragments are extremely weak rock (R0); similar to → ↓ ↓ ↓ ↓ ↓
10.0					18.5-19.75'
-					.
-					.
_					
_					. .
	28.5				
		0.8	SS-6	34-50/3.5	Sandy Silt With Limestone Fragments (ML) Slow advancement rate from 28.5-33.5' with
	29.3	0.0		(84/9.5")	28.5-29.25' - Same as 23.5-25.0 except 40% fine to medium grained sand, interbedded with limestone with light chatter
30					lenses (<1/2") at 28.5-28.8' and intermittent
11.6					throughout
-					11
-					11
-					1
-					
-					
-	00 -				
-	33. <u>5</u> 33.7	0.2	SS-7	50/2.5	Limestone Fragments
-				(50/2.5")	33 5-33 7' - gravish orange to dusky vellowish brown
-					(10YR 7/4 to 10YR 2/2), mild to moderate HCI reaction, gravel-sized limestone fragments up 1-1/2"
35 6.6					diameter, sample includes 1/2" thick iron cemented — — — —
- 0.0					lenses that have no HCl reaction
-					.
_					.
_]
]	38.5				11
1 1				28-35-50/1	<u> </u>
	20.0	1.1	SS-8	(85/7")	Extremely dense from 39.0-46.0', slow
40	39.6				drilling with light to heavy rig chatter
40_					



PROJECT NUMBER:	BORING NUMBER:					Т
338884.FL	A-01	SHEET	3	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723879.2 N, 457603.8 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6 tri-cone bit

ORIENTATION : Vertical

						r, cathead, NWJ rods, 6 tri			ORIENTATION : Vertical
WATER	LEVELS	. ∠π bgs	on 03/15		START : 3/14/2007	END: 3/21/2007 SOIL DESCRIPTION	LOGGE	K∶K. 	COMMENTS
> 무윤	CAMPIE	INTERVA	1 (#\	STANDARD PENETRATION		OOIL DEGONIF HON		90	OCIVIIVILIVIO
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE		- '	TEST RESULTS	SOIL NAME.	USCS GROUP SYMBOL,	COLOR,	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
ATI B		RECOVE	<u> </u>		MOISTURE C	ONTENT, RELATIVE DEI	NSITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
E SEP			#TYPE	6"-6"-6" (N)	CONSISTENCY	, SOIL STRUCTURE, MIN	NERALOGY	SYN	INSTRUMENTATION
1.6				(1.1)	Sandy Silt With I	Limestone Fragments (ML)	+	
-					38.5-39.58' - olive	e gray to light olive gray, d, low to medium plastic	(5Y 3/2 to	1	-
-					rapid dilatancy, m	noderate to strong HCI re	eaction, 35%	1	-
-					fine to coarse gra	iin sand, trace organic o ds at 38.5-38.7' and inte	ontent,	1	-
-					throughout	us at 30.3-30.7 and inte	erritteritty	1	-
-								1	-
-	40.5							┨	-
-	43.5 43.8	0.3	SS-9	50/3	Limestone Fragn	nents			-
-				(50/3")	\ 43.5-43.75' - light	t olive gray, (5Y 6/1), mi	ld HCI	┨	-
					\reaction, very fine	e to fine gravel, up to 3/4	1"X1/2"	┨	-
45 -3.4							_	1	-
-								┨	-
-								┨	-
-								┨	-
-								┨	-
-								┨	-
-								┨	-
-	48.5			28-50/2	Silty Sand (SM)	(5)(0(4)		111	Split spoon sample SS-10 actually advanced -
-		0.3	SS-10	(78/8")	48.5-48.8° - yellov	wish gray, (5Y 8/1), wet, astic, mild to moderate h	very dense, -ICI reaction.	┨	48.5-49.2
					I fine to medium gr	rained sand, 10% grave	l-sized	┨	-
50 -8.4					limestone fragme Begin Rock Corin	ents ng at 49 0 ft bas		-	
-					See the next shee	et for the rock core log		┨	-
-								-	-
-								-	-
-								┨	-
-								-	-
-								┨	-
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55 <u> </u>							_	-	
-13.4								-	-
-								-	-
-								-	-
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60_								\vdash	
			l						

APPENDIX 2BB-5 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-01 SHEET 4 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723879.2 N, 457603.8 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, NW/HW casing

ORIENTATION: Vertical

CORING	NETHOD A	ND EC	אורוע	IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, NW/	HVV C	asing	ORIENTATION : Vertical
WATER	LEVELS: 2 f	bgs o	on 03/	15/07 START : 3/14/2007 END : 3/	21/20	COMPANY OF THE LOGGER : R. Bitely	
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표 등 등	ER'A	(%	FRACTURES PER FOOT		임	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H A A	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Q D (%)	CTI FO	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	l BO	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
		a a	-RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	<u>}</u>	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	49.0				9,	Limestone	Switch to NQ rock coring
_	10:0		0			- 49.0-51.2' - dark yellowish brown,	tooling at 49.0', drive HW
50_	R1-NQ		>10	49.55-49.65, 50.2-50.3' - Fracture zone (2),	Ш	(10YR 4/2), fine grained, extremely	casing to 49', seat casing
-8.4	2.5 ft	42	/10	rough, undulating, with 1" openings	Н	weak to very weak (R0 to R1), voids	in <6" rock, flush casing
-	88%		2	50.45' - Mechanical break or fracture, 40 deg,	П	 (<3/16") over 70% of surface except from 49.65-50.2' where voids 	with 3-7/8" tricone bit
-				rough, undulating, open <3/4" 50.75, 50.9' - Bedding plane or mechanical	╂╫	(<1/16") cover <20% of surface,	T(1. 5 minutes
-	51.5		NR	break (2), <10 deg, rough, undulating, open	Ͳ	 fossiliferous, cavities <1/2"x1/4" over 	-
_			0	<1/2"	H	<15% of surface, trace organics	_
						No Recovery 51.2-51.5' Limestone	
					Н	51.5-56.4' - moderate yellowish	
-			2	53.0' - Mechanical break or fracture, <10 deg,	ш	brown, (10YR 5/4), fine grained,	1
-	R2-NQ			rough, stepped to undulating, tight	H	 moderate to strong HCl reaction, very weak to weak (R1 to R2), voids 	-
-	5 ft	82	0	53.8' - Mechanical break or fracture, <10 deg,		(<3/16") over 60-80% of surface, few	-
-	98%			rough, undulating, tight at fracture with	Ш	_ cavities <1-1/2"x1" concentrated at	-
55			2	associated cavity 54.4' - Mechanical break —		53.8', fossiliferous	
-13.4			-	55.0, 55.1' - Fractures, 35 deg, rough,			
			_	undulating, tight	Н	=	R2: 10 minutes
-	50.5		3	56.0, 56.2' - Mechanical break or fractures,	口	<u></u>	-
-	56.5		NR/	<10 deg, rough, undulating, open <1/2"	HH	No Recovery 56.4-56.5'	Water level at 1' below
-			>10	56.5-56.8' - Fracture zone, rough, undulating,		Limestone	ground surface at 17:30,
				gravel-sized (<1-1/2"x1"), open 57.0, 57.3, 57.5' - Fractures (3), 50-90 deg,	Ш	56.5-60.4' - pale yellowish brown,	end drilling on 03/14/07
				smooth, undulating, intersecting fractures,		(10YR 6/2), fine grained, very weak to medium strong (R1 to R3), voids	1
-			2	tight	Н	(<3/16") over 85% of surface,	Water level at 2' below
-	R3-NQ				Н	fossiliferous, trace organics,	ground surface on -
-	5 ft	48	3	58.7, 58.85, 59.5' - Bedding plane or	Ш	extremely weak rock (R0) zones at	03/15/07 07:30
I -	78%			mechanical break (3), smooth, undulating, tight	╀	56.5-56.8', 58.7', 58.85', 59.5', - 59.75-60.0'	_
60			>10	58.95' - Mechanical break			
-18.4				59.75-60.0' - Fracture zone, rough,	Н		1
-				undulating, gravel-sized fragments <1"diameter, open	ш	No Recovery 60.4-61.5'	R3: 16 minutes
-			NR	T diameter, open	╁┼	_	-
-	61.5			61.3' - Bedding plane or mechanical break,		Limestone	-
-			0	rough, undulating, broken along weak	₽₩	- 61.5-66.45' - pale yellowish brown,	-
_				bedding planes, tight	Ш	_ (10YR 6/2), very fine to fine grained,]
			4		$\vdash\vdash$	weak to medium strong (R2 to R3),	
			'	63.15' - Bedding plane, horizontal, rough,	Ш	 voids (<3/16") over 60-80% of surface at 61.5-61.9', 62.5-62.8',]
-	R4-NQ			undulating, tight	Ш	63.5-65.1' and 65.4-66.3', organic	1
-	5 ft	98	0	63.5, 63.7, 63.95, 64.0, 64.05, 64.4, 64.45,		- material as <1/4" thick laminations at	
-	99%			65.2' - Mechanical break (8)	F	63.0-65.2' over 20% of surface; very weak rock (R1) at 62.7-63.1',	-
65			0	_	Н	— 65.0-65.5' and 66.3', bioturbated with	_
-23.4			Ľ		Ш	some secondary infilling at 65.5-66.3'	1
					$\vdash\vdash$		R4: 8 minutes
-	 CC E		1		П	_	1
-	66.5		NR/		╀┤	No Recovery 66.45-66.5'	-
-			3	66.7, 67.5, 68.2, 68.5, 70.2, 70.3, 70.55' -	ш	-	-
_				Mechanical break or bedding plane (7), <10 deg, rough, undulating, <1/4" openings	H	_]
			2	67.3' - Fracture, 70 deg and vertical, rough,			
]			_	stepped to undulating, tight	Щ		Driller's Remark: Slight
-	R5-NQ				Ш	_	fluid loss in zone -
					曰		
					\perp		I .

APPENDIX 2BB-6 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-01	SHEET	5	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723879.2 N, 457603.8 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, NW/HW casing

ORIENTATION : Vertical

00.1			<u> </u>	MENT: Dietrich D-30 3/N 232, mud rotary, NQ tools, NVV	,,,,,,	00.0	·9		ORIENTATION : Vertical
WATER	LEVELS: 2 f	t bgs (on 03/	15/07 START: 3/14/2007 END: 3	/21/20	07	LOGGER : R. Bitely		
				DISCONTINUITIES			LITHOLOGY		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)			DECODIDATION	SYMBOLIC LOG	\vdash		┪	
NA PER	ĭÃ≿	_	FRACTURES PER FOOT	DESCRIPTION		ı	ROCK TYPE, COLOR,		SIZE AND DEPTH OF CASING,
# # # # # # # # # # # # # # # # # # #	지 된 전 된	(%) _Q	28	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	<u>-</u>	ı	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,		FLUID LOSS, CORING RATE AND
E F S	문항	Ω Ω	R F	PLANARITY, INFILLING MATERIAL AND	₩	ı	AND ROCK MASS		SMOOTHNESS, CAVING ROD
		A Q	FIE	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	ı	CHARACTERISTICS		DROPS, TEST RESULTS, ETC.
<u> </u>	5 ft	62	0		+	-	Limestone	-	
l -	92%			00.451.5.1.00.1			66.5-71.1' - pale yellowish brown,		_
70				69.45' - Fracture, 60 deg, smooth, undulating,			(10YR 6/2), very fine to fine grained,		
-28.4			3	tight –	┺		very weak to weak (R1 to R2), voids		
-					₽		up to 3/16" over 80% of surface,		
l			1		Н		fossiliferous, trace laminated		R5: 7 minutes
-	71.5		NR			1	organics, very weak rock to weak		1
-	71.5		INIX		╨		rock at 66.5-67.0' and 70.0-71.1',		-
l _			1		ᅪ		medium strong rock (R3) at		
			'		\vdash		69.0-70.0'		
-				72.35' - Bedding plane, <10 deg, rough,	十二		No Recovery 71.1-71.5'		-
l -			5	undulating, 1/4" soil seam infill, open 1/2"	二		Limestone		_
l			•	72.6, 72.85, 72.95' - Bedding plane or	\vdash		71.5-76.3' - pale yellowish brown, (10YR 6/2), very fine to fine grained,		
I -	R6-NQ			mechanical break (3), <10 deg, rough,	1—	Ł	weak (R2) to medium strong (R3) at		1
I -	5 ft	50	2	undulating, tight 73.7' - Mechanical break or bedding plane,		ŀ	71.5-72.3', 72.7-73.7', and 74.2-74.7'		-
Ι.	96%			15 deg, rough, undulating, open 1/4"	\perp		with voids (<3/16") over 80% of		
75				74.1' - Mechanical break or bedding plane,	-		surface; extremely weak (R0) to very		7
-33.4			3	horizontal, smooth, undulating, 1/4" infill,	┰		weak (R1) at 72.3-72.7' and		_
-				open 1/4"	┸	1	73.7-74.2' with voids (<3/16") over		
l			5	74.8-75.2 and 75.5-76.0' - Clay seams (2),		1	30% of surface; extremely weak (R0)		R6: 7 minutes
-	70.5			smooth, undulating, extremely weak rock	╨		to very weak (R1) interbeds from		1
-	76.5		NR	(R0) zones	+		74.7-76.0'; all fossiliferous		-
Ι.			2				No Recovery 76.3-76.5' Limestone		_
l			-	77.0, 77.3' - Fractures (2), 60 deg and 50-90			76.5-79.5' - moderate yellowish		
-				deg, rough, stepped to undulating, tight	╁	╁	brown to very light gray, (10YR 5/4 to		1
-			3	77.95, 78.15, 78.3' - Fractures (3), <10 deg,	╨		N8), very fine to fine grained, weak to		
l				rough, stepped to undulating, tight	т		medium strong (R2 to R3), except		03/20/2007 set NW casing
-	R7-NQ			78.65-79.0' - Fracture zone, rough, stepped			extremely weak (R0) to very weak		to 80' to free NQ tooling -
-	5 ft	28	>10	to undulating, dissolution zone, angular to	╨	╂	(R1) rock at 78.1-78.3' and		03/21/2007 continue rock
Ι.	77%			subangular gravel-sized fragments <1"		L	79.5-79.85'; 76.5-78.3' and	Д	coring from 81.5' below –
80			10	diameter	141		79.85-80.35' - 80% voids <3/16",	Н	ground surface, 100%
-38.4			10	79.2' - Fracture, vertical, smooth, undulating,	╨		fossiliferous (molds, casts);	Ш	circulation with NW casing
-				tight	╁┰	╂╢	78.3-79.0' - >90% voids <3/16",	Ш	at 80' below ground -
l _			NR	79.35, 79.5' - Fractures (2), rough,		1 \	30-40% cavities up to 1/2"x1/4", highly fractured zone;	Ш	surface
	81.5			undulating, silt and/or clay sized infilling, tight	ш	1 1	79.0-79.5' - <20% voids <3/16",	П	R7: 10 minutes
-	01.5			79.5-79.65' - Clay seam, 4-1/2" silt and/or	╆	+ 1	medium strong rock (R3)		-
I -			>10	clay sized infilling, Elastic Silt (MH) to Lean Clay (CL), moderate plasticity, low dilatancy,	╀		Lean Clay - Elastic Silt (CL-ML)		_
			L	strong HCl reaction	Ш	1	79.5-79.85' - medium plasticity, slow		
I -				79.85' - Bedding plane, smooth, undulating,	1—		dilatancy, strong HCl reaction		1
1 -			0	tight	╂┴		No Recovery 80.35-81.5'		-
l -	_			81.5-81.7' - Fracture zone, rough, undulating,	-		Limestone		_
I	R8-NQ			gravel sized fragments <1/2" diameter,			81.5-86.0' - pale yellowish brown to		
1 -	5 ft	76	1	angular to subangular	╨	╁	moderate yellowish brown, (10YR 6/2		1
-	90%			82.25' - Fracture, 0-40 deg, rough,	+		to 10YR 5/4), very fine to fine		-
85			_10	undulating, open <1"	ᅪ		grained, mild to moderate HCI		
-43.4			>10	83.6' - Bedding plane, <10 deg, rough,	\perp		reaction, weak to medium strong (R2		SC-1 collected at 84.95-
-				undulating, tight	 		to R3), voids (<3/16") over 60-80% of		86.0'
l -			0	84.0' - Mechanical break 84.65-84.8' - Fracture zone, horizontal and	ᅪᆣ		surface at 81.5-83.0' and 84.5-86.0', fossiliferous (molds <1/2"x1/4"),		R8: 9 minutes
	86.5		NR	20 deg, rough, undulating, fragmented rock,	\vdash		dissolution cavities up to 2"x1/2" at		
1 -				angular gravel sized fragments <1"diameter,	亡		82.3', 84.65-84.8', 84.9-85.15' and		-
I -			>10	open <2"	┯		85.6-86.65'		-
			L	84.95' - Mechanical break, rough, undulating,	\bot	Ł			
Ι -				open <1/2"	7	ſ			1
-			0	86.75-86.95' - Fracture zone, rough,	\Box	1			-
I -				undulating, angular gravel sized fragments	 	1			_
I	R9-NQ			<1-1/2" diameter, 2-1/2" open	\vdash	1			
					1	t		T	
I					1				
				I .		_			

APPENDIX 2BB-7 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-01	SHEET	6	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723879.2 N, 457603.8 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, NW/HW casing

ORIENTATION: Vertical

				PENT . Dietrich D-30 3/N 232, mud rotary, NQ tools, NVV			
WATER	LEVELS: 2 ft	bgs (on 03/	15/07 START : 3/14/2007 END : 3/	21/20	07 LOGGER : R. Bitely	
				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOCK TYPE COLOR	
	R.Y.Y.		FRACTURES PER FOOT	DECOMM HON	으	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
ASE		(%) Q	Į₽ĕ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ď	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
무주의		Ø	AC R	PLANARITY, INFILLING MATERIAL AND	Ĭ₩	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
20 E		ď	FH	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Š	CHARACTERISTICS	BROLO, TEOL MEGGETO, ETG.
	5 ft	80	1	89.0' - Bedding plane, <10 deg, rough,		Limestone	
-	98%			undulating, open 1/4"	┨—	 83.0-84.5' - mild to moderate HCl 	-
90			0	_	┵	reaction, mottled with zones of	
-48.4			"		Н	bioturbation having a secondary infill	
-						of a very fine, medium strong rock	R9: 11 minutes
-			2	00 05' Badding plans, barizontal amouth	+	(R3) matrix, voids (<3/16") over 30%	-
	91.5			90.95' - Bedding plane, horizontal, smooth, undulating, open <1/4"	\vdash	of surface, secondary infilling of	
1 -			NR.	91.25' - Mechanical break or bedding plane,	┰	bioturbated zone consisting of 20-30% of surface, trace fossil molds	1
-			1	15 deg, rough, undulating, tight		No Recovery 86.0-86.5'	-
l -				91.6' - Bedding plane, horizontal, smooth,	<u> </u>	- Limestone	_
				undulating, tight	\vdash	86.5-87.05' - moderate yellowish	
1 -			0	92.9' - Mechanical break	\top	brown to very light gray, (10YR 4/2 to	
1 -	B				亡	 N8), very fine to fine grained, 	-
	R10-NQ	82	3	02.95.02.05! Erecture ==== *****	ш	extremely weak to very weak (R0 to	
1	5 ft 98%	02		93.85-93.95' - Fracture zone, rough, undulating, 3 fractures, open <1-1/2"	\vdash	R1), grayish blue mottling (5PB 5/2),]
-	30 /0		\vdash	undulating, 5 fractures, Open < 1-1/2	+	voids (3/16") over 60-80% of surface	-
95			1 1	_	\perp	from 84.5-86.0' and fossiliferous with	
-53.4			'	05 01 Franking 75 da "	H	trace organics 87.05-89.15' - Same as 86.5-87.05'	
-				95.3' - Fracture, 75 deg, smooth, undulating,	╨	except very light gray (N8) and	R10: 16 minutes
-			4	tight 95.85-95.9' - Clay seam, horizontal, smooth,	╂	grayish blue (5PB 5/2) mottling, voids	-
	96.5			undulating, 3/4" clay infilling, Fat Clay (CH),		(3/16") over 50-60% of surface,	
			NR.	medium gray (N5), moist, soft, high plasticity	\perp	fossiliferous (microfossils)	
-			1	96.05, 96.35' - Mechanical break or bedding	╂┯	89.15-90.7' - fine grained, very weak	-
l _				plane (2), <10 deg, rough, undulating, tight		(R1), voids (<3/16") over 30-50% of	_
				96.85, 97.55' - Bedding plane, <10 deg,		surface, moderately fossiliferous	
-			2	rough, undulating, tight		90.7-91.4' - Same as 86.5-87.05'	SC-2 collected at 98.05-
-				97.05, 99.0, 99.75, 101.05, 101.4' -	╀	except no mottling	99.0'
l .	R11-NQ 5 ft	98	0	Mechanical break (5)	┸	No Recovery 91.4-91.5' Limestone]
	100%	90	"	98.0' - smooth, undulating, <1/2" silt and/or		91.5-96.4' - moderate yellowish	
	1 .00,0			clay sized infilling	╨	brown to yellowish gray, (10YR 5/4 to	-
100_			0	_	╂┯	— 5Y 7/2), very fine to fine grained,	
-58.4					L^{L}	extremely weak to weak (R0 to R2)	
1 -]					91.55-91.85' - fine grained, verv	R11: 8 minutes
-			0		╁	weak (R1), voids (<3/16") over	-
1 -	101.5				╨	30-50% of surface, fossiliferous	
			.	101.55, 102.65, 103.75' - Bedding plane or		91.85-94.6' - moderate HCl reaction,	
-			1	fractures (3), horizontal, smooth, undulating,	亡	- voids (<3/16") over 60-80% of	1
-			\vdash	tight	\perp	surface, moderately fossiliferous	-
			4		\vdash	(molds up to 1/2" x 1/4"), few cavities < 1/2" diameter, trace organics	
1 -			1		Т'	94.6-96.4' - strong HCl reaction,]
1 -	l R12-NQ		\vdash		仜	gradual transition to >30% voids up	-
1 -	5 ft	86	1 1	l	╀	to 1/16", 1/4" diameter cavity with	
	96%	00		104.0, 104.85' - Mechanical break	\vdash	medium light gray (N6) clay infill	
405				•	\top	No Recovery 96.4-96.5'	1
105_ -63.4			0	_		Limestone	-
-03.4					Ш	96.5-101.5' - yellowish gray, (5Y 7/2),	
1 -			-40	105.5-105.6' - Fracture zone, rough,	\vdash	very fine to fine grained, strong HCI	R12: 3 minutes
-			>10	undulating, gravel sized fragments, <1"	ᡛ	reaction, extremely weak to very	-
1 -	106.5		NR,	diameter	ш	weak (R0 to R1), voids (<3/16") over 70-80% of surface, moderately	-
					\vdash	fossiliferous (molds <1/2"x1/4"), trace	
1 -	1		0		╨	organics; 1/2" silt seam at 98.0', slow	1
1 -			\vdash		\Box	to fast dilatancy, low plasticity,	-
1 -			1		\Box	_ carbonate material	
			'		\vdash		
-	R13-NQ			•	┰	<u> </u>	1
-			\vdash		广		
					1		
L	1						

APPENDIX 2BB-8 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-01	SHEET	7	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723879.2 N, 457603.8 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, NW/HW casing

ORIENTATION : Vertical

WATER	LEVELS : 2 ft	bgs o	on 03/	15/07 START : 3/14/2007 END : 3/	21/200	D7 LOGGER : R. Bitely	
≥0≘	- (i)			DISCONTINUITIES	၂ ွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) Q	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEF SUF ELE		A Q	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	5 ft 100%	70	4	108.65' - Fracture, 75 deg, smooth, undulating, tight	\square	Limestone - 101.5-106.3' - yellowish gray, (5Y	_
110 -68.4			4	109.1, 109.15, 109.25' - Fractures (3), 90, 30, 50 deg, smooth to rough, undulating,	Ш		_
-00.4				intersecting fractures from 108.7-109.5'	Ш	 weak (R0 to R1), voids (<1/16") over 	R13: 10 minutes
-	111 5		3	109.65' - Fractures, 65 deg and 70 deg, rough, undulating, tight	Ш	50% of surface, few cavities up to 1/2"x1/4", poorly to moderately	-
-	111.5			110 - Fracture, 75-85 deg, rough, undulating, tight, intersecting	Ш	 fossiliferous; 105.6-106.05' weak rock (R2) zone, voids (<3/16") over 	-
			0	110.5-110.65' - Fracture zone, 50 deg and 70 deg, rough, undulating, open <1-1/2"	Ш	70% of surface, moderately fossiliferous, moderate HCl reaction	
_			0	deg, rough, undulating, open 41 1/2	Н	at 105.6-106.05'	_
-	R14-NQ			113.35, 114.0, 114.2, 115.2, 116.25, 116.5' -	H	No Recovery 106.3-106.5' Limestone	-
-	5 ft 100%	100	0	Mechanical break (6)	H	106.5-111.5' - moderate yellowish brown to yellowish gray, (10YR 5/4 to	SC-3 collected at 114.2-
115	100%				Ħ	 5Y 7/2), very fine to fine grained, strong HCl reaction, very weak (R1), 	115.2' -
-73.4			0	_	Ħ	voids (<3/16") over 60-80% of surface, moderately to highly	_
			0	_	H	fossiliferous (molds <1/4" diameter) concentrated at 106.5-107.7' and	R14: 7 minutes
-	116.5			<u>.</u>	H	_ 110.0-110.3', surface iron staining at	_
-			1	116.6' - Bedding plane, horizontal, smooth, undulating, tight	H	106.8', 107.8' and 109.5' 111.5-116.5' - yellowish gray, (5Y	-
-					Ħ	_ 7/2), very fine to fine grained, strong HCl reaction, very weak (R1), 40%	-
-			0		\Box	voids to <1/16", poorly to moderately fossiliferous (molds <1/16"), iron	-
	R15-NQ 5 ft	92	0	118.85, 119.85' - Mechanical break (2)	\mathbb{H}	staining at 113.8', 114.6' and 115.7' 116.5-119.0' - yellowish gray, (5Y	
-	97%		_		H	7/2), very fine to fine grained, strong HCl reaction, very weak to weak (R1	_
120 -78.4			0	_	団	— to R2), voids (<3/16") over 60% of	_
-			_	120.5-120.6' - Fracture zone, 25 deg and	Ш	surface, poorly to moderately fossiliferous (molds <1/2"x1/4")	R15: 9 minutes
-	121.5		2 NR	horizontal, rough, undulating, intersecting, open <1"	Ш	- 119.0-121.35' - Same as 116.5-119.0' except 80% voids up to	-
			1	121.9' - Bedding plane, horizontal, smooth,	耳	3/16", few cavities up to 1/2" diameter, highly fossiliferous (molds	
-				undulating, tight	H	<1/2") No Recovery 121.35-121.5'	-
-			0		団	- Limestone	-
-	R16-NQ				囯	121.5-122.65' - Same as 119.0-121.35'	-
	5 ft 100%	84	0	-	囯	 122.65-124.0' - pale yellowish brown, (10YR 6/2), very fine to fine grained,]
125_			0	_	\square	very weak (R1), voids (<1/16") over >50% of surface, poorly fossiliferous]
-83.4					oxplus	(molds up to 1/4" diameter), few cavities up to 1/2"x1/4"	R16: 6 minutes
-	100 5		>10	125.75-126.5' - Fracture zone, rough, undulating, gravel sized fragments <3"x1-1/2"	⊞	124.0-126.5' - Same as 122.65-124.0' except voids up to	TATO. O Milliotes
-	126.5			anddialing, graver sized fragments 50 x1-1/2	⊞	3/16" over 60-80% of surface,	-
1			2		\parallel	extremely weak rock (R0), highly fossiliferous below 125.75', friable	-
			1	plane, horizontal, smooth, undulating, tight	H	-]
-	D47 NO				H	-	_
	R17-NQ			128.7, 129.0' - Mechanical break (2)	\boxminus		

APPENDIX 2BB-9 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-01 SHEET 8 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723879.2 N, 457603.8 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, NW/HW casing

CORING	IVIL IT IOD A	ND L	ZUIFIV	IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, NW	/ 🗆 🗸 🗸	casing	ORIENTATION : Vertical
WATER	LEVELS: 2 f	t bgs	on 03/	15/07 START: 3/14/2007 END: 3	/21/20	07 LOGGER : R. Bitely	
				DISCONTINUITIES	(B	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		(n	DESCRIPTION	100		
O A A	Z Z Z	<u></u>	FRACTURES PER FOOT	DEGGINI HON	<u> </u>	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
H H H H	E E E	Q D (%)	L D D	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
민류년	N N N N N N N N N N N N N N N N N N N	Ø	ZAC ER	PLANARITY, INFILLING MATERIAL AND	ΙΞ	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
		œ	H H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	လ်	CHARACTERISTICS	1 1, 1 1, 1
	5 ft	87	0		Ш	Limestone	
-	100%				╁	- 126.5-131.5' - yellowish gray, (5Y	-
130 <u></u> -88.4			0	_		7/2), very fine to fine grained, strong HCl reaction, very weak to weak (R1	
-00.4					\perp	to R2), voids (<3/16") over 60% of	_
					\vdash	surface, poorly to moderately	R17: 5 minutes
1 -	101 E		1			fossiliferous, few cavities <1/2"	-
-	131.5				╨	- diameter, trace secondary infill of	-
-			0		╁┰	cavities, laminated bedding at 127.2',	-
l _						127.85' and 128.95' 131.5-136.5' - yellowish gray, (5Y	
1 -					\vdash	7/2), very fine to fine grained, very	SC-4 collected at 133.05-
I -			0	133.05, 134.0, 135.2' - Mechanical break (3)	+	weak to medium strong (R1 to R3),	134.0'
1 -	R18-NQ		\vdash		亡	- 131.5-132.95' - voids <3/16" over	-
-	5 ft	100	0		╨	40% of surface, poorly fossiliferous	-
1	100%	.50				. (molds <1/2" diameter); - 132.95-136.5' - voids up to 3/16" over	
135					1	70% of surface, highly fossiliferous	
-93.4			0	-	┰	(molds <1/2"), molds over 30-50%	_
-					一	_ surface	D19: 10 minutos
I -			0		ᅪ	_	R18: 10 minutes
1	136.5				H	1	
_					П	136.5-141.2' - yellowish gray to light	_
-			1		╁	 olive gray, (5Y 7/2 to 5Y 5/2), very 	-
-				407 EL Dadding glass basic stal assett	-E	fine to fine grained, strong HCl	-
I -			2	137.5' - Bedding plane, horizontal, smooth, undulating, tight	щ	reaction, very weak to medium strong (R1 to R3), laminated	_
			-	138.05, 138.45, 138.6' - Bedding plane, <10	Н	bedding, 30-60% voids up to 3/16",	
1 -	R19-NQ			deg, rough, undulating, tight		poorly to moderately fossiliferous	-
-	5 ft	86	1		╁	- (molds <1/2"x1/4"), surface iron	-
-	94%				-	staining at 136.7', 137.7', 138.2', 139.1' and 140.5', laminated	-
140_			0	_	┵	— throughout	
-98.4					\vdash	1	
-			>10		ш	Ī	R19: 8 minutes
-			>10	140.9-141.2' - Fracture zone, rough,	╁	 	-
-	141.5		NR	undulating, gravel sized fragments <2"	╨	No Recovery 141.2-141.5'	-
I -			>10	diameter	\perp	Limestone 141.5-145.0' - moderate yellowish	_
				141.6-142.0' - Bedding plane (>10), <10 deg, smooth to rough, undulating, open <1/4"	\vdash	brown to yellowish gray, (10YR 5/4 to	
1 -				142.0-142.65' - Fracture zone, rough,	亡	5Y 7/2), very fine to fine grained,	_
-			>10	undulating, angular gravel-sized fragments	╨	- 141.5-142.0' - moderate yellowish	-
-	D00 N0			<1-1/2" diameter	-	brown, very weak to weak rock	-
I -	R20-NQ 5 ft		4	142.9, 143.3, 143.65, 144.15, 144.25, 144.5, 144.7' - Fractures (8), <10 deg, rough,	二	(R1-R2), voids (<3/16") over 70% of surface, moderately fossiliferous,	_
1	70%	20	~	undulating, <1/2" openings	\vdash	trace organics, trace laminated	
145			>10		世	bedding;	Core barrel melf resting
-103.4				144.7-145.0' - Fracture zone, rough, _ undulating	╁	— 142.0-145.0' - voids up to 3/16" over	Core barrel malfunction from 144.7-145.0' due to
-			l l	andalating	┲	50% of surface, medium strong rock	rock fragments wedged in
I -			NR		\Box	(R3), highly fossiliferous (molds - <1"x1/2"), cavities <1.5"x1", several	bit _
1	146.5				\vdash	cavities with secondary mineral infill,	R20: 10 minutes
1 -				146.6' - Bedding plane, <10 deg, rough,	世	heavily bioturbated	_
-			2	undulating, open <1/4"	╨	No Recovery 145.0-146.5'	-
-			\vdash	146.8, 147.8' - Bedding plane (2), horizontal,	+	 	-
I -			1	smooth, undulating, tight	阜	1	_
					\vdash	1	
1 -	R21-NQ				\Box	ſ	
					+		
1							
							1



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-01	SHEET	9	OF	9	

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723879.2 N, 457603.8 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, NW/HW casing

				NEIVI : Dietiich D-30 3/14 232, maa rotary, 149 tools, 1444		-		ORIENTATION: Vertical
WATER	LEVELS: 2 f	t bgs	on 03/		/21/20	007	· · · · · · · · · · · · · · · · · · ·	
>	<u> </u>			DISCONTINUITIES	U		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	F00	Γ	ROCK TYPE, COLOR,	
뿝병흔	NH, H, H	(%	I R P		1	ı	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
F X X	SGT S	(%) Q	P	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	l BG	П	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	요심원	a Q	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC	П	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	5 ft	80	1	148.95' - Bedding plane, horizontal, rough,	+	┿	Limestone	_
_	86%			undulating, open <1/4"		1	146.5-150.8' - moderate yellowish	_
150			0	_	ш	Ł	brown to yellowish gray, (10YR 5/4 to	
-108.4			"		Н	Т	5Y 7/2), very fine to fine grained, mild	
-			0			1	to moderate HCl reaction, laminated	R21: 13 minutes
-			NR		₩	╁	bedding, 146.5-148.9' - weak to medium strong rock (R2-R3), voids	-
-	151.5		IVIX		上	╁.	(<3/16") over 30% of surface, voids	_
l _			1	151 95' Dodding plane herizontal rough	ᅪ	Ł	increase to 80% from 148.3-148.9'	SC-5 collected 151.85-
			'	151.85' - Bedding plane, horizontal, rough, undulating, tight	\vdash	1	148.9-150.8' - very weak rock (R1),	152.8'
-				directing, tight	ш	1	voids (up to 3/16") over 60% of surface, moderately fossiliferous	-
-			1		╁	╁	(casts) concentrated at 148.9-150.0	-
-				152 45 152 55! Clay soom or hadding		4	No Recovery 150.8-151.5'	_
	R22-NQ	92	0	153.45-153.55' - Clay seam or bedding plane, horizontal, smooth, undulating, 5/8" silt	╨	1	Limestone	
	5 ft 100%	92	"	and/or clay sized infilling, tight	Ъ	ſ	151.5-153.45' - Same as	1
455				3, 3	\Box	1	148.9-150.8' except very weak (R1)	
155_ -113.4			0	_	₩	╀	Silty Sand (SM) 153.45-153.55' - wet, loose, silt has	
-110.4					上	1	rapid dilatancy, 50% fine to medium	
			ا ا	155.65, 156.35' - Bedding plane (2), <10 deg,		4	grained sand, calcareous, 1/4" thick	R22: 14 minutes
-	156.5		2	smooth, undulating, tight	╨	┨	lense	
-	130.3				世	1	Limestone	-
-			3	156.7, 156.8, 156.9' - Bedding plane (3), <10	╁	╁	153.55-156.5' - pale yellowish brown	-
l _				deg, smooth, undulating, tight	╨	╁	to yellowish gray, (10YR 6/2 to 5Y 7/2), very fine to fine grained,	_
					Ш	1	moderate to strong HCl reaction,	
-			0		1—	╌	medium strong (R3), 50-70% voids	1
-	R23-NQ			158.35, 158.6, 159.7' - Mechanical break (3)	亡	1	up to 3/16", poorly to moderately	-
-	5 ft	92	0		╨	╀	fossiliferous, laminated bedding concentrated at 155.0-156.5', few	_
I .	100%				┰	╁	cavities <1/2"x1/4", 1 large	_
160						1	(3/4"x1/2") cavity at 156.4'	
-118.4			0	_	╨	╀	156.5-161.5' - pale yellowish brown,	
-					世	1	(10YR 6/2), very fine to fine grained,	R23: 7 minutes
-			1	160.65' - Bedding plane, <10 deg, smooth, undulating, tight	-	₽	moderate to strong HCl reaction, weak to very weak (R2 to R1), 60%	-
l _	161.5			undulating, tight	\perp	┺	voids up to 3/16", moderately	Water level at 5' below
1							fossiliferous (molds 3/4"x1/2"	ground surface on
1 -	1				1	r	diameter), trace organics, trace	\3/21/2007 at 18:30
-					1	F	secondary infill and silt-sized	
-					4	F	carbonate material at 158.35-158.5' and 160.5', medium strong rock (R3)	-
I -					1	L	lense at 158.7-159.7', laminated	
					1		bedding at 156.5-156.9' and	
_					1	r	160.5-160.9'	1
-					1	F	Bottom of Boring at 161.5 ft bgs on	
-				_	4	⊩	_ 3/21/2007	_
l _					J	L		
					1	Ī]
1 -	1				1	t		1
-					1	F		-
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-02	SHEET	1	OF	13	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723946.2 N, 457608.0 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ and NWJ rods, 6 tri-cone bit ORIENTATION : Vertical

					50 S/N 252, Illud Totary, Catriead, AWJ and NWJ Tods, 6 til-cone bit ORIENTATION . Vertical
WATER	LEVELS	: 1.5 ft b	gs on 03/2	22/07 S	START : 3/22/2007 END : 4/5/2007 LOGGER : R. Bitely
< D =				STANDARD PENETRATION	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
ACE ATIO		RECOVE	ERY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
EV,			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
				(N)	
41.6	0.0			2-2-4	Poorly Graded Sand With Organics (SP) Water level is based on Ground Water
I _		1.1	SS-1	(6)	\fine grained, no HCl reaction, sand is silica, trace \ \ \ 2.4.12.08)"
	1.5			. ,	\(\begin{align*} \nonplastic fines, 20% fine organics \\ \nonplastic fines, 20% fine \\ \nonplastic fines, 20% fines \\ \nonplastic fi
					Poorly Graded Sand (SP) SS-1 collected with hammer only, hammer SS-1 collected with hammer only, hammer stem is AWJ rod, NWJ used below SS-1
					fine to fine grained, sand is silica, trace nonplastic / 6" tri-cone roller bit used with mud rotary to
-					fines, 10% organics and roots open bore hole, rapid drilling from 0-10' below ground surface
-					
-					† †
-					† †
	5.0				
5 36.6	5.0				Silty Sand (SM)
-		0.9	SS-2	3-4-7	5.0-5.9' - light olive gray, (5Y 6/1), wet to moist,
-		0.9	33-2	(11)	medium dense, slow dilatancy, no HCl reaction, fine sand, 22% low plasticity fines
-	6.5				-
-					
-					
-					.
_					
_					<u> </u>
l _]
10	10.0				
31.6	10.3	0.3	SS-3	50/3 (50/3")	Silt With Sand (ML) Silt With Sand (ML) Extremely slow drilling rate 10.0-14.5'
				(30/3)	medium plasticity, rapid dilatancy, mild to moderate
					HCI reaction, 25% sand sized grains, trace iron-rich
-					concretions at 10.25', carbonate material with some -
-					
-					1
-					† †
-					† †
-					
	45.0				Rapid drilling 14.5-20'
15 26.6	15.0				Silt (ML)
-		1.3	SS-4	21-30-25	15.0-16.3' - moderate yellow, (5Y 7/6), wet, hard,
-		1.3	33-4	(55)	nonplastic, rapid dilatancy, moderate HCl reaction, 14% fine to medium sand sized grains, carbonate
-	16.5				derived ————————————————————————————————————
-					-
-					4
-					4
-					
-					
-					
20					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-02	SHEET	2	OF	13	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723946.2 N, 457608.0 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ and NWJ rods, 6 tri-cone bit ORIENTATION : Vertical

					5/N 232, Mud Totary, Cathead, Avv3 and Nv			ORIENTATION : Vertical
WATER	LEVELS	: 1.5 ft bo	gs on 03/2	22/07 S	ART : 3/22/2007 END : 4/5/2007	LOGGER	: R.	
				STANDARD PENETRATION	SOIL DESCRIPTION		၂ ဗွ	COMMENTS
ANI (†	SAMPLE	INTERVA	L (ft)	TEST RESULTS	SOIL NAME LISCS CROLID SYMPO	N COLOR	CLC	DEDTH OF CASING DOULING DATE
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBO MOISTURE CONTENT, RELATIVE D		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
JRF.			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, M	MINERALOGY	YME	INSTRUMENTATION
		0.4	00.5	(N)			Ś	
21.6	20.0	0.1	SS-5	50/2.5 (50/2.5")	Limestone Fragments 20.0-20.1' - grayish yellow, (5Y 8/4), m	ild HCI		-
				(00/2:0)	reaction, rock fragments to 1/2" with 60	% coverage of _		Slow drilling, trace light chatter 20-21'
					voids to 1/16"			Rapid drilling with intermittent dense zones
						_		21-35' -
-						-		1
-						_		1
-						-		
-						_		-
-						-		-
-						_		-
25 16.6	25.0	0.4	00.0	EO/E	Silt With Interbedded Limestone Lens	non (ML)		-
10.0	25.4	0.4	SS-6	50/5 (50/5")	25.0-25.4' - dark yellowish orange, (10)	yR 6/6), wet,	Ш	
_					hard, nonplastic, rapid dilatancy, mild to	o moderate		_
_					HCl reaction, limestone lenses <1/2" th	iick, voids		_
					The ever report innecessive carrace			
						_		1
-						_		1
-						-		-
-						-		-
						-		-
30 <u> </u>	30.0				Silty Sand (SM)			-
-		1.0	SS-7	15-30-50/3	30.0-31.0' - dark yellowish orange, (10'	YR 6/6), wet, -		-
_	31.3	1.0	00-7	(80/9")	very dense, fine to coarse grained, mo reaction, 49% nonplastic fines, 1" thick	derate HCI		-
-	31.3				lense at 30.4', few limestone lenses <1			-
_					interbedded throughout, carbonate der	ved		_
_						_		_
_						_		
1 7						_		1
						_		1
35	35.0					-		1
6.6	00.0			15-50/2.5	Silty Sand (SM)		Ш	Moderate to heavy chatter increasing with
-	36.0	0.8	SS-8	(65/11.5")	35.0-35.8' - Same as 30.0-31.0' except lenses <1/2" thick, no limestone lenses	a few siltier -		depth, moderate to slow drilling 35-40'
-	30.0				lenses < 1/2 thick, no innestone lenses			-
-						-		
-						-		-
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APPENDIX 2BB-13

Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	A-02	SHEET	3	OF	13	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723946.2 N, 457608.0 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ and NWJ rods, 6 tri-cone bit ORIENTATION : Vertical

DRILLIN	GIVILITI	OD AND	EQUIFIVI	ENT . DIEUICH D-:	00 3/14 232, ITIUU TOLATY,	cathead, AWJ and NWJ	Tous, 6 th-cone	DIL	ORIENTATION : Vertical
WATER	LEVELS	: 1.5 ft bo	gs on 03/2	22/07	START : 3/22/2007	END : 4/5/2007	LOGGE	R : F	1
200				STANDARD		SOIL DESCRIPTION		_	COMMENTS
A A N	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COU NAME I	ICCC CDOLID CVMDOL	001.00		DEDTIL OF CACING DOULING DATE
A S S S S S S S S S S S S S S S S S S S		RECOVE	ERY (ft)		MOISTURE CO	USCS GROUP SYMBOL, ONTENT, RELATIVE DEN	NSITY OR	<u></u>	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6"		, SOIL STRUCTURE, MIN		SYMBOLICLOG	INSTRUMENTATION
当の回 1.6	40.0	0.1	\ SS-9 /	(N) 50/1	Limentone France			Ů.	
1.0	40.0	/	33-9	(50/1")	Limestone Fragm 40.0-40.1' - yellow	vish gray to light olive gr	ray, (5Y 7/2	/-	Drilling stops at 17:30 on 03/22/2007 Water/mud level 0.5' below ground surface
_					\to 5Y 5/2), modera	ate to mild HCI reaction	i, fragments	4	at 07:30, 3/23/07
_					<1-1/2" x 1/2" in s	ize		1	Continue drilling from 40' with mud rotary
_								1	NWJ rod and 6" tri-cone bit at 08:00 on 03/23/2007
_								1	Extremely slow drilling, light to moderate
									chatter 40-44'
								1	44.0-45.0' Drill rate increases slightly 40-44'
45	45.0							1	1
-3.4					Sandy Silt (ML)	dive error (EV 510)	band		Rapid drill rate 45-55'
1 1		1.3	SS-10	37-50-48 (98)	45.0-46.3" - light o	olive gray, (5Y 5/2), wet, dilatancy, mild to moder	, naro, rate HCl	111	1
-	46.5			(90)	reaction, 48% fine	to coarse grained sand	d	ДЦ	1
-	10.0							1	1
-								1	1
-								1	1
-								1	1
-								1	1
-								1	1
50	50.0							1	1
-8.4	30.0				Sandy Silt With G	Gravel (ML)		П	
-		1.3	SS-11	12-24-30	50.0-51.3' - model	rate olive brown, (5Y 4/dilatancy, moderate to s	4), wet, hard,	111	1
-	51.5			(54)	reaction, 30% san	nd sized grains, 20% gra	avel sized	Щ	Ц – 1
-	01.0				grains, few extrem	nely weak (R0) rock limes, carbonate derived	estone	/ 🕇	1
-					(1011000 172 111011	, 50.55.10.15 05.1750	/	1	1
-								1	1
-								1	1
-								1	1
-								1	1
_{FF} -	EE ^							1	1
55 <u> </u>	55.0			50-50/3	Sandy Silt With G	Gravel And Limestone	(ML)	+	HW casing set to 55', clean out casing with
-	55.8	0.8	SS-12	(100/9")	-∖ 55.0-55.5' - Same	as 50.0-51.3' except m	nodérate	∕∰	3-7/8" tri-cone to 56'
-					\ <1-1/2" x 1/2" thic	(10YR 5/4), limestone fr k	ayments	H	Rock coring begins at 56.5', no sampling
-					Silt (ML)		10) (D. E.(; ;	Н	from 56.0-56.5'
-					55.5-55.8' - moder	rate yellowish brown, (1 stic, rapid dilatancy, mo	IUYR 5/4), iderate to	1-1	-
-					strong HCI reaction	on, 10-15% very fine to		+	1
-					sized grains, carb Begin Rock Corin			+	1
-						et for the rock core log		+	-
-						ŭ		+	-
-								+	-
60							-	+	_



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-02	SHEET	4	OF	13	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723946.2 N, 457608.0 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

	LEVELS : 1.5			3/22/07 START: 3/22/2007 END: 4/		7 LOGGER : R. Bitely	
≥∩ ∷	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
_	56.5		1	F7.41 Freehore 00 des errecht verhaletien	Ħ	Limestone - 56.5-60.8' - pale yellowish brown to	-
-			1	57.1' - Fracture, 30 deg, smooth, undulating, <1/4" open	崫	moderate yellowish brown, (10YR 6/2 to 10YR 5/4), very fine to fine grained, mild to moderate HCl	1
-	R1-NQ 5 ft	74	2	58.35, 58.5, 58.75' - Fractures (3), <10 deg, rough, undulating, <1/4" open		reaction, very weak to medium strong (R1 to R3), voids (<3/16") over 70% of rock surface from	
60_	86%		2	58.95' - Mechanical break 59.85' - Fracture (2), 60 deg and 30 deg,		56.5-58.2', voids (<3/16") variable from trace to 50% of rock surface from 58.2-60.8', trace organics,	
-18.4			0	smooth, undulating, intersecting fractures	Ħ	moderately fossiliferous, few molds/casts <1/4", many molds/casts < 3/16"	R1: 13 minutes
-	61.5		NR 2	61.7' - Fracture, <10 deg, rough, undulating,	H	56.5-58.2; 58.9-60.5' - weak to medium strong (R2 to R3) 58.2-58.9; 60.5-60.8' - very weak	-
-				<1/2" open 62.1' - Fracture, 15 deg, rough, undulating, <1" open	H	(R1) No Recovery 60.8-61.5' Limestone	-
-	R2-NQ		>10	62.6' - Fracture, 70 deg, smooth, undulating, tight 62.9' - Fracture, <10 deg, rough, undulating,		61.5-66.0' - moderate HCl reaction, extremely weak to medium strong (R0 to R3), trace organics	-
65	5 ft 90%	76	1	<1-1/2" open 63.7' - Fracture, <10 deg, rough, undulating, <1" open		throughout, organic lense at 62.9' <1-1/2" thick (laminated), voids (<3/16") over 70% of surface from	-
-23.4			0	64.0, 64.5' - Mechanical break (2) 64.7' - Fracture, <10 deg, rough, undulating, tight		61.7-63.7', voids (<1/16") over 20% of surface from 63.7-66.0', moderately fossiliferous with molds	R2: 11 minutes
-	66.5		NR	65.35' - Fracture, <10 deg, smooth, undulating, tight	Ħ	<3/16", few cavities (1" x 1/2") 61.5-61.7; 62.9-63.7' - extremely]
-			0			weak to very weak (R0 to R1) 61.7-62.9; 64.2-66.0' - weak to medium strong (R2 to R3)	
-	R3-NQ		0	67.8, 68.9, 70.8, 71.25' - Mechanical break (4)	Ħ	No Recovery 66.0-66.5 Limestone 66.5-71.4' - moderate yellowish]
-	5 ft 98%	98	0			brown, (10YR 5/4), very fine to fine grained, moderate HCl reaction, very weak to medium strong (R1 to R3),	
70 -28.4 -			0			trace laminated bedding, trace organics, voids (<3/16") variable for 0-50% of rock surface, poorly	R3: 12 minutes
-	71.5		0 NR		Ħ	fossiliferous 66.5-68.4, 70.0-71.5' - very weak (R1)	-
-			0			68.4-70.0' - weak to medium strong (R2 to R3) No Recovery 71.4-71.5'	
-	B. 1.1.5		0	72.85' - Fracture, 65 deg, rough, undulating, tight	H	Limestone 71.5-72.3' - pale yellowish brown to moderate yellowish brown, (10YR 6/2	SC-1 collected at 72.9- 74.0'
-	R4-NQ 5 ft 95%	84	1	74.0' - Mechanical break 74.35' - Fracture, 15 deg, smooth, undulating,		to 10YR 5/4), very fine to fine grained, moderate HCl reaction, weak to medium strong (R2 to R3),	
75_ -33.4			0	tight	Ħ	voids (<3/16") over 40-50% of rock surface, fossiliferous with molds <1/4", trace secondary infilling	
_	76.5		0			-	R4: 15 minutes

APPENDIX 2BB-15 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-02 SHEET 5 OF 13

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723946.2 N, 457608.0 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 1.5	ft bgs	s on 0	3/22/07 START : 3/22/2007 END : 4/	5/200	7 LOGGER : R. Bitely	
≥0₽	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - 80 -38.4 -	R5-NQ 5 ft 100% 81.5	60	>10 1 2 3	77.65' - Fracture zone (>5), rough, undulating, <1" open 77.85' - Fracture, 60 deg, rough, undulating, <1/2" open 78.5' - Fracture, 25 deg, smooth, undulating, tight 78.85' - Bedding plane, <10 deg, smooth, undulating, <1/4" clay infilling, tight 79.0' - Mechanical break 79.6' - Fracture, horizontal, rough, undulating, tight 80.45' - Fracture, 40 deg, rough, undulating, tight		Silt (ML) 72.3-72.8' - moist, nonplastic, rapid dilatancy Limestone 72.8-76.25' - Same as 71.5-72.3' except voids (<3/16") over up to 80% of surface No Recovery 76.25-76.5' Limestone 76.5-77.0' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), very fine to fine grained, moderate to strong HCI reaction, very weak to weak (R1 to R2), voids (<3/16") over 50% of rock surface, trace black organics	R5: 11 minutes
85 -43.4	R6-NQ 5 ft 88% 86.5	74	1 0 2 2 0 NR	80.7' - Fracture, horizontal, rough, undulating, tight 80.85' - Fractures (2), horizontal and 30 deg, intersecting, tight 81.75' - Fracture, 15 deg, rough, stepped, tight 83.5, 83.8' - Fractures (2), 15 deg, rough, undulating, to stepped, tight 84.0' - Mechanical break 84.65' - Fracture, 50 deg, rough, undulating, tight 85.15' - Fracture, horizontal, rough, undulating, <1" open		Silt (ML) 77.0-77.3' - moderate olive brown, (5Y 4/4), moist, nonplastic, firm to hard, trace lignite Limestone 77.3-78.15' - Same as 76.5-77.0' Silt (ML) 78.15-78.25' - Same as 77.0-77.3' Limestone 78.25-81.5' - Same as 76.5-77.0' except 1/4" clay lense at 78.8', medium dark gray (N4), plastic, with organics, calcareous, extremely weak to very weak (R0 to R1) from	R6: 24 minutes
	R7-NQ 5 ft 75% 91.5	56	>10 0 >10 2 NR	86.65-86.75' - Fracture zone, rough, undulating, <1-1/2" open 87.05' - Mechanical break 88.85-89.05' - Fracture zone, rough, undulating, <3" open 89.85' - Fracture, 80 deg, rough, undulating, tight 90.05' - Fracture, 55 deg, rough, undulating, <1/2" open		weak to very weak (No to K1) flotting 78.25-79.95' with trace voids and laminated bedding at 78.8' 79.5-81.5' - weak to medium strong (R2 to R3), voids (<3/16') over 50-80% of surface, few cavities (1-1/2" x 1/2"), some cavities with secondary infilling 81.5-85.9' - very pale orange to moderate yellowish brown, (10YR 8/2 to 10YR 5/4), very fine to fine grained, moderate HCI reaction, weak to medium strong (R2 to R3), voids (<3/16') covering 20-70% of surface at 81.5-83.5' and 83.8-84.9' increasing with depth, with secondary	SC-2 collected at 87.05- 87.8' -
 95 -53.4	R8-NQ 5 ft 98%	95	1 0 0 0	92.3' - Bedding plane, horizontal, rough, undulating, silt and/or clay sized infilling, <1/4" open 93.15' - Mechanical break		infilling, bioturbation accounts for 30% of surface area 83.5-83.8' - extremely weak to very weak (R0 to R1), with elastic silt laminations and organics No Recovery 85.9-86.5'	R8: 11 minutes

APPENDIX 2BB-16 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-02 SHEET 6 OF 13

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723946.2 N, 457608.0 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 1.5	ft bgs	s on 0	3/22/07 START : 3/22/2007 END : 4	/5/200	7 LOGGER : R. Bitely	
<0 €	(%)			DISCONTINUITIES	စ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-58.4	R9-NQ 5 ft 100%	100	0 0 0	96.8, 98.75, 99.0, 99.2' - Mechanical break (4)		Limestone 86.5-90.25' - moderate yellowish brown to pale yellowish brown, (10YR 5/4 to 10YR 6/2), very fine to fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), voids (<3/16') over 50-80% of rock surface, highly fossiliferous with molds (1/4" diameter), trace organics, trace laminated bedding, few cavities (<1-1/2" x 1"), extremely weak (R0) to very weak (R1) from 86.5-86.56'	Resume coring at 08:00 on 03/24/2007 - Water level at 1' below ground surface -
- - -	101.5		0 0			No Recovery 90.25-91.5' Limestone 91.5-96.4' - yellowish gray to moderate yellowish brown, (5Y 8/1 to 10YR 5/4), very fine to fine grained, moderate to strong HCI reaction, very weak to weak (R1 to R2), voids (<3/16") over 70% from 91.5-92.3'	- - - -
- 105 -63.4	R10-NQ 5 ft 98%	98	0	104.0, 106.35' - Mechanical break (2) -		and 94.7-96.4', voids (<3/16") over 10-30% of surface from 92.3-94.7'; cavities <1-1/2" x 1/2" partially infilled with silt; clay lense from 94.0-94.05' (elastic silt to fat clay, CH-MH, grayish olive (10YR 4/2), calcareous); fossiliferous especially	- - - - R10: 11 minutes
-	106.5		0 (NR) 1	106.6' - Fracture (2), vertical and horizontal, rough, undulating, <1/2" open 107.7, 108.0, 108.25' - Fractures (4),		at 94.7-96.4' No Recovery 96.4-96.5' Limestone 96.5-101.5' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), voids (<3/16") over	- - -
- - 110 -68.4	R11-NQ 5 ft 99%	42	5 4	horizontal and 80-90 deg, rough, undulating, four intersecting fractures, tight 108.65, 108.8, 108.9, 109.05, 109.15' - Fractures (>5), horizontal and 80-90 deg, rough, undulating, intersecting fractures, tight 109.6, 109.7, 109.8, 109.95, 110.1, 110.3, 110.6, 110.7' - Fractures (>8), horizontal and		50% of rock surface, trace laminated bedding, moderately to highly fossiliferous with molds <1/2", few cavities 1" x 1/2" 101.5-106.4' - Same as 96.5-101.5' except strong HCI reaction, trace organic lenses <1-1/2" x 1/4", few	Driller's Remark: 30-40% loss of circulation at 108.5' -
-	111.5		5 NR	80-90 deg, rough, undulating, intersecting fractures, tight 111.1, 111.2-111.9' - Fracture zone (2), horizontal and 75-90 deg, rough, undulating,		- cavities <3/4" x 1/2" No Recovery 106.4-106.5' Limestone 106.5-111.45' - yellowish gray, (5Y 7/2), very fine to fine grained, strong	R11: 5 minutes
- - -	R12-NQ 5 ft	68	1 >10 7	Bedding plane (17), <10 deg, rough, undulating, tight to 1/4" open 112.6, 112.7, 113.2, 113.3' - Fractures (4),		HCl reaction, extremely weak to very weak (R0 to R1), voids (<3/16") over 50-70% of rock surface, trace laminated bedding, moderately fossiliferous with molds <1/4" in diameter No Recovery 111.45-111.5'	
-115_ -73.4 -	100% 116.5		1	60-70 deg, rough, undulating, intersecting fractures, tight –	- - - - - - - -	Limestone 111.5-116.5' - Same as 106.5-111.45' except poorly to moderately fossiliferous, fossil casts/molds <1/2" x 1/4", laminated bedding over <30% of rock surface	SC-3 collected at 114.4- 115.3' R12: 5 minutes
	10.0				1		

APPENDIX 2BB-17 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-02	SHEET	7	OF	13	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723946.2 N, 457608.0 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 1.5	ft bgs	s on 0	3/22/07 START : 3/22/2007 END : 4/9	5/200	7 LOGGER : R. Bitely	
≥∩≎	(%			DISCONTINUITIES	၂ ပ္	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
SU	CO	RG	1	THICKNESS, SURFACE STAINING, AND TIGHTNESS 116.6' - Fracture, 60 deg, rough, undulating, tight	λs —	CHARACTERISTICS Limestone - 116.5-121.2' - yellowish gray, (5Y	DROPS, TEST RESULTS, ETC.
- - - -	R13-NQ 5 ft 94%	82	1	118.05' - Bedding plane, horizontal, rough, undulating, <1/4" open		7/2), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids (<3/16") over 30-70% of rock surface increasing with depth, moderate to highly fossill ferous increasing with depth, fossil molds/casts <1/2" in diameter,	- - - -
120 -78.4 -	121.5		2 >10 NR	120.0' - Fracture, 75 deg, rough, undulating, <1/4" open 121.0-121.3' - Fracture zone, rough,		several cavities (<1-1/2" x 1/2"), trace secondary infilling and organics No Recovery 121.2-121.5'	R13: 5 minutes -
- - -			1 10	undulating, <1-1/2" angular gravel sized rock fragments 121.8' - Fracture, horizontal, rough, undulating, <1/2" open 122.55, 122.65, 122.8, 122.9, 123.05' - Bedding plane (5), <10 deg, smooth, undulating, tight to 1/4" open		Limestone 121.5-123.0' - yellowish gray to pale yellowish brown, (5Y 7/2 to 10YR 6/2), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids (<3/16") over 30-50% of	Possible loss of circulation, 100% loss of circulation as - R14 proceeded -
125 -83.4	R14-NQ 5 ft 96%	82	0 0	122.65, 122.95' - Fractures (2), 80 deg and vertical, rough, undulating, tight 123.85, 124.5, 124.7' - Mechanical break (3)		rock surface, laminated bedding over 20% of surface from 123.0-125.0' with trace secondary infilling and poorly fossiliferous 123.0-125.0' - Same as 121.5-123.0' except granular texture up to medium grained, very fossiliferous, fossil	- - - R14: 10 minutes
- - -	126.5		1 NR 1	undulating, tight 127.0' - Fracture, 60 deg, rough, undulating, tight 127.7' - Bedding plane, 15 deg, smooth,		- casts/molds <1' x 1/2" 125.0-126.3' - Same as 121.5-123.0' No Recovery 126.3-126.5' - Limestone 126.5-131.5' - yellowish gray, (5Y 7/2), very fine to fine grained, strong - HCl reaction, very weak to weak (R1	-
- 130 -88.4	R15-NQ 5 ft 100%	100	0	undulating, tight, possible mechanical break		to R2), laminated bedding from 127.35-127.7', voids (<3/16") over 10-40% of rock surface especially from 126.5-127.35' and 130.35-131.5', poorly to moderately fossiliferous, few fossil molds/casts	- - - -
-	131.5		0	130.35' - Fracture, horizontal, rough, undulating, <1/4" open - 131.6' - Bedding plane, rough, undulating,		<1/2" x 1/4", trace secondary infilling, trace cavities <3/4" x 1/2" - 131.5-136.5' - yellowish gray, (5Y	SC-4 collected at 130.4- 131.5' R15: 8 minutes
-	D40 NO		0	<1/2" open, possible mechanical break		 7/2), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), limestone with voids (<3/16') over 50% of rock surface interbedded with limestone having laminated bedding with trace voids 	- - -
- 135 -93.4	R16-NQ 5 ft 100%	94	0	133.6, 134.0, 136.45' - Mechanical break (3)		(<3/16"), moderate to highly fossiliferous zones, fossil molds <1/2" x 1/4", trace secondary infilling of cavities	- - -
_	136.5		2	135.15' - Fracture, 45 deg, rough, undulating, tight		-	R16: 22 minutes



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-02

SHEET 8 OF 13

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723946.2 N, 457608.0 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 1.5	ft bgs	s on 0	3/22/07 START : 3/22/2007 END : 4/5	5/200	7 LOGGER : R. Bitely	
>00	(6			DISCONTINUITIES	ŋ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-			0	135.95, 136.15' - Fracture (2), horizontal, smooth, undulating, to rough, tight		Limestone - 136.5-141.5' - yellowish gray to moderate yellowish brown, (5Y 7/2 to	-
_			6	137.55, 137.6, 137.9, 137.95, 138.0, 138.05' - Bedding plane (6), <10 deg, smooth to rough, undulating, tight to 1/4" open	H	10YR 5/4), very fine to fine grained, strong HCl reaction, very weak to weak (R1 to R2), laminated bedding	-
_	R17-NQ 5 ft 100%	90	0	139.0, 140.55, 141.45' - Mechanical break (3)		from 137.5-138.05' and - 140.2-140.65', voids (<3/16") over 0-30% of rock surface from]
140 -98.4			0	_		136.5-137.5', 138.05-140.2', and — 140.65-141.5'	_
-	141.5		0	-	Ħ		R17: 9 minutes
-			3	141.65' - Fracture, 40 deg, rough, undulating, tight 141.8' - Fracture, 50 deg, rough, undulating,		141.5-142.0' - yellowish gray to dark - yellowish brown, (5Y 7/2 to 10YR 4/2), very fine to fine grained, mild to moderate HCI reaction, medium	Water level at 1' below ground surface at 14:30 -
-	D40 NO		1	tight 142.0' - Fracture, <10 deg, rough, undulating, <1/2" open	H	strong (R3), minor infilling with medium grained and weak to medium strong (R2 to R3) limestone,	-
-	R18-NQ 5 ft 86%	54	3	142.6' - Mechanical break 143.3' - Fracture, <10 deg, rough, undulating, <1/4" open		trace voids (<3/16") 142.0-145.2' - Same as 141.5-142.0' except voids (<3/16") over 10-30% of	-
145 -103.4 -			10	143.6' - Fracture, 40 deg, rough, undulating, — tight — 144.1' - Fracture, <10 deg, rough, undulating,	Ė	rock surface, many cavities (<2" x 1") up to 40% secondary infilling with medium grained limestone, highly	— R18: 19 minutes
-	146.5		NR	tight 144.2-144.25, 144.85-144.9' - Fracture zone (2), <10 deg, rough, undulating, <1" open, subangular to angular rock fragments <1" in	Ħ	fossiliferous with molds and casts <1/2", possibly bioturbated 145.2-145.8' - Same as 141.5-142.0'	-
-			0	diameter 145.2' - Fracture, 15 deg, rough, undulating, tight		 except laminated bedding, trace voids, poorly fossiliferous No Recovery 145.8-146.5' 	-
_	R19-NQ		1	145.4' - Bedding plane, horizontal, smooth, undulating, tight 147.85, 149.0' - Mechanical break (2)	H	Limestone 146.5-151.5' - pale yellowish brown to moderate yellowish brown, (10YR	-
150	5 ft 100%	92	0	148.05' - Bedding plane, horizontal, smooth, undulating, <1/4" open		6/2 to 10YR 5/4), very fine to fine grained, moderate to strong HCl reaction, weak to medium strong (R2	-
-108.4			0	-		to R3), trace laminated bedding, trace organics, voids (<3/16") over 10% of rock surface, moderately fossiliferous with molds/casts <1" x	R19: 6 minutes
-	151.5		1	151.15' - Fracture, 60 deg, rough, undulating, possible mechanical break, 1/4" open		1/2", cavities <1/2" diameter from 1/46.5-146.6' 151.5-151.9' - pale yellowish brown]
_			0	151.9' - Bedding plane, horizontal, smooth, undulating, <1/4" open 152.0, 152.2, 152.4, 155.95' - Mechanical		to dark yellowish brown, (10YR 6/2 to 10YR 4/2), fine to medium grained, mild HCl reaction, weak (R2), trace	SC-5 collected at 152.4- 153.25'
_	R20-NQ 5 ft	83	1	break (4)		secondary infilling 151.9-154.1' - Same as 151.5-151.9' except very fine to fine grained,	=
155_ -113.4	97%	-	6	154.0' - Fracture, 70 deg, rough, undulating, tight - 154.65, 154.7, 154.8, 154.95, 155.05, 155.3' - 154.65, 154.05 and 154.65 and 1	Ħ	medium strong (R3), voids (<3/16") over 20% of rock surface, moderately to poorly fossiliferous,	
-113.4			0	Bedding plane (6), <10 deg, smooth to rough, undulating, tight to <1/4" open		-	R20: 10 minutes
	156.5				Ħ		

APPENDIX 2BB-19 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-02 SHEET 9 OF 13

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723946.2 N, 457608.0 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 1.5	ft bgs	s on 0	3/22/07 START: 3/22/2007 END: 4/	5/200	7 LOGGER : R. Bitely	
≥0≎	(%)			DISCONTINUITIES	၅	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE	E RU STH, OVEF	(%) _Q	TUR	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
LEVE THE	SORE	RQD	RAC ER I	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	016	ш	NR/		0,	Limestone	
-			1	156.85, 158.0, 160.8, 161.1' - Bedding plane	H	 154.1-154.8' - Same as 151.5-151.9' 	-
-				(4), horizontal, rough, undulating, <1/4" open	岸	except laminated bedding, voids (<3/16") over 30-50% of rock	-
-			1		廿	 surface, poorly to moderately 	-
-	R21-NQ				╁	fossiliferous Limestone	1
-	5 ft 100%	94	0	158.7, 158.55, 158.95, 159.15, 159.7' - Mechanical break (5)	╀	 154.8-155.3' - Same as 151.5-151.9' except weak to very weak (R2 to R1), 	-
160	100%				口	laminated bedding,	1
160_ -118.4			0	-	世	— 155.3-156.35' - Same as 151.9-154.1'	
-					Ш	No Recovery 156.35-156.5'	R21: 8 minutes
-	161 F		2		\vdash	 Limestone 156.5-161.5' - pale yellowish brown 	Water level is <1.5' below
-	161.5			161.6, 162.4, 163.35, 164.7, 164.85, 165.05,	广	to moderate yellowish brown, (10YR	ground surface at 17:45
-			2	165.7, 165.8, 165.85, 165.9, 166.0, 166.05,	Ħ	 6/2 to 10YR 5/4), very fine to fine grained, strong HCl reaction, voids 	Original boring A-2
-				166.1, 166.25, 166.3, 166.45' - Bedding plane (16), <10 deg, smooth, undulating, to rough	壯	(<3/16") over 40-60% of rock	completed to 161.5' and abandoned on 03/24/2007;
-			1	and planar, tight to <1/4" open	╨	 surface, trace organics, moderately to highly fossiliferous, laminated 	replacement boring offset
-	R22-NQ				F	bedding, secondary infilling of cavities over <10% of rock surface,	7' NE from original and - drilled to 161.5' with 3-7/8"
-	5 ft 100%	75	0	164.0, 164.15' - Mechanical break (2)	口	open cavities (<1/2") over 10% or	tri-cone roller bit on NWJ
165					世	rock surface 161.5-166.5' - yellowish gray, (5Y	rods, samples not collected - NW casing installed in
-123.4			3	_	Ш	7/2), very fine to fine grained, strong	replacement boring to
-					Ή	HCI reaction, very weak to weak (R1 to R2), voids (<3/16") over 20% of	161.5 on 03/29/2007, - coring begins at 161.5' on
-	166.5		>10		F	rock surface except from	04/03/2007 at 11:30 Water level is <1.5' below
			5	166.5-166.7' - Bedding plane (5), horizontal, smooth, undulating to planar, tight	片	161.5-162.4' where voids cover 20-50% of rock surface, poorly to	ground surface at 09:00 on
			5	Smooth, undulating to planar, light	片	moderately fossiliferous with fossil casts <1/4" in diameter, trace	04/03/2007 R22: 5 minutes
			>10	167.65, 167.75, 167.8, 167.9, 167.95, 168.0,		laminated bedding	
_			- 10	168.1, 168.15, 168.2, 168.25' - Bedding plane (10), horizontal, smooth, undulating, to	H	166.5-170.4' - yellowish-gray to light olive gray, (5Y 7/2 to 5Y 5/2), very	_
_	R23-NQ 5 ft	58	0	planar, tight	尸	fine to fine grained, very weak to	_
_	78%			168.25-168.35' - Fracture zone or bedding plane, smooth, undulating, to rough and	╨	medium strong (R1 to R3), strength increases with depth, trace laminated	
170 -128.4			1	planar, tight to <1/4" open, multiple bedding plane fractures with vertical intersecting	口	bedding from 166.5-168.4', voids (<3/16") trace to 30-40% of rock	
-120.4				fractures	上	 surface from 168.4-170.4', 	R23: 12 minutes
-			NR	169.0, 169.45' - Mechanical break (2) 169.55' - Fracture, <10 deg, rough,	\vdash	moderately fossiliferous with molds <3/4" x 1/4"	1323. 12 millules
-	171.5			undulating, silt and/or clay sized infilling,	╂┯	No Recovery 170.4-171.5'	-
-			4	<1/4" open, trace organic stain 171.55, 172.1, 172.2, 172.4, 173.2, 173.65,	F	Limestone 171.5-176.4' - yellowish gray, (5Y	-
-				173.85, 174.35' - Bedding plane (8), <10 deg,	#	_ 7/2), very fine to fine grained, `	-
-			1	smooth, undulating, to rough and planar, tight to <1/4" open	片	moderate HCl reaction, very weak to medium strong (R1 to R3), medium	-
-	R24-NQ			172.85, 175.35' - Mechanical break (2)	世	strong (R3) rock at 171.5-172.1', 172.2-174.5', and 174.95-176.4';	-
-	5 ft	64	4	174.1' - Fracture, 70 deg, rough, undulating,	╀	voids (<3/16") over 30-40% of rock	-
175	98%			tight	仠	 surface, poorly fossiliferous with molds <1/2" x 1/4", trace laminated 	-
-133.4			10	174.55-174.65' - Fracture zone, rough, — undulating, gravel sized fragments	ፗ	bedding	
-				174.7, 174.9' - Bedding plane (2), <10 deg,	世	-	SC-6 collected at 175.35- 176.4'
-	176.5		0	smooth, undulating to planar, tight to <1/4" open	士	-	R24: 7 minutes
	1, 0.0			•	T	_	
					L		<u> </u>

APPENDIX 2BB-20 Rev. 7



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-02

SHEET 10 OF 13

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723946.2 N, 457608.0 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS : 1.5	ft ba	s on 0	3/22/07 START : 3/22/2007 END : 4/9	5/2 <u>0</u> 07	7 LOGGER : R. Bitely	
				DISCONTINUITIES	П	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
180 -138.4	R25-NC 5 ft 86%	16	5 3 >10 10 NR >10	176.6, 179.2' - Mechanical break (2) 176.8, 177.2, 177.5, 177.7, 178.1, 178.15, 178.3, 178.75, 179.05, 179.35, 179.55, 179.6, 179.65, 179.7, 179.85, 180.15, 180.2, 180.4, 180.45, 180.5, 180.6' - Bedding plane (21), <10 deg, smooth to rough, undulating to planar, tight to <1/4" open 178.45-178.44, 180.4-180.45, 180.5-180.6' - Fracture zone (3), smooth to rough, undulating, tight to 1/2" open 181.5-181.65' - Fracture zone, rough, undulating, gravel sized fragments <1" diameter 181.7' - Fracture zone, 20 deg, rough, undulating, <1/4" open		No Recovery 176.4-176.5' Limestone 176.5-180.8' - yellowish gray to moderate yellowish brown, (5Y 7/2 to 10YR 5/4), very fine to fine grained, strong HCl reaction, very weak to medium strong (R1 to R3), voids (<3/16") over 5-30% of rock surface, poorly to moderately fossiliferous with fossil molds <1/2" diameter, trace laminations, few cavities <3/4" x 1/4"; zones of very light gray (N8), very fine grained, non-fossiliferous strong rock (R4) at 178.15-178.3' and 178.75-179.35' No Recovery 180.8-181.5' Limestone 181.5-184.8' - yellowish gray to pale yellowish brown, (5Y 7/2 to 10YR 6/2), very fine to fine grained, moderate HCl specifical versions.	R25: 19 minutes -
185 -143.4 -	R26-NQ 5 ft 90%	48	>10 1 0 NR	182.7, 182.9, 183.1, 183.4, 183.55, 183.7, 183.75, 183.8, 183.95, 184.1, 184.35' - Bedding plane (11), <10 deg, smooth, undulating, tight to <1/4" open 184.15' - Fractures, horizontal and vertical, rough, undulating, multiple intersecting fractures 185.6' - Fracture, <10 deg, rough, undulating, <1/2" open		moderate HCl reaction, weak to medium strong (R2 to R3), voids (<3/16") over 30-50% of rock surface, poorly fossiliferous with few fossil molds <1/2" x 1/4" — 184.8-186.0' - Same as 181.5-184.8' except trace organics at 184.8', voids (<3/16") over 50% of rock surface, highly fossiliferous with molds 3/4" x 1/4", large cavity at 187.75' (2-1/2" x 1-1/2")	R26: 15 minutes
190 -148.4	R27-NQ 5 ft 96%	56	2 4 0 4 >10 NR	186.6' - Fracture or mechanical break, rough, undulating, <1/2" open 187.4, 187.65, 187.95, 188.1, 188.3' - Bedding plane (5), <10 deg, smooth, undulating to planar, tight to 1/4" open 189.65, 189.85, 190.5, 190.9, 191.05' - Fractures or mechanical break (5), rough, undulating, <1/2" open 190.5, 190.6, 191.05, 191.3' - Fracture zone (4), rough, undulating, rock fragments up to 1" diameter and sand sized grains		No Recovery 186.0-186.5' Limestone 186.5-189.5' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), very fine to fine grained, moderate to strong HCI reaction, medium strong (R3), interbedded and laminated fine and very fine grained limestone, undulating bedding planes, voids (<1/16") over <20% or rock surface, poorly fossiliferous with fossil molds <1/1/2" in diameter, several cavities 1-1/2" x 1/2"	- - - - - - R27: 10 minutes
195 -153.4	R28-NC 5 ft 96%	56	2 >10 3 2 >10	191.65' - Fracture or mechanical break, <10 deg, rough, undulating, <1/4" open 192.45' - Fracture or mechanical break, 20		- 189.5-191.3' - Same as 186.5-189.5' except extremely weak to weak (R0 to R2), voids (<3/16") over 50% of rock surface, poorly to moderately fossiliferous, several cavities <1/2" No Recovery 191.3-191.5'	Stop coring at 18:00 on 04/03/2007 - Water level at 1.0' below ground surface at 18:00, 04/03/2007 R28: 5 minutes

APPENDIX 2BB-21 Rev. 7



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-02

SHEET 11 OF 13

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723946.2 N, 457608.0 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS : 1.5	ft bg	s on 0	3/22/07 START : 3/22/2007 END : 4/5	5/200	LOGGER : R. Bitely	
≥0€	- %			DISCONTINUITIES	ပ္ထ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - 200 -158.4	R29-NC 5 ft 68%	20	>10 2 >10 2 NR	195.65' - Fracture or mechanical break, 50 deg, rough, undulating, tight 196.0-196.3' - Fracture zone, rough, undulating, gravel sized fragments <1-1/2" diameter 196.5-196.65, 196.9-197.35, 198.85-199.0' - Fracture zone (3), rough, undulating, angular gravel sized fragments <1-1/2" diameter 197.9' - Fracture or mechanical break, 30 deg, rough, undulating, <1/4" open 198.4' - Fracture or mechanical break, <10 deg, rough, undulating, <1/2" open 198.6, 198.8' - Mechanical break (2) 199.25, 199.4, 199.55' - Bedding plane (3), <10 deg, smooth, planar, tight		Limestone 191.5-194.5' - moderate yellowish brown to yellowish gray, (10YR 5/4 to 5Y 8/1), very fine to fine grained, moderate HCI reaction, extremely weak to very weak (R0 to R1), interbedded with weak to medium strong (R2 to R3) rock from 192.0-193.6', voids (<3/16") over 20-30% of rock surface, cavities <2" x 3/4", poorly fossiliferous, trace secondary infilling with fine grained texture 194.5-196.3' - Same as 191.5-194.5' except medium strong (R3), voids	Core barrel sand-locked at 196.5' on 04/03/2007, core barrel freed from sandlock by over-drilling NW casing from 161.5' to 195.0' on 04/04/2007 Continue coring from 196.5 at 13:30 on 04/04/2007 R29: 7 minutes
 - - - 205 -163.4	R30-NC 5 ft 74%	10	>10 >10 >10 >10 NR	199.7' - Bedding plane, horizontal, smooth, undulating, silt and/or clay sized infilling, organic stained, poorly indurated organic silt lens, <1/4" open 201.8' - Fracture or mechanical break, 60 deg, rough, stepped to undulating, tight to <1/4" open 201.9' - Bedding plane, <10 deg, rough, undulating, <1" open 202.05' - Fracture, vertical, rough, undulating 202.2-202.4, 202.55-202.8' - Fracture zone (2), rough, undulating, gravel sized fragments <1-1/2" diameter 202.9, 203.0, 203.15, 203.35, 203.5, 203.7' - Bedding plane (6), <10 deg, smooth,		(<3/16") over 30% of rock surface, fossiliferous with molds <1/2" in diameter, strong color contact at 194.5' No Recovery 196.3-196.5' Limestone 196.5-199.0' - pale yellowish brown, (10YR 6/2), very fine to fine grained, moderate HCI reaction, extremely weak to very weak (R0 to R1), laminar interbeds of very fine to fine grained material, trace organics, poorly to moderately fossiliferous, voids (<3/16") over <20% or rock surface, dissolution cavities <1/2"	R30: 14 minutes
-108.4 -108.4 	R31-NC 5 ft 64%	40	>10 >10 1 1 NR	undulating, tight to <1/4" open 203.7-203.9, 204.35-204.7' - Fracture zone (2), rough, undulating, gravel sized fragments <2" diameter 205.0' - Fracture, 40 deg, rough, undulating, <1" open 206.8' - Fracture or mechanical break, 20 deg, rough, undulating, <1/2" open 206.95' - Fracture or mechanical break, <10 deg, rough, undulating, <1/2" open 207.35-207.55' - Fracture zone, rough, undulating, gravel sized fragments <1" diameter 207.95, 208.85' - Mechanical break (2) 208.3, 208.4' - Bedding plane (2), <10 deg, rough, undulating, <1/4" open		diameter over 20-30% of rock surface 199.0-199.9' - Same as 196.5-199.0' except very fine grained, extremely weak to medium strong (R0 to R3), trace organics as laminations, voids and fossils absent No Recovery 199.9-201.5' Limestone 201.5-204.0' - yellowish gray to pale yellowish brown, (5Y 7/2 to 10YR 6/2), very fine to fine grained, moderate HCI reaction, weak to medium strong (R2 to R3), interbedded with extremely weak to very weak (R0 to R1) limestone, 20%	R31: 7 minutes
- - - 215 -173.4	R32-NC 5 ft 34%	7	>10 >10 NR	209.1' - Fracture or mechanical break, rough.		laminated, trace orgánic laminations especially at 204', friable, voids (<3/16") over 10% of rock surface, few consolidated seams up to 1/2" thick with 50% voids, poorly fossiliferous with molds <1/2" diameter 204.0-205.2' - Same as 201.5-204.0' except voids (<3/16") over 10% of rock surface, moderately fossiliferous with molds <1/4" in diameter, few cavities with secondary infilling 1" x 1/2" No Recovery 205.2-206.5'	R32: 11 minutes

APPENDIX 2BB-22 Rev. 7



PROJECT NUMBER:

33884.FL BORING NUMBER:

A-02 SHEET 12 OF 13

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723946.2 N, 457608.0 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS : 1.5	ft bgs	s on 0	3/22/07 START : 3/22/2007 END : 4/	5/200	7 LOGGER : R. Bitely	
				DISCONTINUITIES	O	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-			>10	216.7, 216.9' - Bedding plane (2), <10 deg, smooth, undulating, to rough, tight to <1/4" open 216.9-218.2' - Fracture zone, rough, undulating, gravel sized fragments <2"		Limestone - 206.5-207.0' - yellowish gray, (5Y 8/1), very fine to fine grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), with	Formation collapsing on core barrel at 216.5', - advance NW casing to 209' -
- 220 -178.4 -	R33-NQ 5 ft 38%	0	NR	diameter, stain on surface @ 217.6' (laminated organics)		lenses of extremely weak (R0) rock, voids (<3/16") over 10-30% of rock - surface, poorly to moderately fossiliferous with molds/casts <1/2" in diameter, friable - 207.0-208.3' - moderate to strong HCI reaction, poorly consolidated silts to very weak (R1) rock, laminated bedding, trace voids in few	- - - - R33: 14 minutes
-	221.5		>10	221.5-221.7' - Fracture zone or mechanical break, rough, undulating, angular gravel sized fragments <1-1/2" diameter		bedding planes, fossils absent 208.3-209.7' - Same as 206.5-207.0' No Recovery 209.7-211.5' Limestone	Stop coring at 221.5 at 18:30 on 04/04/2007; water – level at ground level
 - - 225 -183.4	R34-NQ 5 ft 4%	0	NR			211.5-213.2' - yellowish gray, (5Y 8/1), very fine to fine grained, moderate to strong HCI reaction, extremely weak to weak (R0 to R2), voids (<3/16") over <20% of rock surface, few cavities <1/2" diameter No Recovery 213.2-216.5' Limestone 216.5-218.4' - yellowish gray, (5Y	Resume coring at 07:00 on 04/05/2007 - Recovery loss for R34 due to core barrel blockage at 221.7' -
-	226.5					8/1), very fine to fine grained, moderate HCl reaction, very weak to weak (R1 to R2), voids (<3/16") over 20-40% of rock surface, moderately	R34: 19 minutes -
-			>10	226.6, 226.75, 226.9, 226.95, 227.05, 227.2, 227.5' - Fractures or mechanical break (7), <10 deg, rough, undulating, <1" open, gravel sized fragments <1/2" diameter		fossiliferous with molds/casts <1/2" diameter, trace organic laminations No Recovery 218.4-221.5'	-
- - - 230	R35-NQ 5 ft 36%	0	>10 NR	227.5-228.1' - Fracture zone, rough, undulating, angular gravel sized fragments <1" diameter		Limestone 221.5-221.7' - yellowish gray, (5Y 8/1), very fine grained, mild to moderate HCl reaction, weak to medium strong (R2 to R3), voids (<3/16") over 20-30% of rock surface, moderately fossiliferous,	- - - -
-188 <u>.4</u> - -	231.5					with molds/casts <1/2" diameter, few cavities <1/2" diameter No Recovery 221.7-226.5' Limestone 226.5-228.3' - yellowish gray, (5Y	R35: 12 minutes
_			0	000 El Daddian alana harizantal accept	E	7/2), very fine to fine grained, mild to moderate HCl reaction, extremely weak to very weak (R0 to R1), voids	SC-7 collected at 231.5- 232.5' -
-	R36-NQ		>10	232,5' - Bedding plane, horizontal, smooth, undulating, <1/8" open 232.6' - Fracture, 60 deg, rough, undulating, tight		(<3/16") over 10-30% of rock surface, poorly to moderately fossiliferous, few cavities <1/4"	-
235 -193.4	5 ft 40%	20	NR	232.8-233.5' - Fracture zone, rough, undulating, gravel sized fragments <2" diameter		diameter, trace organics, medium strong (R3) rock from 227.4-227.5' No Recovery 228.3-231.5'	- - -
_	236.5						R36: 18 minutes

APPENDIX 2BB-23 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-02	SHEET	13	OF	13	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723946.2 N, 457608.0 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 1.5	ft bg	s on 03	3/22/07 START : 3/22/2007 END : 4/	5/200	7 LOGGER : R. Bitely	
₹ Ω₽	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH B	IE RU GTH,	(%) Q	FOCTUR	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP SUR ELE	COR	A Q	FRA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
				236.6' - Fracture or mechanical break, <10	ш	Limestone	
			>10	deg, rough, undulating, <1/4" open 236.9-237.15' - Fracture zone, rough,	口	- 231.5-233.5' - yellowish gray, (5Y 8/1), very fine to fine grained, mild to	1
			2	undulating, gravel sized fragments <1"	」	moderate HCl reaction, very weak (R1), voids (<3/16") over 10-20% of]
				diameter 237.25, 237.45, 238.0, 238.15, 238.85' -	Ь	rock surface, poorly to moderately	
_	R37-NQ 5 ft	30	10	Fracture or mechanical break (5), <10 deg, rough, undulating, tight to <1/4" open		fossiliferous with fossil molds/casts - <1/4", medium strong (R3) rock from	
_	58%			239.2-239.25' - Fracture zone or bedding	\vdash	233.15-233.25'	_
240 -198.4				plane, rough, undulating, <1/2" open, bedding plane fractures with vertical fractures	F	No Recovery 233.5-236.5' Limestone	
-190.4			NR		H	236.5-239.4' - yellowish gray, (5Y 7/2), very fine to fine grained,	R37: 13 minutes
-				-	Ħ	 moderate HCl reaction, extremely 	-
-	241.5			244 CEL Dadding plans or machanical break	Ħ	weak to very weak (R0 to R1), voids (<3/16") over 20-50% of rock	-
-			>10	241.65' - Bedding plane or mechanical break, horizontal, rough, undulating, <1/4" open	片	 surface, trace laminated bedding, poorly to moderately fossiliferous 	-
-			0	241.65-241.8' - Fracture zone, rough, undulating, gravel sized fragments <1"	╫	with fossil molds/casts <3/4", few	-
-			U	diameter 241.85' - Mechanical break	1	cavities <1/2" in diameter, secondary infilling of cavities at 238.5-239.2'	
-	R38-NQ			241.85 - Mechanical break 241.11, 242.35' - Bedding plane or	1	No Recovery 239.4-241.5'	
	5 ft 36%	0		mechanical break (2), <10 deg, rough, undulating, <1/4" open	$1 \parallel \parallel$	241.5-242.55' - yellowish gray, (5Y	
245			NR	242.4, 242.55' - Mechanical break (2)]	7/2), very fine to fine grained, moderate HCl reaction, extremely	
-203.4]	weak to weak (R0 to R2), strength decreases with depth, voids (<3/16")	
_					Ш	over 20-40% of rock surface,	R38: 17 minutes
-	246.5				Ш	moderately fossiliferous with molds/casts <3/4" in diameter, trace	-
-			>10	246.65-246.95' - Fracture zone, rough, undulating, gravel sized fragments <3/4"	H	_ laminations	-
-				diameter	片	Sandy Silt (ML) 242.55-243.3' - very fine to medium	-
-				247.25' - Bedding plane or mechanical break, smooth, undulating, <1/4" open	H	grained, moderate HCl reaction, carbonate derived silts and sands	-
-	R39-NQ			-	H	No Recovery 243.3-246.5'	-
-	5 ft 17%	0		-	╙	Limestone 246.5-247.35' - yellowish gray, (5Y	-
250	1770		NR	-	H	7/2), very fine to fine grained, moderate to strong HCl reaction,	-
-208.4				_	F	extremely weak to very weak (R0 to	
					厂	R1), laminated with organics, trace voids (<3/16"), few cavities <1/4" in	R39: 17 minutes
	251.5				旦	diameter, poorly fossiliferous	Boring completed to 251.5' at 15:30 on 04/05/2007
					1	No Recovery 247.35-251.5' Bottom of Boring at 251.5 ft bgs on	4. 10.00 011 04/00/2001
-					-	4/5/2007	-
-					-	 -	-
-					1	-	-
-					1	-	-
-					1	 	-
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					<u> </u>		

APPENDIX 2BB-24 Rev. 7



PROJECT NUMBER:	BORING NUMBER:	
338884.FL	A-03	SHEET 1 OF 12

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723884.4 N, 457671.8 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews, P. Buchler

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 6 tri-cone bit

RILLIN	G METH	OD AND	EQUIPM	ENT : Dietrich D-5	0 S/N 232, mud rotary, ca	athead, AWJ rods, 6 tri-	cone bit		ORIENTATION : Vertical	
ATER	LEVELS	: 1.3 ft bo	gs on 3/1	1/07 5	START: 3/10/2007	END: 3/12/2007	LOGGEF	? : R.	Bitely, C. Wallestad, N. Jarzyniecki	
200				STANDARD	SC	DIL DESCRIPTION		ပ္ခ	COMMENTS	
SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	OOU NAME U	000 ODOLID OVA 4DOL	SYMBOLIC LOG	DEDTIL OF GAOING DRILLING DATE		
HSE TOPE		RECOVE	ERY (ft)		SOIL NAME, US MOISTURE CON	CS GROUP SYMBOL, (ITENT, RELATIVE DEN	COLOR, ISITY OR	OLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND	
F.F.			#TYPE	6"-6"-6"	CONSISTENCY, S	OIL STRUCTURE, MIN	IERALOGY	YME	INSTRUMENTATION	
5 万 山 42.1				(N)				S		
4 2.1 -							-		C. Wallestad and N. Jarzyniecki also logged	
-							-		portions of boring A-03	
_							-			
_							-			
_							_			
_							_			
_	3.5				Dearly Creded Can	4 With City (CD CM)		nethe		
_				3-4-6	Poorly Graded San 3.5-4.7' - very pale of	orange and dark vellov	wish orange, -	H		
_		1.2	SS-1	(10)	(10YR 8/2 and 10YF	R 6/6), wet, loose, very	y fine to fine	H		
5 7.1	5.0				matter, trace iron ce	6% nonplastic fines, i mented sand nodules	trace root 5 < 1/4" — 7 -	$T_i^{\dagger}T$		
/.I _					diameter		/ _		Moderate to light chatter, slow advancement at 5.0-8.5'	
_							-			
_							_			
_							-			
_							_			
_							-			
_	8.5				O:I+ /84L \			.		
_				3-8-4	Silt (ML) 8.5-9.4' - pale yellov	vish orange, (10YR 8/6	6), wet, stiff, -	$\ \ $		
_		0.9	SS-2	(12)	nonplastic to low pla	sticity, rapid dilatancy	, mild to _	Ш		
0	10.0				\sand, all carbonate	ion, 5-10% fine to med	dium grained /			
2.1										
_							-			
_							-		Very slow drilling at 11.5-13.5'	
_							-		very slow drilling at 11.5-13.5	
_							-			
_							-			
_	13:8	0.0	\ SS-3 /	50/1	No Recovery 13.5-1	3 6'				
_		/	\	(50/1")	140 Hecovery 13.3-1	0.0	/ _		Rapid advancement	
							-		napia aavanooment	
5 '.1										
-							-			
-							-			
-							-			
-							-			
-							-			
-	10.5						-			
-	18.5 18.8	0.3	SS-4	50/4	Silt With Sand (ML))		Ш		
-	-			(50/4")	18.5-18.8' - pale yel	lowish orange, (10YR pid dilatancy, mild HCl	8/6), wet,		Very dense layer at 18.75', very slow advancement	
20					15-20% fine to med	ium grained sand, all d	carbonate	1	3	
20						<u> </u>		\vdash		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-03	SHEET	2	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723884.4 N, 457671.8 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews, P. Buchler

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 6 tri-cone bit

					U 3/N 232, Hidd rotary, Catheau, AWS rous,		. D	Ditable C. Wallacted N. Jammistaki
WATER	LEVELS	: 1.3 ft bg	gs on 3/1		TART: 3/10/2007 END: 3/12/200		: : K.	Bitely, C. Wallestad, N. Jarzyniecki COMMENTS
302				STANDARD PENETRATION	SOIL DESCRIPTION	I	ဗ္ဂ	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	. ,	TEST RESULTS	SOIL NAME, USCS GROUP SYM	ROL COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
A ACE		RECOVE	ERY (ft)		MOISTURE CONTENT, RELATIVE	DENSITY OR	30LI	DRILLING FLUID LOSS, TESTS, AND
L HEV			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE	, MINERALOGY	YME	INSTRUMENTATION
<u> </u>				(N)			S	
22.1						_		_
_						_		_
_						_		
						_		
-						_	1	Moderate to rapid advancement at 22.5'
-	23.5					_	l	_
-	20.0				Silty Sand (SM)		Ш	Sample SS-5 may be weak limestone
-		1.5	SS-5	23-36-46	23.5-25.0' - grayish orange, (10YR 7 dense, fine to coarse grained, mild to	/4), wet, very -		-
-		1.0		(82)	reaction, 46% nonplastic fines, appro	oximately 5		-
25 17.1	25.0				 interbedded extremely weak (R0) lim 	estone lenses 7	Ш	-
-					<1/2" thick			-
-						-		-
_						-		=
_						_		_
_						_		_
						_		
	28.5							
					Silty Sand (SM)			_
-		1.5	SS-6	8-9-27	28.5-30.0' - Same as 23.5-25.0' exceorange, (10YR 6/6), dense, 1/2" lens	ept dark yellowish - e of medium		-
30	30.0			(36)	plastic silt at 28.6', approximately 5 in	nterbedded		-
12.1	30.0				limestone lenses up to 1/2" thick		141	Moderate drilling rate with variable thin,
-						-		dense zones.
-						_		-
-						-		-
-						_		=
-						-		-
-						-		-
-	33.5				Cilty Cond With Limestons (CAA)		717	=
-		0.5	SS-7	4-10-50/1.5	Silty Sand With Limestone (SM) ¬ 33.5-34.0' - Same as 28.5-30.0' exce	ept 50% of /-	Ш	_
_	34.6	0.0		(60/7.5")	sample is limestone lenses to 1/2" th	ick/		_
35								
7.1						_		
						_		
1 7						_]
-						_		7
-						-		-
-	20.5					-		-
-	38.5			22-50/5				-
-	20.4	0.9	SS-8	22-50/5 (72/11")		-		-
-	39.4			,	٦	Γ=	11.1	-
40							\vdash	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-03	SHEET	3	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723884.4 N, 457671.8 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews, P. Buchler

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 6 tri-cone bit

						END 0/40/0007			ONIENTATION : Vertical
WATER	LEVELS	: 1.3 ft bo	gs on 3/1		START: 3/10/2007	END : 3/12/2007	LOGGE	1 : K.	Bitely, C. Wallestad, N. Jarzyniecki
300				STANDARD		SOIL DESCRIPTION		g	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COU MANAGE	E LICOS ODOLID OVARDOL O	COL OR	SYMBOLIC LOG	DEDTIL OF CACING DRILLING DATE
불병은		RECOVE	ERY (ft)		MOISTURE	E, USCS GROUP SYMBOL, C CONTENT, RELATIVE DENS	OLUK, SITY OR	O L K	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
F F A			#TYPE	6"-6"-6"		CY, SOIL STRUCTURE, MINE		MB	INSTRUMENTATION
SU				(N)				ŝ	
2.1					38.5-39.4' - oliv	h Limestone (SM) ve gray, (5Y 4/1), wet, very of ed, moderate HCl reaction, s, with interbedded limeston bonate	30%		Slow drilling with intermittent light chatter at 40.0-43.5'
-	43.5						- - -		- - -
-	43.6	0.1	SS-9	50/1 (50/1")	Limestone Frag	i gments /e gray, (5Y 4/1), mild to mo	derate HCI		
-				(50/1)	\reaction, coarse	e sand to fine gravel-sized f	ragments	1	
45					(<1/2" in diame	eter), trace fossils and voids	<1/16"	1	-
-2.9					Begin Rock Col	oring at 43.5 ft bgs neet for the rock core log	_	1	
-					OGG THE HEAT SH	ication the rook core log	-	1	-
-							-	1	-
-							-	1	-
-							-	ł	-
-							-		-
-							-		-
_							-	1	_
_							-	1	_
l _							-		_
50									
-7.9							_		
_							_		
							-		
-							-		
-							-	1	
-							-	1	
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-03	SHEET	4	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723884.4 N, 457671.8 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews, P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

CORING	NE I HOD AI	ND E	JUIPIV	IENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	casing		ORIENTATION : Vertical
WATER	LEVELS: 1.3	ft bg	s on 3/	11/07 START : 3/10/2007 END : 3/	12/200	DT LOGGER : R. Bitely, C. Wallestad	d, N. Jarzyniecki
	_			DISCONTINUITIES	(2)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		(0	DESCRIPTION	SYMBOLIC LOG		
O A E	Z Z Z	_	FRACTURES PER FOOT	DESCRIPTION	_ □	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
AAGE	N.E.A.	(%) □	∄ÿ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ő	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
무유진	BASS	Ø	RAC R.F.F	PLANARITY, INFILLING MATERIAL AND	Æ	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
20 S		α	표표	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	
	43.5		0		Ш	Limestone	HW casing installed to
-			H		Н	- 43.5-45.9' - moderate yellowish	43.5'; begin rock coring at
-	R1-NQ		0		Н	brown, (10YR 5/4), fine grained,	43.5'
45_	2.5 ft	88		44.65' - Mechanical break	Ш	weak to extremely weak (R2 to R0), — voids (<1/6") over 60-70% of rock	_
-2.9	90%		1		Н	surface, hardness decreases with	R1: 5 minutes
-	1		I I	45.4' - Bedding plane or fracture, <10 deg,		depth, highly to poorly fossiliferous	·
-	46.0		NR	rough, undulating, <1/4" open	ш	 decreasing with depth, trace 	-
l _			3	46.15, 46.25, 46.4' - Bedding plane or	Н	laminations	<u> </u>
				mechanical break, 0-<10 deg, smooth,	Н	No Recovery 45.9-46.0'	
-				undulating, <1/4" open 46.55, 47.2, 47.85' - Mechanical break	Ш	 Limestone 46.0-50.3' - moderate yellowish 	-
-			1	47.4-47.65' - Clay seam	╂┼┦	brown, (10YR 5/4), fine grained, very	-
-					₽	weak to extremely weak (R1 to R0),	
	R2-NQ	77	0		Ш	voids (<3/16") over 40-80% of rock	
1 -	5 ft 86%	11	"	48.5' - Mechanical break	\mathbb{H}	surface increasing with depth, poorly	
1 -	00,0					fossiliferous, moderately to highly fossiliferous with fossil molds from	·
-			1	49.25-49.45' - Clay seam	ш	- 47.7-49.2'	-
50				_	H		_
-7.9			1	50.25' - Bedding plane or mechanical break,		N D 500.54.01	R2: 4 minutes
-	54.0		NR	<10 deg, smooth, undulating, tight	1Ш	- No Recovery 50.3-51.0'	-
-	51.0			To deg, smooth, undulating, tight	Н	Limestone	-
l -			0			- 51.0-55.9' - moderate yellowish	
			ਁ		ш	brown, (10YR 5/4), very fine to fine	
-]				Н	grained, moderate HCl reaction, very	<u> </u>
-			4	52.3, 52.5' - Bedding plane or mechanical	口	- weak to weak (R1 to R2), voids	-
-	DO NO			break, <10 deg, rough, undulating, <1/8" open	ш	(<1/16") over 80-90% of rock surface, moderately to highly	-
l _	R3-NQ 5 ft	84	2	52.85' - Fracture or mechanical break, 50	Н	- fossiliferous with molds up to	<u> </u>
	98%	0+	-	deg, rough, undulating, tight		1/2"x1/4", extremely weak at	
-				53.0' - Bedding plane or mechanical break,	ш	52.0-52.5	·
-			2	35 deg, rough, undulating, tight	Ш	_	-
55				53.2' - Fracture or mechanical break, 20 deg,	\perp		
-12.9			2	rough, undulating, tight 53.3' - Fracture or mechanical break, 50 deg,	Щ	_	R3: 8 minutes
I -	56.0			rough, undulating, tight	Ш		1
-	00.0		NR/	53.45, 53.6' - Mechanical break	口	No Recovery 55.9-56.0'	l -
-			1	54.25' - Fracture or mechanical break, 60	╀╫	Limestone	
1 -			Ш	deg, rough, undulating, tight	Ш	56.0-60.5' - moderate yellowish	
			_	55.4' - Fracture or mechanical break, <10 deg, rough, undulating, tight	\square	brown, (10YR 5/4), very fine to fine grained, moderate to strong HCl	
1 -			5	55.7' - Bedding plane or mechanical break,	14	reaction, weak to medium strong (R2	
-	R4-NQ		\vdash	<10 deg, rough, undulating, 1/8" infilling,	ш	to R3), voids (<3/16") over 80-90% of	
-	5 ft	67	1	sand infilling, open	\square	rock surface, moderately to highly	
	90%			56.55' - Fracture or mechanical break, 30	Н	fossiliferous, with fossil molds	
1				deg, rough, undulating, tight 57.25, 57.35, 57.5, 57.55, 58.0, 58.4' -	Ш	 1/2"x1/4", extremely weak to very weak at 57.25-57.55' and 59.95-60.5' 	
-			2	57.25, 57.35, 57.5, 57.55, 58.0, 58.4 - Bedding plane or mechanical break, <10 deg,	╁┼┤	woak at 31.23-31.33 and 39.93-00.5	l -
-17.9			\vdash	rough, undulating, <1/4" open —	╂╫		D4: 10 minutes —
			2	59.25' - Bedding plane or mechanical break,	Д	_	R4: 10 minutes
	61.0		NR	<10 deg, smooth, undulating, <1/4" open	H	No Recovery 60.5-61.0'	I
1 -				59.95' - Bedding plane or mechanical break, horizontal, rough, undulating, <1/2" open	ш	-	
-			1	60.2, 60.45' - Bedding plane or mechanical	П	-	
I -			Ш	break, <10 deg, rough to smooth, undulating,	₽₽	_	
			,	1/4" open			I
1 -			1	61.8' - Fracture or mechanical break, 30 deg,	Ш	_	
-	R5-NQ		\vdash	rough, undulating, sandy or fragmented	+	_	l -
<u> </u>	1.0110		\vdash	infilling, 1/2" to 1/4" open	H	-	
							I

APPENDIX 2BB-28 Rev. 7



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-03 SHEET 5 OF 12

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723884.4 N, 457671.8 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews, P. Buchler

ORIENTATION : Vertical

CORING	METHOD A	ND E	QUIPN	IENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	casino	1	ORIENTATION : Vertical
WATER	LEVELS : 1.3	ft bg	s on 3/	11/07 START : 3/10/2007 END : 3/	12/200	7 LOGGER : R. Bitely, C. Wallestad	d, N. Jarzyniecki
	_			DISCONTINUITIES	(h	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- 65_ -22.9	5 ft 84% 66.0	74	1 1 1 NR	62.5' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/2" to 1/4" open 63.45' - Mechanical break 63.7-64.0' - Fracture or mechanical break, <10 deg, rough, undulating, rock fragment infilling, 3-1/2" open		Limestone - 61.0-65.2' - moderate yellowish brown, (10YR 5/4), very fine to fine grained, moderate HCI reaction, - extremely weak to very weak (R0 to R1), voids to 1/16" over <15% of rock surface from 61.0-61.6', voids to	R5: 12 minutes
- - -	00.0		2	64.65' - Bedding plane or mechanical break, horizontal, smooth, undulating, 1/8" open 65.05' - Bedding plane or mechanical break, <10 deg, rough, undulating, 1/8" open 66.3' - Fracture or mechanical break, 60 deg, rough, undulating, tight		- 3/16" over 10% of rock surface in mottled patterns from 61.6-63.4', mottling decreasing with depth, voids to 1/16" covering <5% of rock surface from 64.0-65.2', poorly to moderately fossiliferous with molds	- - - -
- - - 70	R6-NQ 5 ft 100%	98	1	66.8' - Bedding plane or mechanical break, horizontal, rough, undulating, tight 68.45' - Bedding plane, horizontal, smooth, undulating, tight		to 1/2"x1/8", solution cavities/bioturbation at 63.45', weak to medium strong at 62.5-64.3' No Recovery 65.2-66.0' Limestone 66.0-71.0' - pale yellowish brown,	- - - -
-27.9 - - -	71.0		1	70.0' - Bedding plane or mechanical break, horizontal, smooth, undulating, tight 70.2, 71.0' - Mechanical break		— (10YR 6/2), mild to moderate HCI reaction, very weak to medium strong (R1 to R3), voids (1/6") over 30-70% of rock surface, poorly fossiliferous, trace molds, trace cavities to 3/4"x1/4" some cavities	R6: 9 minutes - - -
-	R7-NQ 5 ft	53	3 NR	1/4" open 72.4' - Fracture, 60 deg, smooth, undulating, tight 72.65' - Fracture or mechanical break, 20 deg, rough, undulating, tight		with secondary infilling, laminated bedding with organics from 67.3-67.7 71.0-72.9' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very fine to fine grained, moderate HCl reaction, extremely weak to medium	- Driller's Remark: Silt seam from 72.9-73.9' based on -
- 75_ -32.9	74%		1 4	72.8' - Bedding plane or mechanical break, horizontal, smooth, undulating, tight 72.9-73.9' - Clay seam, driller reports soil horizon — 74.5' - Fracture, 40 deg, rough, undulating, tight		strong (R0 to R3), voids (3/16") over 20-80% of rock surface, moderately fossiliferous with fossil molds, trace secondary infilling of cavities, mottled No Recovery 72.9-73.9'	drilling speed and circulation – Driller's Remark: 30% loss of circulation fluids at approximately 74' – R7: 9 minutes _
- - -	76.0		NR 1	75.15, 75.25' - Bedding plane, horizontal, smooth, undulating, tight 75.5, 75.55' - Bedding plane or mechanical break, horizontal, smooth to rough, undulating, tight		73.9-75.7' - Same as 71.0-72.9' No Recovery 75.7-76.0' Limestone 76.0-76.9' - light olive gray, (5Y 5/2), very fine to fine grained, moderate	- - -
-			0	76.9' - Bedding plane or mechanical break, <10 deg, rough, undulating, open 1"		HCl reaction, weak to medium strong (R2 to R3), voids (1/16") over	-
-	R8-NQ 5 ft 49%	27	0 NR	77.1' - Fracture, 70 deg, rough, undulating, 1/2" open 77.3-77.5' - Clay seam 77.75, 77.85, 77.9, 78.05' - Bedding plane, horizontal, smooth, undulating, tight		10-90% of rock surface, cavities to 2"x1/8" 76.9-77.3' - yellowish gray, (5Y 7/2), very fine to fine grained, extremely weak (R0), voids (1/6") covering 75% of rock surface	- - -
80 -37.9 	81.0					Fat Clay To Highly Plastic Silt (CH) - 77.3-77.5' - moderate HCl reaction - Limestone - 77.5-78.1' - Same as 76.9-77.3'	R8: 9 minutes -
-			2	81.35, 81.4' - Fracture or mechanical break, <10 deg, smooth to rough, undulating,		78.1-78.45' - Same as 76.0-76.9' No Recovery 78.45-81.0'	SC-1 collected at 81.4- 82.4'
-	R9-NQ		1	organic staining over 50-80% of surface, <1/2" open 82.7, 83.25, 83.4' - Mechanical break		- -	-
					╁┼┨		-

APPENDIX 2BB-29 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-03	SHEET	6	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723884.4 N, 457671.8 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews, P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

WATER	LEVELS: 1.3	ft bgs	s on 3	/11/07 START : 3/10/2007 END : 3/	12/20	07 LOGGER : R. Bitely, C. Wallesta	d, N. Jarzyniecki
300	<u></u>			DISCONTINUITIES	U	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A B B A S A S A S A S A S A S A S A S A	DR. J.R.	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	7	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
	ORE CO	Ø	SAC ER F	PLANARITY, INFILLING MATERIAL AND	/MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
		ď		THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	2.10. 0, 120. 1202. 0, 2.10.
	5 ft 98%	84	2	83.6, 83.7' - Bedding plane, rough, undulating	⊬	Limestone - 81.0-85.35' - yellowish gray to very	_
			0			light gray, (5Y 7/2 to N8), very fine to	
85			0	·	Ш	fine grained, weak to medium strong	1
-42.9			. 40	_	1—	— (R2 to R3), extremely weak at 83.6-83.7', laminated from 81.0-81.4',	R9: 12 minutes
	86.0		>10	85.55-85.9' - Fracture zone, rough,		voids (<1/16") over 30% of rock	1
1 1	00.0		NR)	undulating to stepped	╨	 surface, organics rare from 81.35-81.4', secondary infilling of 	1
-			>10	86.0-86.3 - Fracture zone, rough, undulating to stepped, intersecting fractures	口	very fine grained matrix from	-
-				86.8-87.0' - Bedding plane, <10 deg, 1/2" clay	世	- 81.4-83.6', fossiliferous with molds	-
-			1	infilling, 1/2" open	╁	up to 1/2"x1/4" with some secondary infilling, cavities up to 3" with	-
-	 R10-NQ			87.6' - Bedding plane, <10 deg, smooth, undulating, 1/4" open	广	 secondary infilling, voids (3/16") over 	-
-	5 ft	64	0	.	\vdash	80-90%, organics, fossiliferous, and cavities up to 1-1/2", possible	-
	86%			88.5' - Mechanical break	尸	bioturbation at 81.4-83.6'	-
			>10		口	85.35-85.9' - Same as 81.0-85.35']
90				89.7-90.3' - Fracture zone, rough, undulating, _	\vdash	except extremely weak to very weak (R0 to R1), molds up to 1"x1/4" with	
-47.9			>10	intersecting fractures		some secondary infilling, cavities up	R10: 7 minutes
	91.0		NR			to 1-1/2"x1/2", trace organics No Recovery 85.9-86.0'	
1 7					Ш	Limestone	End drilling for the day
			0		ш	86.0-87.0' - Same as 85.35-85.9' except fat clay (CH) to elastic silt	3/10/07 at 91.0' – Resume drilling on 3/11/07
				92.0, 94.3' - Mechanical break	╁	(MH) seams at 86.8' and 87.5',	at 91.0', water level is 1.3'
-			1		匚	secondary infilling of cavities at	below ground surface -
-	R11-NQ			92.8' - Bedding plane or mechanical break,		86.65-86.8', cavities up to 1-1/2"x1/2" 87.0-87.65' - yellowish gray, (5Y 7/2),	-
-	5 ft	76	0	<10 deg, smooth, undulating 93.5' - Mechanical break	╨	 very fine to fine grained, extremely 	-
-	100%			94.05, 94.5' - Bedding plane or mechanical	口	weak (R0), fossil molds up to 1/2"x1/4", cavities few, some	-
-			4	break, <10 deg, rough, undulating	╂┰	 secondary infilling 	-
95 <u> </u>				94.65' - Fracture, smooth, undulating, 1/4"		87.65-90.3' - light olive gray to dark yellowish brown, (5Y 5/2 to 10YR	R11: 24 minutes
-52.9			>10	open 94.75' - Fracture, 50 deg, infilling, up to 1/2"		- 4/2), very fine to fine grained, very	RTT: 24 minutes
	96.0			open	⊬	weak to medium strong (R1 to R3),	
			0	95.1-96.0' - Fracture zone, intersecting fractures	\Box	voids (<3/16") over 60% of rock surface, cavities few (up to 1/2"),	SC-2 collected at 96.0- 97.0' -
						trace organics, possible bioturbation,]
			0	97.05, 99.5, 96.0-96.2' - Mechanical break	F	very fossiliferous, molds and casts up to 1/4"x1/2"]
			U		片	No Recovery 90.3-91.0']
1	R12-NQ				\vdash	Limestone	1
	5 ft 100%	87	1	98.7' - Mechanical break, 50 deg, rough,	匚	 91.0-93.0' - dusky yellow, (5Y 6/4), very fine to fine grained, very weak to 	1
	10070			stepped		medium strong (R1 to R3),	
100			1		\vdash	fossiliferous with casts up to 3/4"x1/2", voids (3/16") over 30% of	
100 -57.9				99.9' - Bedding plane, <10 deg, smooth,	片	rock surface, cavities up to 1/2"x1/4"	R12: 10 minutes
-			5	undulating, up to 1/4" open 100.35, 100.4' - Fracture, <10 deg, rough,	世	over 15% of rock surface, yellowish	-
+	101.0			undulating, up to 1/4" open	oxdapprox	gray (5Y 7/2) secondary infilling up to 2"x2" with trace voids (1/16"), trace	-
			1	100.55-101.0' - Fracture zone, 80-85 deg,	口	organics	-
				rough, undulating, fracture interval separated by bedding plane fractures	\vdash	<u></u>	-
			1	100.7-100.9' - Fracture zone or bedding	Ħ	_ -	
			L '	plane, rough, undulating 101.2, 103.3, 103.5, 103.6, 104.4' -	\vdash	_]
	R13-NQ			Mechanical break	Е		

APPENDIX 2BB-30 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-03 SHEET 7 OF 12

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723884.4 N, 457671.8 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews, P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

				MENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW		<u> </u>	ORIENTATION : Vertical
WATER	LEVELS : 1.3	ft bg	s on 3		12/20	·	
≥o.⊋	(%			DISCONTINUITIES	P00	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION] ;	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A B B C C C C C C C C C C C C C C C C C	S F F	Q D (%)	150 150	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FPT.	NG.	D C	AC.	PLANARITY, INFILLING MATERIAL AND	₩	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
E S E		ď	HH	THICKNESS, SURFACE STAINING, AND TIGHTNESS	ς	CHARACTERISTICS	BROI G, TEOT REGGETG, ETG.
	5 ft 100%	98	0	101.3' - Fracture, 50 deg, rough, undulating	Ш	93.0-96.0' - yellowish gray, (5Y 7/2),	
-	100 /6			102.5' - Mechanical break, <5 deg, rough, undulating	1	 weak to medium strong (R2 to R3), voids over <10% of rock surface 	-
-			1	dildulating	匚	increasing to 30% from 93.65-94.35',	-
105_ -62.9				104.95' - Bedding plane, rough, undulating	╫	 fossiliferous with molds/casts up to 	R13: 8 minutes —
- 02.0			0	To 1.55 Bodding plane, rough, anddiating	ш	1/2"x1/4", possibly bioturbated from	1715. 6 minutes
	106.0				┢	93.65-94.35' - Limestone	_
						96.0-101.0' - yellowish gray, (5Y 7/2),	
-			0	106.5, 108.3, 109.2' - Mechanical break	╨	very fine to fine grained, very weak to	-
-					世	- medium strong (R1 to R3), voids	-
-			1	107.35' - Bedding plane, <15 deg, rough,	\vdash	(3/16") over 35% of rock surface decreasing to 15-20% at 99.8',	-
-	_			undulating, 1/4" open	┸	 fossiliferous with casts/molds up to 	-
	R14-NQ 5 ft	87	3	108.1, 108.6, 108.8' - Bedding plane, 10 deg,	$oldsymbol{\perp}$	1/2"x1/4", organics visible in solution	_
	100%	07		smooth to rough, undulating, tight to up to 1/8" open at 108.8'		cavities at 98.4-98.6', secondary infilling with voids over <10% of	
				1/0 Open at 100.0	\Box	surface and with trace fossils	· -
140			1		₩	⁻ 101.0-106.0' - yellowish gray, (5Y	-
110_ -67.9				109.75' - Mechanical break, 10-15 deg,	ፗ	7/2), very fine to fine grained, weak	SC-3 collected at 109.75-
- 07.5			3	rough, undulating	╁	to very weak (R2 to R1), voids over 20-30% of rock surface, fossiliferous	110.65' R14: 5 minutes
I _	111.0			110.65, 110.85, 110.95' - Bedding plane, <10		with casts up to 1"x1/2", fossils and	1714. 5 minutes
				deg, rough, undulating, up to 1/4" open	Н	voids increase from zone at	
-			3	111.05' - Fracture zone, rough, undulating, intersecting fractures	世	102-103.5', clay infilling over 5% of voids, secondary infilling of yellowish	<u> </u>
-				111.7, 112.1, 115.15-115.2, 115.85' -	╁	gray (5Y 8/1) limestone with <10%	-
-			0	Mechanical break	世	 voids and fossils; sparsely 	-
-	D45 NO				₩	fossiliferous from 101-102.5' with	-
I _	R15-NQ 5 ft	89	6	113.1, 113.35, 113.45, 113.55, 113.7, 113.8,	┸	15-25% voids on rock surface - 106.0-106.9' - light olive gray to	_
	100%	00		114.1, 144.3, 144.35, 114.75, 114.85' - Fracture zone or bedding plane, <10 deg,	H	yellowish gray, (5Y 5/2 to 5Y 7/2),	
				smooth to rough, undulating, up to 1/8" open,	世	very fine to fine grained, very weak	
115			5	healed fracture at 119.6'	╨	(R1), voids (1/16") over 20% of rock surface, fossiliferous with	-
-72.9				-	+	molds/casts up to 1"x1/2", laminar	R15: 9 minutes —
-			1	115.5' - Bedding plane, <10 deg, smooth to	厂	 bedding planes 	-
-	116.0			rough, undulating, up to 1/8" open	╨	106.9-111.0' - yellowish gray, (5Y	-
1 _			3	116.1, 116.45, 116.55' - Bedding plane, <10	Д	5/2), very fine to fine grained, very weak to weak (R1 to R2), voids] .
1				deg, smooth to rough, undulating, up to 1/4"	\vdash	(3/16") over 25-30% of rock surface,	1
1 7				open	广	fossiliferous with fossils up to]
-			0		╨	 1/4"x1/4", possible dissolution cavities up to 1/2"x1/2" 	·
-	R16-NQ			440 5 440 45 440 75 440 0 400 0	口	111.0-119.0' - yellowish gray, (5Y	-
-	5 ft		0	118.5, 118.45, 116.75, 119.8, 120.9' - Mechanical break	╁┼	 7/2), very fine to fine grained, very 	-
-	100%			Miccilatiical Dicar		weak (R1), voids (<1/16") over 10-30% of rock surface, voids with	-
			1	119.3' - Bedding plane, rough, undulating,	╨	Secondary infilling over additional	_
120				ground rock infilling, up to 1/2" open		25% of rock surface, secondary]
-77.9				_	1—	infilling is yellowish gray (5Y 8/1)	R16: 6 minutes
-			2	120.6' - Bedding plane, rough, undulating	世	119.0-121.0' - yellowish gray, (5Ý 7/2), very fine to fine grained, weak	-
-	121.0			120.6 - Bedding plane, rough, undulating 120.95' - Fracture or mechanical break,	╨	(R2), voids (3/16") over 30% of rock	-
-			1	rough, undulating, high angle fracture	上	surface, highly fossiliferous, with	-
				121.35' - Bedding plane, 15 deg, rough,	\vdash	fossils up to 1/2"x1/4", dissolution cavities up to 1/4" in diameter over] .
				undulating, 1/2" open 122.0' - Bedding plane, rough, undulating to	Ľ	L 15% of rock surface	
			2	stepped, tight	\mathbf{H}]
-	R17-NQ			- · · · · · · · · · · · · · · · · ·	т	-	·
-					+		
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APPENDIX 2BB-31 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-03	SHEET	8	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723884.4 N, 457671.8 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews, P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

CORING	METHOD AI	ND E	JUIPIN	MENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	casing		ORIENTATION : Vertical
WATER	LEVELS : 1.3	ft bg	s on 3		12/200		
≥⊖£	<u> </u>			DISCONTINUITIES	၂ _ဗ ၂	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	5 ft	88	1	122.9' - Fracture, 55 deg, smooth to rough,	\Box	Limestone	
- 125_ -82.9 -	126.0		0	undulating, up to 1/4" open 123.4' - Bedding plane, smooth to rough, undulating, up to 1/2" open 123.5, 123.7, 124.15, 125.7' - Mechanical break 125.75' - Fracture, 55 deg, rough, undulating		 121.0-126.0' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 6/1), very fine to fine grained, voids (3/16") over 30% of rock surface, secondary infilling with yellowish gray (5Y 8/1) to medium gray (N5) limestone, voids increase to 40-50% at 123.8-124.0 	R17: 11 minutes
-			>10		H	and 125.2-126.0', fossiliferous with highly fossiliferous zones at	_
-			1	126.9-126.95' - Fracture zone, intersecting fractures, up to 1/4" open 127.4' - Bedding plane, rough, undulating, up	Ħ	- 121.0-122.2', 123.8-124.2' and 125.2-126.0' (casts/molds), dissolution cavities at 121.8' and	- -
-	R18-NQ 5 ft 100%	98	2	to 1/4" open 127.5, 130.15, 130.9' - Mechanical break 128.4, 128.7' - Bedding plane, tight to 1/4" open		 122.1' up to 1"x1/2", smaller dissolution cavities throughout, laminar bedding at 122.9' 126.0-127.1' - Same as 121.0-126.0' 	-
130 -87.9			0	орен		except very weak to weak (R1 to R2), voids decreasing with depth 127.1-131.0' - yellowish gray, (5Y	D19: 7 minutes
-07.9	131.0		0			7/2; 5Y 8/1), very fine to fine grained, very weak (R1), voids (1/16") over 10% of rock surface becoming infilled with depth, laminar bedding,	R18: 7 minutes SC-4 collected at 130.15- 131.1'
-			0	131.95, 133.3, 134.35, 135.5' - Mechanical		finited with depth, farillian bedding, fossiliferous with some fossils up to 1/4" in diameter, trace cavities 131.0-134.8' - yellowish gray to	<u> </u>
-	R19-NQ		2	break 132.4, 132.9' - Fracture, 40 deg, smooth to rough, undulating	甘	dusky yellow, (5Y 7/8 to 5Y 6/4), very fine to fine grained, very weak to weak (R1 to R2), voids (1/8") over	-
-	5 ft 100%	94	4	133.45' - Bedding plane, <5 deg, smooth, undulating 133.55' - Fracture, 80 deg, rough to smooth,	Ħ	10-30% of rock surface increasing with depth, fossiliferous as casts/molds, fossils more abundant	- -
135_ -92.9			0	undulating, tight		- at 132.7-133.2', laminar bedding planes 134.8-136.0' - vellowish grav. (5Y	 R19: 8 minutes
-	136.0		0	135.5, 133.6' - Fracture, 75 deg and 80 deg, rough to smooth, undulating, fractures	目	- 7/6), very fine to fine grained, weak (R2), voids (3/16"), fossiliferous (casts), dissolution cavities at	-
-			4	intersect at 133.55' 136.05' - Bedding plane, 40 deg, rough to smooth, undulating 136.35, 136.7, 136.85' - Bedding plane, 40		- 134.9-135.2' (1"x1/2") 136.0-141.5' - yellowish gray and light olive gray, (5Y 7/2 and 5Y 5/2),	-
-	R20-NQ		>10	deg, rough to smooth, undulating, up to 1/4" open 136.45, 137.1, 137.75, 139.0' - Mechanical		very fine to fine grained, very weak to weak (R1 to R2), voids (1/16") over 10% of rock surface increasing to	-
-	5 ft 100%	69	2	break 137.3-137.75' - Fracture zone or bedding plane, multiple high angle intersecting	Ħ	- 1/8" at 138.7' covering 25:% of rock surface, dissolution cavities up to 1/4" with some secondary calcite	- -
140 -97.9			1	fractures 138.2, 138.5, 139.2' - Bedding plane, 40 deg, — rough to smooth, undulating, up to 1/4" open	Ħ	mineralization, poorly fossiliferous, laminar bedding	R20: 8 minutes
-	141.0		3	140.0, 140.3' - Fracture (2), 60 deg and 65 deg, rough, undulating, up to 1/4" open 140.7' - Bedding plane, <10 deg, smooth,	Ħ	-	Driller's Remark: 100% loss of circulation fluids at - 140'
_			0	undulating, up to 1/2" open 141.3, 141.95, 145.9' - Mechanical break 141.45' - Bedding plane, <10 deg, smooth,		- - -	SC-5 collected at 141.85- 142.9'
_	R21-NQ		U	undulating		- -	-

APPENDIX 2BB-32 Rev. 7



PROJECT NUMBER: BORING NUMBER: 338884.FL A-03 SHEET 9 OF 12

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723884.4 N, 457671.8 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews, P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

WATER LEVELS: 1.3 ft bgs on 3/11/07 START: 3/10/2007 END: 3/12/2007 LOGGER: R. Bitely, C. Wallestad, N. Jarzyniecki

ORIENTATION: Vertical

VV/XILLIX	LEVELS: 1.3	it bg.	3 011 3		12/20	D/ LOGGER : R. Bitely, C. Wallesta	
≥∩≘	_			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	5 ft	53	>10	143.0' - Bedding plane, <10 deg, smooth to	1	Limestone	1
-	91%		>10	rough, undulating, up to 1" open 143.3' - Bedding plane, <10 deg, some	Ħ	 141.5-143.1' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very 	-
145_ -102.9			>10	recrystallization on 20% of surface 143.5-144.6; 145.05-145.55' - Fracture zone, — intersecting fractures	H	fine to fine grained, very weak to — weak (R1 to R2), voids over 20% of rock surface, cavities over 10% of	R21: 22 minutes
	146.0		NR		\vdash	rock surface up to 1-1/3"x3/4", most voids and cavities infilled with	
-			4	146.1-146.15' - Fracture zone, open 146.3' - Bedding plane, <10 deg, smooth to rough, undulating to planar, organic staining	Ė	medium gray (N6) material, fossiliferous (as casts) - 143.1-145.55' - yellowish gray to very	_
-	R22-NC		3	on fracture face, up to 1/2" open 146.9, 147.4' - Fracture, 50 deg 147.55' - Bedding plane, <10 deg, 1/4" open 147.9' - Bedding plane, 10-15 deg, up to 1"		light gray, with light olive grey mottling, (5Y 7/2 to N8, with 5Y 5/2), very fine to fine grained, weak to	-
-	5 ft 80%	71	2	open		medium strong (R2 to R3), voids over 15% of rock surface, dissolution cavities up to 1/2" in diameter, fossiliferous (as casts)	-
150 -107.9			1 NR	_		No Recovery 145.55-146.0' Limestone 146.0-147.2' - Same as	R22: 25 minutes
-	151.0		4	151.05' - Fracture, 20 deg, up to 1/2" open		143.1-145.55' except laminar beds up to 4" thick, trace to 20% voids over rock surface, trace organics 147.2-150.0' - dusky yellow to very	_
-			1	151.65, 151.8, 151.9' - Bedding plane, <20 deg, up to 1/2" open 152.0' - Bedding plane, <5 deg, tight	崫	pale orange, (5Y 6/4 to 10YR 8/2), very fine to fine grained, very weak (R1), voids (<3/16") over 30% of rock	_
-	R23-NG 5 ft	71	1	-		surface, dissolution cavities up to 1/4" in diameter, fossiliferous (fossils 1/16"-1" in length), some voids and	_
-	89%		6	153.8' - Mechanical break, 50 deg - 154.35-154.6' - Fracture zone or bedding -	Ħ	cavities with dusky yellow (5Y 6/4) to light olive gray (5Y 6/1) secondary infilling	_
155_ -112.9			>10	plane, <10 deg, 1/2" open at 156.5	崫	No Recovery 150.0-151.0' Limestone - 151.0-152.75' - dusky yellow to light	R23: 12 minutes
-	156.0		NR	155.4-155.55' - Fracture zone, intersecting fractures 156.0-156.1' - Fracture zone, open		gray, (5Y 6/4 to N7), very weak to weak (R1 to R2), voids (up to 1/16")	-
-			>10	156.35, 156.45' - Bedding plane, <10 deg, rough, undulating, up to 1/8" open 156.4' - Fracture, 85 deg, 1/8" open	Ħ	 over 40% of rock surface, dissolution cavities up to 1"x1/2", organic layer at 152.0' with very fine grained limestone layer with no voids (<1/4" 	-
-	R24-NG 5 ft	66	2	157.6' - Bedding plane, <10 deg, rough, undulating, 1/4" open 158.5-158.8' - Fracture zone, 50 deg, rough,		thick) 152.75-155.45' - yellowish gray, (5Y 7/2), very fine to fine grained, weak	-
- 160	92%		6	undulating, organic staining over 10-20% 159.0-159.45' - Fracture zone, rough, undulating, intersecting fractures, up to 1/4"		(R2), very weak at 154.45-155.4', voids (up to 3/16") over 20% of rock surface, poorly fossiliferous, laminar beds	-
-117.9 -			0	open — 159.55, 159.75' - Bedding plane, 10 deg, rough, undulating, 1/8" open		No Recovery 155.45-156.0' Limestone 156.0-156.45' - Same as	R24: 8 minutes End drilling for the day
-	161.0		NR 1	160.5' - Fracture, 50 deg, rough, undulating, -1/8" open -161.55' - Bedding plane, <5 deg, rough to		150.0-150.45 - Same as 152.75-155.45' except very weak (R1), laminar organics (<3/4") thick, moderately fossiliferous with casts up	03/11/2007, 18:30 at 161.0' - Resume drilling on 03/12/2007, water level is
-			2	smooth, undulating, up to 1/4" open 162.05' - Bedding plane, <5 deg, rough to smooth, undulating, up to 1/8" open 162.75, 163.75, 164.55' - Mechanical break,		- to 1/4"x1" ´ - -	1.0' below ground surface -
	R25-NG	<u> </u>		rough, undulating	F		

APPENDIX 2BB-33 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-03 SHEET 10 OF 12

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723884.4 N, 457671.8 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews, P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

				MENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW			ORIENTATION: Vertical
WATER	LEVELS : 1.3	ft bgs	s on 3		12/20		· · · · · · · · · · · · · · · · · · ·
30≘	_ ;;			DISCONTINUITIES	Ď	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) Q D	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ПОП	5 ft	<u>⊬</u>	1		S		
-	86%	00	2	-	Ė	Limestone 156.45-160.6' - very fine to fine grained, very weak to weak (R1 to R2), alternating laminar beds up to 8"	-
165_ -122.9			0		世	— thick defined by changes in voids,	R25: 19 minutes
-	166.0		NR	undulating, up to 1/2" open -		voids ranging from <10% up to 30% (up to 1/16"), dissolution cavities at - 157.6', 158.45', 158.9', and 159.5' up	- -
-			3	- 166.6, 166.75, 166.8, 167.1, 167.2, 167.4, 167.55, 167.65, 167.7, 167.8, 167.95, 168.10,		to 1/2"x1/4" over 15% of rock surface, poorly to moderately fossiliferous	- -
-			8	168.15, 168.2, 168.35, 168.45, 168.50, 169.9, 170.0' - Bedding plane or mechanical break,	Ħ	No Recovery 160.6-161.0' Limestone 161.0-165.3' - light olive gray to	_
-	R26-NQ 5 ft 85%	38	6	<5 deg, smooth, undulating to planar, open up to 1/4" -		yellowish gray, (5Y 5/2 to 5Y 7/2), very fine to fine grained, voids (up to 3/16") over <10% of rock surface,	SC-6 collected at 168.6-
170			1		H	fossil casts over <10% of rock surface, laminar bedding characterized by color change and %	169.6'
-127 <u>.9</u> -	171.0		1 NR	-		voids, trace organics, highly fossiliferous from 162.05-163' with	R26: 15 minutes
-	171.0		3	- 171.55' - Bedding plane or mechanical break,		increase in voids (up to 1/4") over 35% of rock surface, some secondary infilling of voids with	- -
-			9	horizontal, rough, undulating, tight 171.8' - Bedding plane, 20 deg, smooth, undulating, <1/8" open		yellowish gray (5Y 7/2) to gray (N7) limestone No Recovery 165.3-166.0' Limestone	- -
-	R27-NQ 5 ft 97%	34	3	171.95-172.25' - Fracture zone, <5 deg, rough to smooth, undulating, up to 1/4" open 172.4' - Fracture, 80 deg, rough to smooth,		166.0-168.7' - yellowish gray to moderate olive brown, (5Y 7/2 to 5Y 4/4), very fine to fine grained, weak	-
- 175_			4	undulating, recrystallization on fracture surface 172.6' - Bedding plane, smooth to rough,		to medium strong (R2 to R3), extremely weak (R0) to very weak rock (R1) at discontinuities, voids	-
-132 <u>.9</u> -	176.0		5	undulating, silt-sized infilling, organic staining, up to 1/4" open 172.9, 172.95, 173.1, 173.5, 174.0, 174.35,		(<3/16") over 60-80% of rock surface, several cavities (>5) from 1/4"-1/8" on bedding laminations,	R27: 6 minutes
_			NR) 1	174.65' - Bedding plane or mechanical break, - <5 deg, smooth, undulating 174.5' - Bedding plane or mechanical break, - 25 deg emoch undulating	H	poorly fossiliferous - 168.7-170.25' - Same as 166.0-168.7' except mild to moderate	-
-			5	35 deg, smooth, undulating 175.0, 175.25-175.35, 175.55, 175.65, 175.75' - Bedding plane or mechanical break, rough, undulating, <1/2" open, friable from	Ė	HCl reaction, moderately to highly fossiliferous (casts/molds), trace bedding plane laminations, trace	-
-	R28-NQ 5 ft 91%		7	175.25-175.35' 176.95' - Bedding plane or mechanical break, 20 deg, smooth to rough, undulating		secondary infilling of fossil molds at 169.8-169.9' No Recovery 170.25-171.0' Limestone	-
180 -137.9			>10	177.25, 177.3' - Bedding plane or mechanical break, 10 deg, smooth, undulating 178.7, 178.8' - Bedding plane, <10 deg, —	H	171.0-175.85' - light olive gray to pale yellowish brown, (5Y 5/2 to 10YR 6/2), very fine to fine grained,	
-137.9	181.0		3 NR	rough, undulating, up to 1/4" open 178.75' - Fracture, 60 deg and 65 deg 178.95' - Bedding plane, <10 deg, rough,		extremely weak to weak (R0 to R2), weakest along bedding plane fractures, voids (<3/16") over	R28: 19 minutes
-			2	undulating, up to 1" open 179.2-179.25' - Fracture zone, rough, undulating, 1/2" open	H	50-80% of rock surface, laminated bedding at 171.8', 172.9' and	_
-			3	179.3' - Bedding plane, <5 deg, smooth to rough, planar 179.45' - Bedding plane or mechanical break,		(<1/2") over 20% of rock surface, poorly fossiliferous No Recovery 175.85-176.0'	_
	R29-NQ			smooth to rough, 1/2" to 1/4" open	\vdash	110 110001019 110.00-110.0	

APPENDIX 2BB-34 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-03	SHEET	11	OF	12	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723884.4 N, 457671.8 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews, P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

WATER	LEVELS : 1.3	3 ft bg	s on 3	/11/07 START : 3/10/2007 END : 3/	12/20	07 LOGGER : R. Bitely, C. Wallestad	I, N. Jarzyniecki
≥0.0	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
ANI (f)	N, AND ?Y (%		LES	DESCRIPTION	12	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
JEPJ SURF	CORI	RQ	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	3×ME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	5 ft	54	>5	179.5, 179.65, 179.8, 179.85, 179.95, 180.0,	107	Limestone	
-	88%			180.1, 180.15' - Bedding plane, <10 deg,	H	 176.0-178.5' - pale yellowish brown 	-
- 405			4	smooth to rough, undulating, up to 1/2" open 179.6-179.8' - Fracture zone, rough,	Ħ	to very light gray, (10YR 6/2 to N8), very fine to fine grained, weak to	-
185 <u>-</u> -142.9			0	undulating —	世	— medium strong (R2 to R3), voids	R29: 15 minutes —
-	400.0		NR	181.3, 181.35' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/4"	₩	(<3/16") over 60-80% of rock surface, dissolution cavity at 179.3'	-
-	186.0			open - 191 6' Fracture Zone 0 55 deg	\vdash	- (1-1/2"x1"), few fossil molds	SC-7 collected at 186.0-
-			1	181.45-181.6' - Fracture zone, 0-55 deg, rough, undulating, intersecting fractures	口	178.5-178.7' - Same as 176.0-178.5' except medium strong (R3), voids	186.75' -
-				182.75, 182.9, 183.0, 183.05, 183.35, 183.4,	士	- (<1/16") over 0-30% of rock surface,	-
-			5	183.45, 184.2, 184.3' - Bedding plane or mechanical break, smooth to rough,	╁	trace mottling 178.7-179.0' - Same as 176.0-178.5'	-
-	R30-NQ			undulating, friable zones at 183.0-183.5'	F	179.0-179.5' - Same as 178.5-178.7'	-
-	5 ft	56	5	186.75, 187.05' - Bedding plane or mechanical break, <10 deg, rough,	岸	179.5-180.55' - Same as 176.0-178.5'	-
-	100%			undulating, <1/4" open 187.2, 187.35, 187.75, 187.9, 188.1, 188.45,	H	No Recovery 180.55-181.0' Limestone	-
400			3	188.65, 188.75' - Bedding plane, <10 deg,	⊬	181.0-185.4' - pale yellowish brown,	-
190 -147.9				rough to smooth, undulating, with some <1/4" open	圧	(10YR 6/2), very fine to fine grained, very weak to medium strong (R1 to	R30: 18 minutes —
-	101.0		4	189.25' - Fracture, 50 deg, smooth,	口	R3), with extremely weak (Ř0) and	-
-	191.0			undulating 189.65, 189.75, 190.4, 190.55, 190.75' -	世	friable silty lens, voids (<3/16") over 60% of rock surface, few cavities	-
-			3	Bedding plane, <10 deg, rough to smooth,	╁	(3/4"x1/4") poorly fossiliferous with	-
-				undulating, <1/8" open 191.1, 191.35, 191.7' - Fracture, <10 deg,	F	L few casts/molds, bioturbated, friable lens at 184.55-184.6'	-
-			2	rough, undulating	Ħ	No Recovery 185.4-186.0'	-
-	R31-NQ			192.15' - Mechanical break 192.85, 193.0-193.1' - Fracture zone, rough,	Ħ	Limestone 186.0-191.0' - pale yellowish brown	-
-	5 ft 99%	62	3	undulating, <1/2" open	╨	to moderate yellowish brown, (10YR	-
-	9970			193.45, 193.6' - Mechanical break 193.75, 193.95, 194.1' - Bedding plane or	尸	6/2 to 10YR 5/4), very fine to fine grained, weak to medium strong (R2	-
195			3	mechanical break, <10 deg, rough, undulating to stepped	口	to R3), voids (<3/16") over 70-80% of rock surface, moderately to highly	-
-152.9				194.55' - Mechanical break, 40 deg	口	fossiliferous especially at	R31: 10 minutes
-	196.0		1	194.75-194.9' - Fracture zone, rough,	╁	- 186.0-186.75' (molds/casts), laminated bedding over 50% of rock	-
-	130.0		NR/	195.6-195.8' - Fracture, rough, undulating, 2"	H	surface	-
-			3	fragment missing over 180 degrees of core section	炐	- 191.0-193.0' - moderate yellowish brown to yellowish gray, (10YR 5/4 to	-
-				196.45' - Bedding plane, horizontal, rough,	Ħ	5Y 7/2), fine grained, very weak to	-
-			>10	undulating, silt and/or clay sized infilling, 1/2" - open	世	weak (R1 to R2), voids (<3/16") over 80% of rock surface, dissolution	-
-	R32-NQ			196.9-197.45' - Fracture zone, rough,	╨	cavities (<1-1/2" diameter),	-
	5 ft 84%	40	3	undulating 198.55' - Bedding plane, horizontal, rough,	圧	 laminated over 30% of rock surface, highly fossiliferous 	-
	3.73			undulating, 1/4" silt infilling	口	193.0-194.0' - Same as 191.0-193.0'	-
200			>10	198.8, 198.85, 199.15' - Bedding plane, <10 - deg, rough, undulating, <1/4" open	世	except very weak (R1), voids(<1/16") over 40% of rock surface,	-
-157.9			>10	199.4-199.65; 199.95-200.1' - Fracture zone, rough, undulating to stepped	\vdash	few dissolution cavities (<1/2"x1/8") 194.0-195.95' - Same as	R32: 11 minutes
-	201.0		NR	199.65-199.95' - Fracture zone, smooth to	Ħ	191.0-193.0' except voids (<3/16")	Total depth of boring is
				rough, undulating, high angle fracture planes / .intersecting bedding plane at 199.8', tight	1	over 30-80% of rock surface, fossils decreasing with depth, highly	201.0'
				minoraconing bedding plane at 199.0, light	1	fossiliferous with casts/molds and 2"	-
					1	diameter dissolution cavities at 195.6-195.8'	_
					1	No Recovery 195.95-196.0'	_

APPENDIX 2BB-35 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-03	SHEET	12	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723884.4 N, 457671.8 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews, P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

00111110			<u> </u>	MENT . DIELICH D-30 3/N 232, Hidd Totally, NQ tools, HW	oaoiii	ING ORIENTATION : VERLICAL
WATER	LEVELS: 1.3	ft bgs	s on 3/		2/20	2007 LOGGER: R. Bitely, C. Wallestad, N. Jarzyniecki
	_			DISCONTINUITIES	(D	LITHOLOGY COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE COLOR
	N. A. Y.	(9	RE C	BESSELL HOLY	2	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, SIZE AND DEPTH OF CASING,
H N N N N N N N N N N N N N N N N N N N	E E	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ	WEATHERING, HARDNESS, SMOOTHNESS, CAVING ROD
[판류편]	S.S.S.S.	Ø	ZAC ER I	PLANARITY, INFILLING MATERIAL AND	Į₩	AND ROCK MASS CHARACTERISTICS DROPS, TEST RESULTS, ETC.
SE	2 2 2	œ	12.2	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS DROF3, TEST RESULTS, ETC.
					П	Limestone
1 -				-	ł	- 196.0-197.45' - pale yellowish brown -
1 -				-	l	to very pale orange, (10YR 6/2 to
					l	10YR 8/2), very fine to fine grained, extremely weak to weak (R0 to R2),
1 7					1	voids (<3/16") over 50% of rock
1 1				-	1	surface, mottled, bioturbated over
-				-	ł	- 30% of rock surface, elastic silt (MH)
				_		from 196.0-196.5'
					ı	197.45-199.4' - Same as - 196.0-197.45' except very weak to
1 7					1	medium strong (R1 to R3), voids
				-	1	(<3/16") over 70-80% of rock
1 -				-	1	surface, cavities (<3/4"x1/2"), highly
				_		fossiliferous, trace laminated bedding
1 7						199.4-200.2' - Same as
1 1				-	1	196.0-197.45' except voids (<1/16")
1 -				-	ł	fossiliferous, organics from
1 4					1	199.5-200.1'
					ı	No Recovery 200.2-201.0'
1 7					1	Bottom of Boring at 201.0 ft bgs on
1 -				-	ı	- 3/12/2007 -
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-04	SHEET	1 0	F g	•	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724023.6 N, 457634.2 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6 tri-cone bit

					00 3/14 232, Illuu Tolaiy	v, cathead, NWJ rods, 6 tri-	COHE DIL		ORIENTATION: Vertical
WATER	LEVELS	: 0.1 ft bo	gs on 03/2	26/07	START: 3/25/2007	END: 3/27/2007	LOGGE	R: R.	Bitely, C. Wallestad
>				STANDARD		SOIL DESCRIPTION		g	COMMENTS
AND	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	0011 NAME	LIGOR OPOLID OVANDOL	3	DEDTIL OF CACING DRILLING DATE	
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE	ERY (ft)			USCS GROUP SYMBOL, CONTENT, RELATIVE DEN		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
THE YEAR			#TYPE	6"-6"-6"		, SOIL STRUCTURE, MIN		ΜM	INSTRUMENTATION
<u> </u>				(N)	B 1 0 1 10	1 (00)		Ś	
41.3	0.0			1-1-2	Poorly Graded S 0.0-1.0' - pale vel	oand (SP) llowish brown, (10YR 6/2	?). moist.		"Water level is based on Ground Water Monitoring at LNP site (FSAR Table -
-		1.0	SS-1	(3)	very loose, very fi	ine to fine grained, subro	ounded silica		2.4.12.08)"
l _	1.5				sand, trace nonpl	lastic fines, 1" loamy org	anic layer at		_
_					mass/organics				
l _									
									Water table between 1.5' and 5' below
-							-		ground surface, based on split spoon sample -
_							•		Rapid drilling rate
5	5.0						-	1	-
36.3	5.0				Silty Sand (SM)				_
-		1.3	SS-2	1-2-3	5.0-5.7' - dusky y	rellow, (5Y 6/4), wet, loos	e, very fine	Ш	-
-		'.5	00-2	(5)	\ grained, subround \ fines	ded silica sand, 20-25%	iow plasticity /		-
-	6.5				Clay With Sand ((CH)		Г	-
-					5.7-6.3' - modera	ite olive brown, (5Y 4/4), dilatancy, 20-25% very	moist, firm,		=
-					silica sand	dilataricy, 20-25/6 very	ine grained	1	-
_								-	-
-							-	1	_
_								1	_
l _									_
10	10.0							<u> </u>	_
31.3				40.40	Fat Clay (CH)	olive gray, (5Y 5/2), wet,	soft [K	
		1.3	SS-3	16-4-8 (12)	medium to high p	plasticity, slow to no dilate	ancy, no HCI	₩	
	11.5			(12)	reaction, trace ve	ery fine grained silica san	nd	Ш	Light chatter at 11 feet
-					Silt (ML)	sh yellow, (5Y 8/4), mois	t to wet stiff		_
_					rapid to no dilatar	ncy, moderate HCI reacti	ion, fine to		_
-					medium sand-size	ed lenses <1/2" thick at	10.2'	1	-
-					Silt (ML)	illate		1	-
-					10.7-11.3' - Same	e as 10.2-10.7' except we	et ·	1	-
-					(saturated)			1	Moderate to slow drilling rate 11-20'
								1	3
15 <u></u> 26.3	15.0				Sandy Silt (ML)			\mathbf{H}	_
		1,	00.4	11-6-10	15.0-16.0' - grayis	sh yellow, (5Y 8/4), mois	t, very stiff,	4	-
-		1.0	SS-4	(16)		dilatancy, moderate HCl <1/4" thick of fine to coa		Ш	-
-	16.5				Scattered lenses	<1/4 thick of line to coa	ise saiiu	1	=
-								1	_
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-04	SHEET	2	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724023.6 N, 457634.2 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6 tri-cone bit

						r, cathead, NWJ rods, 6 tri-c			ORIENTATION : Vertical
WATER	LEVELS	: 0.1 ft bo	gs on 03/2		START : 3/25/2007	END: 3/27/2007 SOIL DESCRIPTION	LOGGEF	: R.	Bitely, C. Wallestad COMMENTS
≥Q€	CANADIS	INTERVA	1 (4)	STANDARD PENETRATION		JOIL DEJUNIF HUN		OG	CONTINION
ON (SAMPLE	INTERVA		TEST RESULTS	SOIL NAME.	USCS GROUP SYMBOL, (COLOR.	IC L	DEPTH OF CASING, DRILLING RATE,
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE	<u> </u>		MOISTURE C	ONTENT, RELATIVE DEN	SITY OR	SYMBOLIC LOG	DRILLING FLUID LOSS, TESTS, AND
			#TYPE	6"-6"-6" (N)	CONSISTENCY	/, SOIL STRUCTURE, MINE	ERALOGY	SYM	INSTRUMENTATION
21.3	20.0			(14)	Silt And Limesto	ne Lenses (ML)		ΠΠ	
-		1.0	SS-5	18-11-11	20.0-21.0' - grayis	sh yellow to grayish orang	ge, (5Y 8/4 -		-
-		'.0	00-3	(22)		ist to wet, very stiff, nonplate to strong HCI reaction		ш	-
-	21.5				carbonate, 50% s	silt and 50% limestone ler	ises <2" / -		-
-	-				tnick, voids and to	ossil structures intact			-
-	-						-		-
-	-						-		-
-							-		-
-							_		-
-							-		-
25 <u> </u>	25.0				Silt And Limesto	no Longos (MI)			Moderate to heavy chatter 25-37', moderate
- 10.5			00.5	8-10-16	25.0-26.5' - Same	e as 20.0-21.0' éxcept yel			to slow drilling rate -
-		1.5	SS-6	(26)	(5Y 7/2), 2" elasti	c silt or lean clay (CL) sellerate plasticity with slow	am at		_
-	26.5				25.5 -25.65 , 11100	lerate plasticity with slow	uliataricy	Ш	-
-							_		-
_							_		-
-							_		_
_							-		_
_							_		_
l _							_		_
30	30.0 30.3								
11.3	30.3	0.2	SS-7	50/3 (50/3")		ments And Silt And Sand ne as 25.0-26.5' except m		Н	_
l _				(00,0)	\HCl reaction, all o	carbonate, limestone frag	ments <1/2" / _		_
_					∖thick				_
_							_		_
							_		
							_		
35	35.0						_		
6.3		0.9	SS-8	20-50/5	Silt With Sand (M	ML)			
-	35.9	0.8	33-0	(70/11")	yellowish brown.	erate yellowish brown to d (10YR 5/4 to 10YR 2/2), v	usky - vet, hard	Ш	_
-					\ low to medium pla	asticity, slow to rapid dilat	ancy, mild / -		_
-	1				HCl reaction, 15%	% fine to coarse sand-size	ea / -		-
-									Moderate to heavy chatter from 37-39',
-							-		extremely slow drilling (15 minutes / 2 feet)
-							-		-
-							-		-
-							=		Heavy chatter from 39-40', slow drilling rate
40	40						=		-
+0_									
L									



PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	A-04	SHEET	3	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724023.6 N, 457634.2 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6 tri-cone bit

`			gs on 03/2		START: 3/25/2007	y, cathead, NWJ rods, 6 tri END : 3/27/2007		· R	ORIENTATION: Vertical Bitely, C. Wallestad
		. 0.1 100	JO 011 00/L	STANDARD	174111.0/20/2007	SOIL DESCRIPTION	LOGGLI		COMMENTS
SQ €	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				LOG	
BEL		RECOVE	RY (ft)	TEST NESOETS	SOIL NAME,	, USCS GROUP SYMBOL,	, COLOR,	OLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)		MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY		SYMBOLIC LOG	INSTRUMENTATION
1.3	40.0	0.1	(SS-9)	50/2 (50/2")	dense, mild to m	ments yellowish brown, (10YR loderate HCI reaction, ve oids <1/16" diameter	6/2), very ery fine to fine	_	Moderate to heavy chatter from 40-55', moderate to rapid drilling rate
-45 -3.7 -	45.0	1.4	SS-10	27-42-50/4.5 (92/10.5")	moist to wet, ver	erate yellowish brown, (1 y dense, very fine to coa e HCl reaction, 30% non	rse grained,		- - - - -
- - - - 50 -8.7	50.0 50.2	0.2	\SS-11,	50/2	□ Limestone Frag	ments	- - - - -		
-	FF O			(50/2")	\ 50.0-50.2' - mod	erate yellowish brown, (1 n, wafer-shaped fragmer	10YR 5/4),		
5513.7 -13.7 - - - - - - - - - - - - - - - - -	55.0 55.3	0.1	SS-12	50/3 (50/3")	Limestone Frag 55.0-55.1' - Sam Begin Rock Cori See the next she	ie as 50.0-50.2'	- - - - - - - -	+	End SPT at 55' below ground surface; switch to rock coring Set HW casing to 55' below ground surface at 17:00 Break for day at 17:00 Water level at 0' (ground surface)



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-04

SHEET 4 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724023.6 N, 457634.2 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

CORING	METHOD A	ND F	QUIPN	MENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	casing		ORIENTATION : Vertical
WATER	LEVELS: 0.1	Ift ba	s on 0	3/26/07 START: 3/25/2007 END: 3/	27/200	7 LOGGER : R. Bitely, C. Wallestad	d
		~ अ		DISCONTINUITIES	П	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		·0	DESCRIPTION	SYMBOLIC LOG		00
N A N	Z Z Z	<u></u>	FRACTURES PER FOOT	DESCRIPTION	길	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
AACH	IN TER	(%) Q	ĬĔĞ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	屃	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
F 문문년	8888	Ø	IR &	PLANARITY, INFILLING MATERIAL AND	Į≅į	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
	225	ď	E E	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	
-13.7	55.0				Ш	Limestone	Continue drilling at A-04 at
-	R1-NQ 1.5 ft	60	0		+	- 55.0-55.9' - moderate yellowish	07:30 on 03/26/07 -
-	60%		NR	55.7' - Mechanical break	口	brown, (10YR 5/4), very fine to fine grained, moderate HCl reaction,	Begin rock coring at 55' Water level at 1 inch below
	56.5		INIX		₽₩	extremely weak to weak (R0 to R2),	ground surface at 07:30
l			4		Ш	strength decreasing with depth, voids	
I -			4	56.9, 57.0, 57.4, 57.95, 58.05, 58.9, 59.55,	П	<3/16" over 60% of surface, trace	R1: 2 minutes
-	1			60.0' - Fractures (8), <10 deg, rough, undulating, along bedding planes, open <1/2"	₩	organic laminations No Recovery 55.9-56.5'	-
-	-		3	57.4' - Fracture, 60 deg, rough, undulating,	ш	Limestone	_
l _				open <1/2"	\vdash	- 56.5-60.1' - moderate yellowish	_
1	R2-NQ		>10	58.5' - Fracture, 40 deg, rough, undulating,	Н	brown, (10YR 5/4), very fine to fine	1
-	5 ft 72%	48	>10	open <1/2" 59.15-59.55' - Fracture zone, rough,	Ш	grained, extremely weak (R0), to	<u> </u>
-	/3		2	undulating, gravel-sized fragments <2"	╁	 compacted non-indurated carbonate silts, <10% organics, voids <3/16" 	-
60 <u> </u>				diameter —		over 30% of surface, weakest	
-10.7					Щ	material at 56.5-57.2' and 58.5-60.0'	
			NR		\mathbb{H}	No Recovery 60.1-61.5'	R2: 8 minutes
-	61.5				П	-	_
-	01.5			•	╨	Limestone	-
-			0		╆	61.5-66.25' - moderate yellowish	_
l -					П	brown, (10YR 5/4), very fine to fine	_
l					Н	grained, mild to moderate HCl reaction, extremely weak to weak	
-			1	63.1' - Fracture or mechanical break, 35 deg,	Ш	(R0 to R2), <10% laminated	_
-	R3-NQ			rough, undulating, tight	╁┼	organics, voids <3/16" over 40-50%	-
-	5 ft	82	0	63.3, 61.75, 64.1 - Mechanical break (3)	╀┼┤	of surface, strongest rock zones	_
l -	95%				Ш	62.0-63.0' and 63.7-65.8', few	_
65			ا م	64.55, 64.65' - Fractures or mechanical break	Н	cavities <1"x1/2"	
-23.7	1		3	(2), <10 deg, rough, undulating, open <1/2"			
-				65.2' - Fracture or mechanical break, 35 deg, rough, undulating, open <1/2"	╨	-	R3: 18 minutes
-	-		2	65.85, 66.05' - Fractures or mechanical break	╂┰╂	-	-
l -	66.5		NR	(2), <10 deg, rough, undulating, along		No Recovery 66.25-66.5'	_
			1	bedding planes, open <1/2"	Щ	Limestone	
Ι -			'	66.9, 67.9' - Fractures or mechanical break (2), <10 deg, rough, undulating, open <1/2"	回	66.5-71.25' - pale yellowish brown to moderate yellowish brown, (10YR 6/2	1
-				(2), 10 deg, rough, ununlating, open 1/2	╁	to 10YR 5/4), very fine to fine	-
-			1	·	ᡛᠲ	grained, moderate HCl reaction,	-
l -					П	extremely weak to medium strong	-
l _	R4-NQ 5 ft	78	4	68.75, 69.1' - Fractures (2), 70 to 90 deg,	\mathbb{H}	(R0 to R3), voids < 3/16" over	1 .
	95%	70	-	rough, undulating, tight	口	30-50% of surface, few fossil casts and molds <1/4" diameter, trace	
70	1			69.3' - Fracture or mechanical break, <10	Ш	secondary infill of cavities 1/4"	-
-28.7	-		0	deg, rough, undulating, tight	╆	— diameter	_
				69.4, 70.05, 71.0' - Mechanical break (3)	口	-	
l _			0		Н	_	R4: 8 minutes
	71.5		NR		Ш	No Recovery 71.25-71.5'	
I -			1417	·	H	Limestone	-
-	1		0		╚	71.5-74.6' - pale yellowish brown to	Driller's Remark: Slight
-					Ш	moderate yellowish brown, (10YR 6/2	water loss <10%
Ι -			3		H	to 10YR 5/4), very fine to fine grained, moderate HCl reaction, very	Driller's Remark: Strength _
1				73.05, 73.15' - Fractures (2), horizontal,	口	grained, moderate HCI reaction, very weak to medium strong (R1 to R3),	decreasing abruptly from 74.8' to 75.4'
I -	R5-NQ			rough, undulating, open <1/2"	14	voids <3/16" over <30% of surface,	/4.8° TO /5.4° -
-	5 ft	53	4	73.1' - Fracture, vertical, rough, undulating, intersects with 73.05' and 73.15', open 1/2"	╁┼┼	moderately fossiliferous, fossil molds	-
-	62%			74.25, 74.35' - Fractures (2), horizontal and	口	and casts <1-1/2" x 1/2", few cavities	-
75				50 deg, rough, undulating, open <1/4"	Ш	<1"x1/2"	
					ΙП		
L					⊥ I		
			_				-

APPENDIX 2BB-40 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-04 SHEET 5 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724023.6 N, 457634.2 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

COKING	INIC ITTOD A	ND L	QUIF IV	IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	Casiri	-	ORIENTATION : Vertical
WATER	LEVELS: 0.1	l ft bg	s on 0	3/26/07 START: 3/25/2007 END: 3/2	27/200	D7 LOGGER : R. Bitely, C. Wallestad	1
				DISCONTINUITIES	(5)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		m	DESCRIPTION	FOG	DOOK TYPE OOLOD	
SH NO	N. A.Y.	(6)	FRACTURES PER FOOT	DESCRIPTION	힏	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
H N N	I HE	%	LY M	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	딣	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
	SCORE	Q D (%)	ZAC ER	PLANARITY, INFILLING MATERIAL AND	SYMBOLIC	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
	025	22	# 5	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	, , , , , , , , , , , , , , , , , , ,
-33.7				74.5' - Fracture, horizontal, rough, undulating,	ш	No Recovery 74.6-76.5'	
1 -	1		NR	along bedding plane, open <1/4"	Н	-	R5: 10 minutes
-	1			-	口	-	-
-	76.5			-	₽		-
			2	76.7, 76.75' - Fractures (2), 40 deg and	Н	Limestone	
1 7]			horizontal, smooth, planar, tight	П	 76.5-77.3' - very pale orange to dark yellowish orange, (10YR 8/2 to 10YR 	SC-1 collected at 76.75-
-	1			-	Н	6/6), very fine to fine grained, strong	77.6' -
-	-		3	77.65, 78.1, 78.2' - Fractures or mechanical break (3), <10 deg, smooth, undulating, along	Н	 HCl reaction, extremely weak to 	_
l -	1			bedding planes, open <1/4" to tight -	\Box	medium strong (R0 to R3), strength	_
	R6-NQ	70		78.7, 78.85' - Fractures (2), 80 deg and 50	Н	increasing abruptly 77.3' to 77.4', non-indurated silt to extremely weak	
1 -	5 ft 91%	76	2	deg, rough, undulating, open 1/4" to 1/2"	Ш	rock (R0) 76.5-77.3', trace voids	_
	1 0.70			-	H	<3/16", no fossils, trace laminated	-
80 <u> </u>			0			— bedding	
-30.7]			-	Д	77.3-80.1' - Same as 76.0-77.3'	
			1	80.5' - Fracture or mechanical break, <10	$\vdash\vdash\vdash$	except medium strong (R3), voids <3/16" over 30-50% of surface, trace	R6: 18 minutes
1 -	81.5		NR	deg, rough, undulating, tight	Ш	fossil casts, trace secondary infill	·
1 -	01.0		<u> </u>	-	⇅	80.1-81.05' - Same as 77.3-80.1'	-
-	-		2	-	Н	 except secondary infill with voids 	_
l -	1			82.15, 82.45' - Mechanical break or fractures		<3/16" over 30-50% of surface,	_
			>10	(2), <10 deg, rough, undulating, open <1/2"	Н	poorly fossiliferous, heavily bioturbated with 50% of bioturbation	
1 -	1		> 10	_	Ш	with secondary infilling, cavities up to	_
-	R7-NQ			83.5-83.9' - Fracture zone, rough, undulating,	Н	1/2"x5"	-
-	5 ft	86	0	gravel-sized fragments <1-1/2" diameter -	Н	No Recovery 81.05-81.5'	-
1 -	100%			_	Ш	Limestone 81.5-82.0' - moderate yellowish	_
85					Н	brown to yellowish gray, (10YR 5/4 to	
-43.7]		0		Ш	5Y 8/1), very fine to fine grained,	
-	1			-	ш	strong HCl reaction, extremely weak	R7: 9 minutes
-	-		0	-	Н	to medium strong (R0 to R3), voids	-
1 -	86.5			_		<3/16" over 30-60% of surface, heavily fossiliferous, fossil	_
					Н	molds/casts <1"x1/4", cavities	
1 -	1		1	_	Ш	<1/2"x1/4", few cavities with	_
-	1			87.35' - Fracture or mechanical break, 60-90	\Box	- secondary infill	-
-			4	deg, rough, undulating, tight to open 1/8" 87.65' - Fracture or mechanical break, 20	╀┤	82.0-82.25' - Same as 81.5-82.0'	-
1 -				deg, rough, undulating, tight to open 1/8"	Ш	except very weak (R1), - laminated/variegated bedding 30% of	_
	R8-NQ	0.4	0	88.25, 88.4, 88.45' - Mechanical break or	H	zone	
1 -	5 ft 98%	84	"	fractures (3), rough, undulating, open <1/2" at	Ш	82.25-84.8' - Same as 81.5-82.0'	l
	1 00/0			88.25', others are tight -	Ш	- 84.8-85.25' - Same as 81.5-82.0'	-
90 <u> </u>	-		0	88.9, 88.95, 89.35' - Mechanical break (3)	HH	except non-indurated silts as secondary infill, very very weak	_
	.			-	口	- (<r0)< td=""><td></td></r0)<>	
I]		0		Н	85.25-85.4' - Same as 81.5-82.0'	R8: 11 minutes
1	91.5		•	_	Ш	85.4-86.0' - Same as 81.5-82.0']
I -	01.0		NR)	01.65! Erecture herizental amonth places	\square	 except extremely weak (R0), trace voids 	SC-2 collected at 95.65-
-	1		2	91.65' - Fracture, horizontal, smooth, planar, along bedding plane, tight	╀┤	86.0-86.5' - Same as 81.5-82.0'	96.45'
-	.			92.2' - Fracture, 70 deg, rough, undulating, -	Ш		-
I .]		10	tight	\mathbb{H}	_	_
1			'0	92.85-92.9' - Fracture zone, rough, planar	77	A F	
1 -	R9-NQ			93.6, 93.7, 93.8, 93.9, 94.05' - Fractures, 80	Ш	[· -
-	5 ft	50	10	deg, rough, undulating, tight	Ш	-	-
-	99%				$\vdash\vdash\vdash$	-	-
95					Ш		
		L			⊥ l		
	_	_					

APPENDIX 2BB-41 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-04

SHEET 6 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724023.6 N, 457634.2 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

COMING	IVILITIOD A	ND L	ZUIFIV	IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	casin		ORIENTATION : Vertical
<u>WATE</u> R	LEVELS: 0.1	ft bg	s on 0	3/26/07 START: 3/25/2007 END: 3/	27/20	7 LOGGER: R. Bitely, C. Wallesta	ad
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		(n		SYMBOLIC LOG		
NA PE	Ž,Š.Ž		FRACTURES PER FOOT	DESCRIPTION	ᅵ딜ㅣ	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H AGE	N H H	(%) Q	⊉8	DEPTH, TYPE, ORIENTATION, ROUGHNESS,		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
[문문]	NG SK	ØΒ	AC.	PLANARITY, INFILLING MATERIAL AND	₩	AND ROCK MASS	SMOOTHNESS, CAVING ROD
	SER	R	유립	THICKNESS, SURFACE STAINING, AND TIGHTNESS	λS	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-53.7			10	94.45' - Fracture, <10 deg, rough, undulating,		Limestone	
-				tight		86.5-91.4' - moderate yellowish	DO: 14 minutes
l .			1	94.8-95.2' - Fractures, 80 deg, rough,	ш	brown to vellowish gray. (10YR 5/4 to	R9: 14 minutes
	96.5		'	undulating, tight	Н	5Y 8/1), very fine to fine grained,	
-	30.5		NR/	95.45' - Fracture, 65 deg, rough, undulating,		strong HCl reaction, extremely weak	-
l -			2	tight	ш	to weak (R0 to R2), voids <3/16"	-
				95.65' - Bedding plane, horizontal, smooth, undulating, along bedding plane, tight	Н	over 30%, moderately to highly fossiliferous, fossil casts and molds	
-]			96.65' - Fracture or mechanical break, 20	1	less than 1"x1/2"; cavity zones from	1
-			1	deg, rough, undulating, tight to open 1/8"	口	87.1-88.45' and 90.0-91.4'; trace	-
-				97.15' - Fracture, 80-90 deg, rough,	\vdash	unfilled cavities 1-1/2"x1"; heavily	-
	R10-NQ			undulating, tight	Н	bioturbated or dissolution cavities	
I -	5 ft 100%	50	2	97.9' - Fracture, 70 deg, rough, undulating,	Ш	over 25% of core, 20% filled with	1
I	100 /0			tight	\Box	secondary infill of poorly indurated	-
100_			1	99.0, 99.2' - Mechanical break or bedding plane (2), <10 deg, rough, undulating, tight to	₽₩	silts to extremely weak rock (R0)	_
-58.7				plane (2), <10 deg, rough, undulating, tight to open 1/8"	Ш	No Recovery 91.4-91.5'	
I -				99.4' - Fracture, 85 deg, rough, undulating,	\Box	91.5-93.05' - yellowish gray, (5Y 8/1),	R10: 6 minutes
-			2	tight	₽₽	very fine to fine grained, strong HCl	-
I -	101.5			100.4, 100.6' - Fracture (2), 50 deg and 80	\vdash	reaction, extremely weak to medium	1 -
				deg, smooth, undulating to stepped, tight		strong (R0 to R3), weak zones at	
-			10	100.85' - Mechanical break or bedding plane,	Щ	92.35-93.05', voids <3/16" over	1
-				<10 deg, smooth, undulating, tight	H	_ 0-15% surface, poorly fossiliferous,	-
I -			0	101.55, 101.6, 101.85, 101.95, 102.0' - Fractures or bedding plane (5), 70-90 deg		trace organics	1
				and horizontal, rough, undulating, tight to	Ш	Fat Clay To Elastic Silt (CH)	
I -	R11-NQ			open <1/4"	\mathbb{H}	93.05-93.25' - olive gray, (5Y 3/2), strong HCl reaction, high plasticity	1
-	5 ft	86	0	102.45' - Fracture, 60 deg, rough, undulating,	╀┤	from 93.05-93.15', moderate to low	-
I -	98%			tight	ш	plasticity from 93.15-93.25',	1 .
105				103.7, 104.0' - Mechanical break (2)	H	non-indurated silt	
-63.7			0	_	+	Limestone	_
I -			\vdash		団	- 93.25-96.45' - Same as 91.5-93.05'	D11: 5 minutes
I _			0			except weak zones at 93.25-93.4'	R11: 5 minutes
1	106.5		_		Н	and 95.5-96.45'; at 94.3-95.5' voids	
I -	.00.0		NR/	•		- <3/16" over 60% of surface and	1
-			1		口	highly fossiliferous with fossil casts and molds up to 1/4" diameter	-
_]			107.2' - Fracture, 70 deg, rough, undulating,	Щ	- No Recovery 96.45-96.5'	
I -				tight	Н	Limestone	1
I -			10			96.5-101.5' - very pale orange to	-
l -	!		<u> </u>	108.3' - Fractures (3), 70-90 deg, rough,	Ш	grayish orange, (10YR 8/2 to 10YR	-
	R12-NQ		2	undulating, intersecting fractures, tight to	H	7/4), very fine to fine grained, strong	
Ι -	5 ft 100%	86		open <1/4"		HCI reaction, extremely weak (R0),	1
l	100 /0			109.1, 109.25' - Fractures (2), 70 deg and	Ш	medium strong (R3) zone from	-
110_			0	horizontal, rough, undulating, intersecting	$\vdash\vdash$	99.3-100.2'; voids <3/16" cover 10-25% of surface, except voids	_
-68.7			_	fractures, tight to open <1/4"	Н	_ <3/16" cover 40-60% of surface at	
					Ш	99.3-100.2'; moderately fossiliferous	R12: 7 minutes
I -			0		H	with fossil casts and molds to	-
l -	111.5				₽₩	_ 1"x3/4", trace secondary infill in	1 -
					Ш	casts, trace organics, trace laminae.	
Ι -			0	·	\Box	101.5-106.4' - Same as 96.5-101.5'	1
-			\vdash		Н	except extremely weak to weak (R0 to R2), voids <3/16" cover 10-25%	-
l -			0		Н	No Recovery 106.4-106.5'	1 -
						140 Necovery 100.4-100.3	
I -	R13-NQ			113.45, 114.05, 116.3' - Mechanical break (3)	Ш	-	1
-	5 ft		0		$\vdash\vdash$	_	-
	100%				Н	_	_
115					Ш		1
115					\Box		
							1

APPENDIX 2BB-42 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-04

SHEET 7 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724023.6 N, 457634.2 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

COMING	IVIL IT IOD AI	ND L	ZUIFIV	IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	Casiii	9	ORIENTATION : Vertical
WATER	LEVELS: 0.1	ft bg	s on 0	3/26/07 START : 3/25/2007 END : 3/	27/20	07 LOGGER : R. Bitely, C. Wallestad	
>				DISCONTINUITIES	U	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	- PO-	ROCK TYPE, COLOR,	
ᆱ핑흔	H, H, M,	(%	STO		SYMBOLIC	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
F A A	SOV	Q D (%)	CT F	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	l BG	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	RENEW	A Q	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S.√I	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-73.7			0		╅	Limestone	SC-3 collected at 115.45-
-				115.45' - Mechanical break		 106.5-111.5' - yellowish gray, (5Y 	116.3' -
-			0		╀	7/2), very fine to fine grained, very	R13: 12 minutes
l -	116.5				丌	weak to weak (R1 to R2), voids - <3/16" over 20-50% of surface,	_
					Н	moderately fossiliferous, fossil casts	
1 -			0			and molds <1/2" diameter, trace iron	<u> </u>
1 -					╨	stainingLimestone	-
-			0	-	口	111.5-116.5' - yellowish gray, (5Y	-
-	D44 NO			-	╂┯	 8/1), very fine to fine grained, strong 	-
1 -	R14-NQ 5 ft	96	0	_		HCl reaction, weak (R2), voids	_
l _	100%			119.05' - Mechanical break	⊬	<3/16" over <20% of surface, tracelaminations, poorly fossiliferous, few	_
120					ш	fossil molds 1/2"x1/4"	
-78.7			0	_	1—	116.5-120.7' - yellowish gray, (5Y	_
-				400.7.400.0L Markey'. LL	⇈	 8/1), very fine to fine grained, strong HCl reaction, very weak to weak (R1 	R14: 17 minutes
-			2	120.7, 120.9' - Mechanical break or bedding plane (2), horizontal, smooth, undulating,	₩	to R2), trace laminations, voids	-
-	121.5			tight to open 1/2"	仜	_ <3/16" over 10-50% of surface	-
1 -			1	404.05.400.01. Frankins (0). 50 day and 00	┢┯	(highly variable across length), moderately to heavily fossiliferous	_
1 .				121.95, 122.0' - Fractures (2), 50 deg and 30 deg, rough, undulating, intersecting fractures,		with fossil casts and molds up to 1/4"	_
			0	open 1"	\vdash	diameter, especially 117.5-118.0' and	
1 -			0	·	口	118.5-119.5', laminated bedding from 116.85-117.0'	_
-	R15-NQ			-	╂┼	120.7-121.5' - Same as 116.5-120.7'	-
-	5 ft	94	3	123.95, 124.0, 124.25' - Bedding plane (3),	亡	except extremely weak (R0) rock to	-
-	100%			horizontal, smooth, planar to stepped, tight	₽	non-indurated silt, laminated from 120.7-120.9'	-
125_ -83.7			0	_	仜	120.7-120.9 121.5-123.6' - yellowish gray to	
-03.7					╀	grayish orange, (5Y 8/1 to 10YR 7/4),	
1 _			0			very fine to fine grained, strong HCl reaction, weak (R2), voids to 3/16"	R15: 12 minutes
	126.5		"		\vdash	over 50% of surface, decreasing with	
1 -					Ш	depth, fossil casts and molds to	_
-			1		╁┼	 1/2"x1/4" over 30% of surface. 123.6-126.55' - Same as 	-
-				127.2, 130.45, 131.0, 131.05, 131.35' - Fractures (5), <10 deg, smooth, planar to	F	123.6-126.55 - Same as 121.5-123.6' except voids to 3/16"	-
-			0	undulating, along bedding planes, tight to	╀	 over 20-40% of surface, trace fossil 	-
-				open 1/4"	\Box	molds and casts to 1/4" diameter, possibly bioturbated 123.6-126.55'	-
1 -	R16-NQ 5 ft	89	0		\vdash	- 126.55-131.45' - very pale orange to	_
	99%	00	Ľ		广	pale yellowish brown, (10YR 8/2 to	
130					H	10YR 6/2), very fine to fine grained,	l
-88.7			0	— 130.1' - Mechanical break	\coprod	— strong HCl reaction, very weak to weak (R1 to R2), voids to 3/16" over	_
-					t	10-20% of surface except	R16: 11 minutes
-			4		+	130.15-130.85' voids to 3/16" over	-
-	131.5		NR/	424 FF 422 OL Freedom - (0) hard-out-		60% of surface, poorly to moderately fossiliferous except 130.15-130.85'	SC-4 collected at 133.9-
-			1	131.55, 133.9' - Fractures (2), horizontal, smooth, planar, along bedding planes, tight	╀	 highly fossiliferous, with casts and 	134.7' -
-					口	molds to 1/2"x1/4", trace infill	
			0		┰	material No Recovery 131.45-131.5'	
1 7							· ·
1 -	R17-NQ				11	-	· -
-	5 ft 99%	98	1		仜	-	-
	9970			-	╁	-	-
135					F		
					1		
							l .

APPENDIX 2BB-43 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-04 SHEET 8 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724023.6 N, 457634.2 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

COMING	I WIL II IOD AI	ND L	ZOIFIV	IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	casing		ORIENTATION : Vertical
WATER	LEVELS: 0.1	ft bg	s on 0	3/26/07 START: 3/25/2007 END: 3/	<u> 27/20</u> 0	7 LOGGER : R. Bitely, C. Wallestad	<u> </u>
				DISCONTINUITIES	П	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG		
D A A	Z Z Z	<u></u>	FRACTURES PER FOOT	DESCRIPTION	- I 드	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
ATI	IN THE	Q D (%)	Įξρ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	<u>ا</u> يّ	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
THR 3	SING	ØΓ	AAC ER F	PLANARITY, INFILLING MATERIAL AND	Į ₩	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	222	S.	FF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	ŝ	CHARACTERISTICS	
-93.7			2	134.7, 135.1' - Bedding plane or mechanical	Ш	Limestone	
-				break (2), 10-20 deg, smooth, undulating,	╁┼	- 131.5-136.45' - pale yellowish brown	R17: 8 minutes
-			0	trace organics, tight	Н	to yellowish gray, (10YR 6/2 to 5Y	-
	136.5		NID		Д	8/1), very fine to fine grained, strong HCl reaction, extremely weak to	
			(NR)	136.65, 140.2, 140.65' - Fractures or	Н	weak (R0 to R2), voids to 1/16"	
1 7			1	mechanical break (3), rough, undulating,	ш	covering 10-30% of surface,	1
-			\vdash	along bedding planes, open <1/2"	╁┸	decreasing with depth, except voids	-
l _			0		Н	to 3/16" over 60-70% of surface from	_
						131.6-133.05', trace fossils, except	
1 7	R18-NQ				Щ	 highly fossiliferous 131.6-133.05', with casts and molds to 3/4"x1/2",]
-	5 ft	86	0	-	╁┼┼	trace infill in fossil casts	R18: 10 minutes
-	98%				口	No Recovery 136.45-136.5'	-
140_			1		Щ	Limestone	DR: 100% circulation loss
-98.7				_	H	136.5-141.4' - yellowish gray, (5Y	at 141.5' below ground
				140 65 140 05' Ernotira	⇈	8/1), very fine to fine grained, strong HCl reaction, weak to medium strong	surface -
-			>10	140.65, 140.95' - Fracture zone, rough, undulating, fragments <1-1/2" diameter	₩	(R2 to R3), voids to 3/16" over	Stop drilling at 17:30 on
	141.5		NR /	and diameter	₽	5-30% of surface, decreasing with	03/26/07 at 141.5' below –
			-		口	depth, poorly to moderately	ground surface
]			1	-	₽₽	fossiliferous, fossil casts and molds	Water level at 1.8' below
-				142.45, 142.55' - Fracture zone, rough,	╆	to 3/4"x1/4", secondary infill extremely weak rock (R0) and void	ground surface at 17:30 -
-			10	undulating, fragments <1/2" diameter,	口	- <3/16" over 30-40% in infill, several	-
				angular, open <1"	Щ	bioturbation or dissolution cavities	Continue rock coring 03/27/07 at 08:00
]	R19-NQ			142.9, 143.1, 143.25, 143.35, 143.55' -	Ш	with secondary infilling up to 2" x 1"	Water level at 1.3' below
	5 ft 97%	75	2	Fractures (5), <10 deg, rough, undulating, tight to open <1" at 143.25-143.35', with	口	No Recovery 141.4-141.5'	ground surface
-	9170			angular rock fragments <1" diameter	╁┼┤	Limestone	No circulation –
145_			1	143.8' - Fracture, horizontal, smooth,	Ш	141.5-143.6' - light olive gray to moderate yellowish brown, (5Y 5/2 to	
-103.7				undulating, along bedding plane, tight	尸	10YR 5/4), very fine to fine grained,	
1 1				144.0, 144.5' - Mechanical break (2)	╁	weak to medium strong (R2 to R3),	R19: 12 minutes
-			1	144.9' - Fracture, <10 deg, smooth, undulating, tight	団	voids <3/16" over 20-30% of surface	-
-	146.5		NR	145.95' - Fracture, <10 deg, smooth,	\vdash	moderately fossiliferous, fossil molds	-
			1	undulating, along bedding plane, tight to open	Н	<1/2" diameter, many cavities - <1-1/2"x1/2" comprising 20% of	
				<1/4"	Ш	surface, several (<50% of cavities)	
-				146.6' - Fracture, horizontal, rough,	╁	with secondary infill, trace organic	1
-			0	undulating, along bedding plane, open <1/4"	╂┴╂	- laminations	-
					Ш	143.6-146.35' - Same as	_
	R20-NQ		0		H	141.5-143.6' except moderate HCl reaction, voids <3/16" over <5%-30%	
7	5 ft 100%	98	ا ا		世	variable, trace laminated bedding]
,_, -	100 /0			149.55' - Fracture, horizontal, smooth,	田	especially 143.8-144.0' and	-
150			1	undulating, along bedding plane, open <1/4" —	₽	- 145.9-146.0', poorly fossiliferous	-
-108.7					Ш	No Recovery 146.35-146.5'	
					Щ	Limestone 146.5-149.6' - grayish orange to	R20: 8 minutes
	151 5		0		+	moderate yellowish brown, (10YR 7/4	1
-	151.5				口	to 10YR 5/4), very fine to fine	-
-			1		₩	grained, weak to medium strong (R2	-
				152.1, 153.0, 153.15, 153.25, 153.35, 153.7' -	Н	to R3), strength increasing with	SC-5 collected at 152.1-
1				Fractures or mechanical break (6), along	Ħ	depth, except very weak rock (R1) at	152.9'
-			3	bedding planes, smooth to rough, undulating,	╁┼┼	149.35-149.6', voids <3/16" over <20% of surface, poorly fossiliferous,	-
-	Double.			tight 152.9' - Mechanical break	₽	trace cavities with secondary infill	-
	R21-NQ 5 ft	90	1		口	- <1"x1/2"	
]	100%	90		153.9, 154.15, 154.4' - Mechanical break (3) 154.0' - Mechanical break	Щ]
155				107.0 - McChailleal bican	┢	-	1
155					ဓ	_	
					<u> </u>		

APPENDIX 2BB-44 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-04	SHEET	9	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724023.6 N, 457634.2 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%)	S	DISCONTINUITIES	Ğ	LITHOLOGY	COMMENTS
DEPTH BELOV SURFACE ANI ELEVATION (fl	ORE RUN, ENGTH, AND RECOVERY (%	(%)	S	DECODIDATION			
	. ∺∺ .	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THE PROPERTY OF THE PROPER	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-113.7	034	Ω.	0	THICKNESS, SURFACE STAINING, AND TIGHTNESS 154.95, 156.3' - Mechanical break	S	CHARACTERISTICS Limestone	
	156.5 R22-NQ 5 ft 98%			, ,			R21: 22 minutes R22: 9 minutes 10:30 03/27/07: Reach total depth at 161.5' with criteria at 80% recovery and 70% RQD



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-05	SHEET	1	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723975.3 N, 457680.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 2-3/8 tri-cone bit

DNILLIN	GIVILITI	JD AND	LQUIFIVII	ENT DIELLICH DE	50 3/11 232, Illuu Tolai	y, cathead, AWJ rods, 2-3	70 til-cone bit		ORIENTATION: Vertical
WATER	LEVELS	: 3.5 ft bo	gs on 3/06	6/07	START : 2/26/2007	END: 3/1/2007	LOGGER	: T.	Valentine, R. Bitely, J. Schaeffer
				STANDARD		SOIL DESCRIPTION		(L	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				SYMBOLIC LOG	
HHO NA NA		RECOVE	BV (ft)	TEST RESULTS	SOIL NAME,	, USCS GROUP SYMBOL	., COLOR,	CIC	DEPTH OF CASING, DRILLING RATE,
F EE ¥		INLOOVE	<u> </u>		MOISTURE C	CONTENT, RELATIVE DE Y, SOIL STRUCTURE, MI	NSITY OR	lBO	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			#TYPE	6"-6"-6" (N)	CONSISTENC	T, SOIL STRUCTURE, WI	INLHALOGT	SYN	INSTRUMENTATION
42.0				(,				H	Water level is based on Ground Water
-							-		Monitoring at LNP site (FSAR Table
-							-		2.4.12.08) 2-3/8" tricone roller bit
l -							_		2-3/0 tricone roller bit
l -							_		
I _							_		
-	3.5						_		-
-	0.0				Poorly Graded S	Sand With Silt (SP-SM)	-	H	·
-		0.7	SS-1	5-5-4	3.5-4.2' - modera	ate yellow to moderate of	olive brown, -	誾出	-
		0.7	00 1	(9)	fines, 30% very f	1), wet, loose, 10-15% n fine silica sand, trace iro	onplastic on cemented		-
5 37.0	5.0				sand concretions	s to 1/8"		1711	_
-									
-							_		
I _							_		_
l _							_		
-	1						_		-
-	8.5						_		-
-	0.5				Silt (ML)			Ш	-
-	1	1.2	SS-2	9-18-50/4	8.5-9.7' - dark ye	ellowish orange, (10YR)	6/6), moist to -		-
	9.8			(68/10")	wet, nard, nonpia	astic, rapid dilatancy, me to medium sand-sized	oderate HCI _all carbonate <i>—</i>		-
10 32.0					1	, tooa.a oaa ozoa			
-							-		-
_							-		-
_							_		<u>.</u>
l _							_		_
							_		
-	13.5						_		
-					Silt With Sand (I	ML)		Ш	-
-		1.3	SS-3	25-28-31	13.5-14.8' - Sam medium sand	ne as 8.5-9.7' except 20°	% very fine to -		
	45.0			(59)	IIIeuiuiII Saiiu				-
15 27.0	15.0								_
-							-		
-							-		-
-							_		-
-							_		
_	17.5							Ш	_
	18.1	0.3	SS-4	33-50/1 (83/7")	Silt With Sand (I	ML) ne as 13.5-14.8' except l	one of fine to	Ш	
				(00/7)	coarse sand-size	ed material from 18.6-18	3.7'		
-	1								
-							_		-
20							-		-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-05	SHEET	2	OF	a	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723975.3 N, 457680.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 2-3/8 tri-cone bit

DNILLIN	GIVILITI	JD AND	EQUIFIVI	ENT DIELLICH DE	50 5/N 232, IIIuu Iolai	y, cathead, AWJ rods, 2-3	o th-cone bit		ORIENTATION: Vertical
WATER	LEVELS	: 3.5 ft bg	gs on 3/06	6/07	START: 2/26/2007	END: 3/1/2007	LOGGE	R : T.	Valentine, R. Bitely, J. Schaeffer
				STANDARD		SOIL DESCRIPTION		(n	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				SYMBOLIC LOG	
N A N		RECOVE	DV (ft)	TEST RESULTS	SOIL NAME,	, USCS GROUP SYMBOL	, COLOR,	음	DEPTH OF CASING, DRILLING RATE,
A F A E		INLOOVE			MOISTURE (CONTENT, RELATIVE DE Y, SOIL STRUCTURE, MI	NSITY OR	8	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
929			#TYPE	6"-6"-6" (N)	CONSISTENC	Y, SOIL STRUCTURE, MII	NERALOGY	Ĭ,	INSTRUMENTATION
22.0				(14)				۳	
							-	-	-
l -								1	_
I -							•		1
-								1	-
-							-	ł	-
-	23.5			25-50/2	Silty Sand (SM)			100	-
_	24.2	0.6	SS-5	25-50/2 (75/8")		yellowish orange, (10YF	R 6/6), wet,		_
_				(/	\ very dense, mild	I to moderate HCI reaction	on, fine to	1	
25_ 17.0					\coarse sand, 35	% nonplastic fines, all ca	arbonate]	
17.0							_	1]
-								1	1
-								1	-
-								ł	-
-								1	-
I _									_
-	28.5								
-	20.0				Silty Sand (SM)			m	1
-		0.9	SS-6	8-8-50/2 (58/8")	28.5-29.4' - Sam	ne as 23.5-24.1' except f	ragmented	1111	<u>-</u>
-	29.7			(36/6)	limestone lenses	s 1/4"-1/2" thick at 28.75	or and 29.4	1 1-1	-
30 12.0							_	1	_
12.0								1	_
I _							-		_
-							-		1
-								1	-
-								1	-
-	33.5				Silty Sand With	Gravel (SM)		717	-
-				13-16-7	33.5-34.7' - dark	vellowish orange. (10YI	R 6/6), wet.	1	-
1 _		1.2	SS-7	(23)	medium dense, i	mild to moderate HCl rea	action, fine to]
35_	35.0			,	coarse sand, 25° nonplastic fines,	% fine to coarse gravel,	30%	1111	1
7.0					Tionplastic lines,	an carbonale		1]
-							-	1]
-							-	1	1
-							-	1	-
-								1	Driller's Remark: Intermittent heavy chatter
-								1	on drilling 37.0-38.5'
-								1	on drilling 37.0-38.5' – Driller's Remark: Very dense material, difficult drilling 37.0-40.0'
	38:5							L	difficult drilling 37.0-40.0'
1 -	-00.0	0.0	SS-8	50/1.5	No Recovery 38	3.5-38.6'		Г	1
-				(50/1.5")	1		-	1]
40								1	1
40								1	
								1	
ь		l	I					1	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-05	SHEET	3	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723975.3 N, 457680.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 2-3/8 tri-cone bit

DRILLIN	<u>G METH</u>	OD AND	EQUIPM	ENT: Dietrich D-5	60 S/N 232, mud rotary, cathead, AWJ rods, 2-3/8 tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 3.5 ft bo	gs on 3/0	6/07	START: 2/26/2007 END: 3/1/2007 LOGGER: T. Valentine, R. Bitely, J. Schaeffer
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
필유한		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
ATA -XA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
SUI			# · · · · _	(N)	≿s
2.0					
-	1				1
-	1				†
-	1				
-	-				
-					
-					
_	43.5 43.8	0.4	00.0	50/0	
_	45.0	0.1	SS-9	50/3 (50/3") /	Lean Clay With Sand (CL) 43.5-43.6' - moderate olive brown, (5Y 4/4), wet, hard,
_				(00/0)	\medium plasticity, mild to moderate HCl reaction. /
45					20% sand and limestone fragments
-3.0					
-	1				
-					
-	-				
-					
-					
-					
l _	48.5				
l _	49.0	0.5	SS-10	50/4 (50/4")	Fat Clay (CH) 48.5-48.6' - pale olive, high plasticity
				(50/4)	Silt With Sand And Gravel (ML)
50	1				\48.6-48.8' - moderate olive brown, (5Y 4/4), wet, low
-8.0					plasticity, rapid dilatancy, mild to moderate HCI reaction, 25% fine to coarse sand, 20% gravel
-	1				Leaction, 25% line to coalse said, 20% graver
-					
-					
_					
-					
-					│
-	53.5				
I _		0.5	SS-11	47-50/3 (97/9")	Silty Sand With Gravel (SM) 53.5-53.95' - moderate olive brown, (5Y 4/4), wet, very -
	54.3			(97/9)	\ dense, mild to moderate HCl reaction, fine to coarse
55					\sand, 25% nonplastic fines, 30% fine gravel
-13.0	1				\limestone, all carbonate \
-					
-					
-					-
1 -					-
-					
-	58.0	0.0	00 10	FO/0	Posin Pook Caring at F0.0 # has
-	58.0	0.0	SS-12	50/0 (50/0")	Begin Rock Coring at 58.0 ft bgs See the next sheet for the rock core log
-				(==,0)	
[_					
60] [



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-05 SHEET 4 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723975.3 N, 457680.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

COMINC	NETTIODA	ND L	ZUIFIV	/IEN1: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	Casiii	3	ORIENTATION : Vertical
WATER	LEVELS: 3.5	ft bg	s on 3	/06/07 START : 2/26/2007 END : 3/	1/200	LOGGER: T. Valentine, R. Bitely	, J. Schaeffer
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOCK TYPE COLOR	
	1 2 4 K	(9	FRACTURES PER FOOT	5200 m non	익	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
H H H		Q D (%)		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	교	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
	N N N N	Ø	ER Z	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ΙŽ	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
		œ	표료	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	, i
	58.0			58.05' - Mechanical break, vertical, rough,	ш	Limestone	
-	R1-NQ		3	stepped	╁┼	- 58.0-59.7' - light olive gray, (5Y 5/2),	Driller's Remark: hard,
-	2 ft	54		58.1' - Mechanical break, 10 deg, rough,		very fine to fine grained, strong HCl reaction, weak to medium strong (R2	switch to 3 7/8" rock core -
Ι.	80%		2	stepped 58.3' - Mechanical break, 60 deg, rough,	ш	- to R3), voids up to 3/16" on 50% of	bit to depth
60	60.0		NR	undulating	Н	surface, cavities up to 1/2",	R1: 2 minutes
-18.0	00.0			59.05' - Bedding plane or mechanical break,	1	microfossils with few macrofossils, 1"	Even, continuous boring —
-	R2-NQ		>10	rough, undulating	ш	 low to moderate plasticity silt at 	R2: 2 minutes
l _	1.5 ft	31		59.45' - Fracture, 70 deg, smooth, undulating	\mathbb{H}	_ 59.5-59.6'	Short run to adjust tooling -
	60% 61.5		NR	60.0-60.4' - Fracture zone or mechanical	Н	No Recovery 59.7-60.0'	for 5' continuous run length
-	01.0			break, multiple intersecting fractures, various	ш	 Limestone 60.0-60.8' - Same as 58.0-59.7 	
-			1	angles, bedding plane fractures at 60.2',	╂	except medium strong to very strong	CC 1 callegated at C2 0
I -				60.25', and 60.4, rough to smooth, undulating to stepped, tight	Н	- (R3 to R5), trace organic	SC-1 collected at 62.0- 62.8'
			.	61.7' - Mechanical break	Ш	laminations, seams up to 1/16" thick,	02.0
1 -			1	62' - Bedding plane, horizontal, smooth,		voids <3/16" over 60% of surface,	1
I -	Do NO			undulating	╂╨┤	few cavities up to 1x1/4"	-
I -	R3-NQ 5 ft	55	3	62.8' - Bedding plane, 40 deg, rough, stepped	Ш	No Recovery 60.8-61.5	
	75%	55		63.1' - Mechanical break		Limestone 61.5-65.25' - Same as 60.0-61.5']
			_	63.35' - Mechanical break, 40 deg, rough, stepped	₩	except moderate yellowish brown to	1
-23.0	-		6	63.7' - Mechanical break, 60 to 90 deg.	$+ \Box$	pale yellowish brown, (10YR 5/4 to	
-20.0				smooth, undulating		10YR 6/2), extremely weak (R0),	_
			NR	63.8' - Mechanical break, 50 deg, smooth,	Н	voids up to 1/12" on 30% of surface,	R3: 9 minutes
_	005			undulating, intersecting 67.7' mechanical	111	large cavities up to 3" with silt infill	1
-	66.5			break		No Recovery 65.25-66.5' Limestone	-
l -			4	64.05' - Mechanical break, horizontal, rough,	ш	66.5-67.3' - Same as 61.5- 66.5'	_
			'	undulating 64.65-64.75' - Mechanical break (4), rough,	Н	except very weak to medium strong	
-				undulating, multiple intersections and angles,		(R1 to R3), voids <1/16" over 10% of	1
-			3	ground rock	╂┴┤	surface, trace cavity infill	-
-				64.75' - Fracture, 60 deg, smooth, undulating	H	_ 67.3-68.1' - Same as 66.5-67.3'	CC 2 callegated at 60 45
	R4-NQ	77	0	65.05' - Bedding plane, 40 deg, smooth,		except weak to medium strong (R2 to	SC-2 collected at 68.45- 69.45'
	5 ft 98%	11	0	undulating	Ш	 R3), voids up to 3/16" over 50% of surface, cavities up to 1/2" 	00.40
<u>-</u> , -	1 00%			67.05, 67.15, 67.30, 67.65' - Mechanical break (4), <10 deg, rough, stepped to	т	68.1-68.45' - Same as 67.3-68.1'	1
70			1	undulating —		— except very weak (R1), friable	-
-28.0				68.15, 68.45' - Bedding plane, horizontal,	Щ	surface, no voids or cavities	
I -				smooth, undulating	H	68.45-71.4' - Same as 68.1-68.45'	R4: 13 minutes
1 -			1	68.3' - Mechanical break		- except dense, strong HCl reaction,	-
1 -	71.5		NR/	69.7, 70.1' - Mechanical break	₽₽	medium strong (R3), voids up to 1/16" over 20% of surface, trace	-
I -			1	70.4' - Fracture, 60 deg, smooth, undulating 71.05' - Fracture or mechanical break, 10 to	H	- organics, microfossils	
1				50 deg, rough, stepped to undulating		No Recovery 71.4-71.5'	
1 -				71.2' - Fracture, vertical, rough, stepped to	14	Limestone	1
-			2	undulating	HH	- 71.5-72.4' - Same as 68.45-71.4'	-
I -			$oxed{}$	72.15' - Bedding plane, horizontal, smooth,		except pale yellowish brown to	
1	R5-NQ		_	undulating	Ш	yellowish gray, (10YR 6/2 to 5Y 7/2), very weak to weak (R1 to R2), voids	
I -	5 ft 88%	55	3	72.4' - Mechanical break or bedding plane, horizontal, smooth, undulating, <1/2" open	1	- very weak to weak (RT to R2), voids <3/16" over 60% of surface] 1
I	0070			72.65' - Bedding plane, horizontal, smooth,		72.4-72.65' - Same as 71.5-72.4'	-
75			1	undulating —	₽₽	— except extremely weak to weak (R0	-
-33.0			Ľ.	72.8' - Fracture, 70 deg, rough, undulating	Н	to R2), few cavities 1/4 x 1/8"	
Ι -			>10	73.8' - Fracture, horizontal, rough, undulating		72.65-75.1' - Same as 72.4-72.65'	R5: 11 minutes
1 -			NR	74.5, 74.75, 74.85' - Mechanical break		except medium strong (R3), voids up to 3/16" over 50%, cavities up to	-
1 -	76.5		INIX	75.1' - Fracture, 20 deg, smooth, undulating 75.15, 75.25' - Mechanical break, horizontal,		1/2x1/4" over 40%, sharp contact at	-
Ι.			>10	rough, undulating, 1/2" open	///	75.1'	
			10	75.55' - Fracture, 50 deg, rough, undulating			
-					П	<u> </u>	1
			\vdash		+-	<u> </u>	-

APPENDIX 2BB-49 Rev. 7



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-05 SHEET 5 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723975.3 N, 457680.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

				MENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW			ORIENTATION : Vertical
WATER	LEVELS : 3.5	ft bg	s on 3		1/200 		, J. Schaeffer COMMENTS
ĕ9€				DISCONTINUITIES	90	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
			4	75.6, 75.65' - Mechanical break or fracture	Ш	Limestone	
- 80	R6-NQ 5 ft 94%	57	3	zone, multiple intersecting fractures and angles, ground rock 75.8' - Bedding plane, horizontal, smooth, undulating 76.85-77.4' - Fracture zone, rough,		75.1-75.6' - Same as 72.65-75.1' except extremely weak to very weak (R0 to R1), weakens with depth, voids up to 3/16" over 30%	
-38.0			2	undulating, various angles 77.4' - Fracture, 50 deg, rough, undulating -	Ė	Calcareous Silty Fat Clay (CH) 75.6-75.9' - moist, hard, high plasticity, strong HCl reaction	R6: 18 minutes
- - -	81.5		0 NR 1	77.65, 77.95, 78.0, 78.05' - Bedding plane, <10 deg, smooth, undulating 78.55, 78.95, 79.35' - Bedding plane, horizontal, smooth, undulating		No Recovery 75.9-76.5' Calcareous Silty Fat Clay (CH) 76.5-76.85' - Same as 75.6-75.9' except pale yellowish brown, (10YR	
-			0	79.5' - Mechanical break 80.3, 80.5' - Bedding plane, <10 deg, rough, undulating		6/2), moist Limestone - 76.85-78.65' - pale yellowish brown,	SC-3 collected at 82.45- 83.25'
-	R7-NQ 5 ft	83	5	80.55-80.7' - Mechanical break 81.9, 84.3' - Mechanical break 82.25' - Mechanical break, 40 deg, smooth,		(10YR 6/2), strong HCI reaction, extremely weak to weak (R0 to R2), trace laminations with organics, voids	-
85	100%	os	2	undulating 83.6-83.65' - Fracture zone, rough, stepped, various angles, ground rock		up to 3/16" over 20%, cavities up to 1/4x1/8" over 5% of surface 78.65-79.85' - Same as 76.85-78.65'	
-43. 0			3	84.55, 85.2, 85.6, 85.95' - Mechanical break, rough, undulating to stepped, <1/2" open		except weak to medium strong (R2 to R3), voids up to 3/16" over 30-50% of surface	R7: 13 minutes
-	86.5		1	86.45' - Bedding plane, horizontal, smooth, undulating - 86.75' - Fracture or mechanical break, 70		79.85-80.50' - Same as 78.65-79.85' except dark yellowish brown, (10YR 4/2), voids up to 3/16" over 70% of surface, cavities up to 1/2"	
-			>10	deg, rough, stepped 87.9-88.3' - Fracture zone or mechanical break, rough, undulating, various angles		80.50-81.20' - Same as 79.85-80.5' except yellowish gray, (5Y 8/1), very fine grained, medium strong (R3),	
-	R8-NQ 5 ft 90%	67	2	88.5' - Bedding plane, horizontal, smooth, undulating 88.9' - Fracture or mechanical break, rough,		voids up to 3/16" over 15% of surface, fossil molds No Recovery 81.2-81.5' Limestone	
90 <u></u> -48.0			1	stepped, 1/2" open 89.1, 89.75, 90.65' - Bedding plane or fractures, smooth, undulating	H	81.5-83.1' - Same as 80.50-81.20' except possible bioturbation - 82.25-83.6' - few voids	_
-			1	89.4' - Mechanical break -	H	83.1-85.6' - strong HCl reaction, weak to medium strong (R2 to R3),	R8: 12 minutes
-	91.5		NR 5	91.5-91.6' - Fractures or mechanical break (3), rough, various angles, stepped to undulating	 	voids <1/16" over 70-80% of surface, cavities up to 3/4x1/2" over 30% of surface, few fossil molds, potential bioturbation	
-	R9-NQ		3	91.95' - Fracture, horizontal, rough, stepped, <1/2" open - 92.25, 92.5-92.6' - Fractures, horizontal, rough, stepped		85.95-86.5' - yellowish gray, (5Y 8/1), strong HCl reaction, very weak to weak (R1 to R2), voids up to 1/16"	
- 95	5 ft 86%	48	>10	92.9' - Fracture, horizontal, rough, stepped 93.7-94.25' - Fractures (>10)		over 30%, cavities up to 1/4x1/8 " over 15% of surface 86.5-87.9' - yellowish gray to dark yellowish brown, (5Y 8/1 to 10YR	
-53.0 -			0 3			4/2), very weak to medium strong (R1 to R3), voids <1/4" over 70 % of surface, cavities <1/2x1/4" over	R9: 14 minutes
- - -	96.5		NR >10	96.95' - Fracture or mechanical break, 0 to 45 deg, rough, stepped		30-40% of surface, possible bioturbation 87.9-91.0' - Same as 86.7-87.9' except voids <1/4" over 40-70 % of surface, cavities <1/4x1/4" over 10-20% of surface	

APPENDIX 2BB-50 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-05 SHEET 6 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723975.3 N, 457680.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

COMING	INIC IT IOD A	ND L	QUIF IV	IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	Casin	3	ORIENTATION : Vertical
WATER	LEVELS: 3.5	ft bg	s on 3.	/06/07 START: 2/26/2007 END: 3.	1/200	LOGGER: T. Valentine, R. Bitely	, J. Schaeffer
>00				DISCONTINUITIES	ں ا	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	Log	ROCK TYPE, COLOR,	
岩병흔	AUN H,A	Q D (%)	FRACTURES PER FOOT		SYMBOLIC	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YFA YFA	SGTE) [P	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BG	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SUF	COF	S. O	FR FR	THICKNESS, SURFACE STAINING, AND TIGHTNESS	l√S	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
			>10	97.15' - Fracture or mechanical break,		Limestone	
-	D40 NO			horizontal, rough, stepped	-	- 88.8-88.9' - Same as 87.9-91.0'	-
_	R10-NQ 5 ft	8		97.15-98.3' - Fracture zone, rough, stepped,	₽₩	except strong HCl reaction, mottled	
	40%	Ū		gravel up to 2" diameter, intersecting angles	ш	infilling with cavities, possible bioturbation, fossils prevalent	
100					1—1	No Recovery 91.0-91.5'	l -
-58.0			NR	_		Limestone	_
-					₩	91.5-92.25' - very light gray and	R10: 5 minutes
-					+ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$	yellowish gray, (N8 and 5Y 8/1), strong HCl reaction, extremely weak	-
1 _	101.5					to medium strong (R0 to R3), voids	_
			1		Н	up to 1/4" over 30% of surface,	SC-4 collected at 101.5-
			'		Ш	cavities up to 1/2", infill and	102.4'
-				102.45' - Fracture, 30 deg, rough, undulating	+	bioturbation Calcareous Fat Clay (CH)	l -
-			1	102.8' - Fracture, 30 deg, rough, undulating	口	92.25-92.60' - yellowish gray, (5Y	-
-	R11-NQ			103.3' - Mechanical break	╀┦	- 8/1), moist, stiff to hard, high	-
-	811-NQ 5 ft	69	2		Щ	plasticity, strong HCl reaction,	-
	100%				Н	carbonate derived	_
105				104.5, 104.35, 104.7, 105.1' - Bedding plane,	ш	 Limestone 92.6-95.8' - Same as 91.5-92.25' 	
-63.0			4	<10 deg, rough, undulating –	144	No Recovery 95.8-96.5'	_
-				105.2, 105.35' - Bedding plane, <10 deg, rough, undulating	Ш	95.8-96.5"	R11: 7 minutes
-			0	105.7' - Mechanical break	╁┼┤	Limestone 96.5-98.5" - yellowish gray, (5Y 7/2),	-
-	106.5				┸	 very fine to fine grained, strong HCl 	_
_			>10	106.65-107.25' - Fracture zone, rough,	Щ	reaction, extremely weak (R0),	_
			10	undulating, intersecting fractures at various	Н	friable, voids up to 1/4" over 30% of	
				angles, gravel up to 1-1/2" diameter 107.5' - Bedding plane, horizontal, rough,	\Box	 surface, few cavities with infill up to 1/4"x1/8", fossiliferous, trace 	
-			0	undulating	╁┼	organics	-
-	R12-NQ			108.1' - Mechanical break	┰	- No Recovery 98.5-101.5'	-
-	5 ft	53	1	108.95' - Fracture or bedding plane,	+	Limestone 101.5-104.8' - yellowish gray, (5Y	-
_	80%			horizontal, rough, undulating		- 7/2), very fine to fine grained, strong	_
110			5	400 05 440 05 440 05 440 41 Dodding	Н	HCl reaction, extremely weak to very	_
-68.0			"	109.85, 110.25, 110.35, 110.4' - Bedding – plane, horizontal, rough, undulating, tight to	ш	weak (R0 to R1), voids up to 3/16"	
				<1/2" open	\mathbb{H}	 over 50-70% of surface, cavities up to 1/2" over 30% of surface. 	R12: 6 minutes
-			NR		\Box	fossiliferous with infilled cavities and	-
-	111.5			444.01	₩	fossil molds, trace organics	-
-			2	111.6' - horizontal, smooth, undulating, 1/6" open, loose	Щ	104.8-105.05' - Same as 101.5-104.8' except laminated	-
				111.9' - horizontal, smooth, undulating, 1/12"	\square	_ bedding	_
			6	open, loose		Limestone	
1 1			°	112.55' - Bedding plane, horizontal, smooth,	Ш	105.05-106.5' - Same as 101.5-104.8	l -
1 -	R13-NQ			undulating 112.9' - Mechanical break	Ш	_ 106.5-110.5' - Same as 104.8-105.05' except voids <1/4"	l -
-	5 ft	30	2	113.1' - Fracture, 40 deg, smooth, undulating	뮈	over <20% of surface, many fossil	-
-	100%			113.3, 113.4, 113.5' - Fractures, 20 to 65	世	_ casts and cavities up to 1/2" diameter	-
115			3	deg, smooth, undulating 113.85' - Fracture, 40 deg, smooth,	Щ	No Recovery 110.5-111.5' Limestone	_
-73.0			Ĺ	undulating	\mathbb{H}	111.5-116.5' - Same as 106.5-111.5'	
			_	114.05' - Bedding plane, horizontal, smooth,		except few cavities 3/4"x1/4"	R13: 8 minutes
1 7	116.5		7	undulating	14		_
1 -	110.0			115.2' - Fractures, 0 to 80 deg, smooth, undulating	Ш	_ Limestone	
1 -			>10	115.4, 115.5' - Fractures, 35 deg and vertical,	+	- 116.5-118.7' - Same as 111.5-116.5'	-
1 -				smooth, undulating	口	except secondary infill in a few fossil	-
					Ш	molds	
					Ш		

APPENDIX 2BB-51 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-05	SHEET	7	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723975.3 N, 457680.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

DISCONTINUITIES LITHOLOGY COMMENTS	DISCONTINUTIES					IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW			ORIENTATION : Vertical
DESCRIPTION DESCRIPTION SUCH NESS DESCRIPTION DEPTH, TYPE ORIENTATION, ROUGHNESS DEPTH, TYPE ORIENTATION, ROUG	DESCRIPTION DESCRIPTION Section DESCRIPTION Section DESCRIPTION DESCRIPTION Section DESCRIPTION Section DESCRIPTION DE	WATER	LEVELS: 3.5	ft bg	s on 3/		1/2007		
121.5	121.5	⊋Q⊋	(%				၂ ဗွ	LITHOLOGY	COMMENTS
121.5	121.5	DEPTH BELO' SURFACE AN ELEVATION (f	CORE RUN, LENGTH, ANC RECOVERY (R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AN SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
Comparison	Comparison	- -	R14-NQ 5 ft 44%		>10	undulating, intersecting at various angles 116.6' - Bedding plane, horizontal, smooth, undulating 116.6-117.7' - Fracture zone, rough, undulating, multiple intersecting fractures, gravel < 1-1/2" diameter 118.35, 118.55' - Fractures, 55 deg, smooth,		No Recovery 118.7-121.5'	R14: 4 minutes
122.6. 124.3' - Mechanical break 122.6. 124.3' - Mechanical break 122.6. 124.3' - Mechanical break 122.6. 124.6' - Mechanical break 122.6' - Fracture, 25 deg., smooth, undulating 123.6' - Fracture, 20 deg., smooth, undulating 123.6' - Fracture, 20 deg., smooth, undulating 123.6' - Fracture, 20 deg., smooth, undulating 125 Bedding plane, horizontal, smooth, undulating 126.5, 126.5' - Bedding plane, horizontal, smooth, undulating 122.6, 125.6, 125.75, 125.75, 125.9, 125.6' - 125.6, 125.46' - 126.5	12.6 124.3' - Mechanical break 122.6' - Bedding plane, horizontal, smooth, undulating 123.6' - Fracture, 20 deg, smooth, undulating 123.6' - Fracture, 20 deg, smooth, undulating 123.6' - Fracture, 20 deg, smooth, undulating 125' - Bedding plane, horizontal, smooth, undulating 125' - Bedding plane, horizontal, smooth, undulating 126.15, 126.26' - Bedding plane, horizontal, smooth, undulating 126.5 126.85, 126.95' - Bedding plane, horizontal, smooth, undulating 1272, 1293, 12945, 129.6, 130.25' - Mechanical break 1272, 1293, 12945, 129.6, 130.25' - Mechanical break 128.65, 128.6' - Same as 123.65-125.6' - S	-	121.5		0		Ħ	- 121.5-123.65' - Same as	
R15-NO 76 0 123.3" - Fracture, 35 deg, smooth, undulating 123.65 - 125.65 125.65 - 125.65 125.65 - 125.65 125.65	R15-NQ 5 ft 100% 128 5 Fracture 35 deg, smooth, undulating 123 def - Fracture 23 deg, smooth, undulating 123 def - Fracture 20 deg, smooth, undulating 125 - Bedding plane, horizontal, smooth, undulating 125 - Bedding plane, horizontal, smooth, undulating 126 ft, 126 degrees 126 ft, 126 degrees 128 degrees	-			3				
125	125	-	5 ft		0	undulating 123.3' - Fracture, 35 deg, smooth, undulating 123.65' - Fracture, 20 deg, smooth,	Ħ		
126.5 125.4 125.45 125.6 125.7 125.75 125.9 126.15 126.25' - Bedding plane, horizontal, smooth, undulating 127.4 129.3 129.45 129.6 130.25' - Mechanical break 128.65 126.65' - Bedding plane, horizontal, smooth, undulating 127.2 129.3 129.45 129.6 130.25' - Mechanical break 128.65 128.65' - Same as 123.65-125.0' 125.45-126.5' - Same as 123.65-126.0' 125.45-126.5' - Same as 123.65-126.5' - Same as 123.65-12	126.5 126.5 126.5 125.6 125.7 125.75 125.9 126.1 126.2 126.15 126.25 126.15 126.25 126.15 126.25 126.15 126.25 126.15 126.25 126.15 126.25 126.15 126.25 126.15 126.25 126.15 126.25 126.15 126.25 126.15 126.25 126.15 126.25 126.15 126.25 126.15	125_ -83.0	100%		3	_		 medium strong (R2 to R3), highly fossiliferous, voids <1/4" over 50-70% of surface, cavities 	
126.85, 126.95' Bedding plane, horizontal, smooth, undulating 127.2, 129.3, 129.45, 129.6, 130.25' - 126.5-131.4' - very fine to fine grained, strong HCI reaction, very weak to weak (R1 to R2), voids (< 3/16") variable 0-30% of surface, (especially at 127.05-128.5' and 129.6-131.4'), formulating 132.05, 132.35' - Bedding plane, horizontal, smooth, undulating 132.35' - 132.5' - Fracture someth, undulating 132.35' - Same as 125.45-126.5' except many fossil molds and casts with few secondary infill of molds 128.5-129.6' - Same as 128.5-129.6 except many fossil molds and casts with few secondary infill of molds 128.5-129.6' - Same as 128.5-129.6 except many fossil molds and casts with few secondary infill of molds 128.5-129.6' - Same as 128.5-129.6 except many fossil molds and casts with few secondary infill of molds 128.5-129.6' - Same as 128.5-129.6 except many fossil molds and casts with few secondary infill of molds 128.5-129.6' - Same as 128.5-129.6 except many fossil molds and casts with few secondary infill of molds 128.5-139.5' - Same as 128.5-129.6 except many fossil molds and casts with few secondary infill of molds 128.5-139.5' - Same as 128.5-129.6 except many fossil molds and casts with few secondary infill of molds 128.5-139.5' - Same as 128.5-139.5' - Facture sone, horizontal, smooth, undulating 132.65' - Bedding plane, horizontal, smooth, undulating 133.45' - 38.55' - Fracture zone, horizontal, smooth, undulating 133.65' - Bedding plane, horizontal, smooth, undulating 133.65' - Fracture, 40 deg, smooth, 136.5' - Fracture, 40 d	126.85, 126.95 - Bedding plane, horizontal, smooth, undulating 127.2, 129.3, 129.45, 129.6, 130.25 - Mechanical break 128.6 - 131.4 - very fine to fine grained, strong HCI reaction, very weak to weak (R1 to R2), voids (< 3/16") variable 0-30% of surface, (especially at 127.05-128.5' and 129.6-131.4'), fostifierous (molds/casts), secondary infill in molds 127.6 - 128.5' -	_	126.5		6	125.4, 125.45, 125.6, 125.7, 125.75, 125.9, 126.15, 126.25' - Bedding plane, horizontal,		125.0-125.45' - Same as 123.65-125.0'	R15: 5 minutes
127.2, 129.3, 129.45, 129.6, 130.25' -	127.2, 129.3, 129.45, 129.6, 130.25' -	-			2	126.85, 126.95' - Bedding plane, horizontal, smooth, undulating		123.65-125.0' Limestone	
R16-NQ S ft 98% 82 0 0 0 0 0 0 0 0 0	R16-NQ 5 ft 98% 82 0 0 0 0 0 0 0 0 0	-			0		H	grained, strong HĆl reaction, very weak to weak (R1 to R2), voids (<	
secondary infill in molds 127.05-128.5' - Same as 125.45-126.5' except many fossil molds and casts with few secondary infill of molds 128.5-129.6' - Same as 121.5-123.65 129.6-131.4' - Same as 128.5-129.6 except many fossil molds and casts with few secondary infill of molds 128.5-129.6' - Same as 121.5-123.65 129.6-131.4' - Same as 128.5-129.6 except many fossil molds and casts with few secondary infill of molds 128.5-129.6' - Same as 121.5-123.65 129.6-131.4' - Same as 128.5-129.6 except many fossil molds and casts with few secondary infill of molds 128.5-129.6' - Same as 121.5-123.65 129.6-131.4' - Same as 128.5-129.6 except many fossil molds and casts with few secondary infill of molds 128.5-129.6' - Same as 121.5-123.65 129.6-131.4' - Same as 128.5-129.6 except many fossil molds and casts with few secondary infill of molds 128.5-129.6' - Same as 121.5-123.65 129.6-131.4' - Same as 128.5-129.6 except many fossil molds and casts with few secondary infill of molds 128.5-129.6' - Same as 121.5-123.65 129.6-131.4' - Same as 128.5-129.6 except many fossil molds and casts with few secondary infill of molds 128.5-129.6' - Same as 121.5-123.65 129.6-131.4' - Same as 128.5-129.6 except many fossil molds and casts with few secondary infill of molds 128.5-129.6' - Same as 121.5-123.65 129.6-131.4' - Same as 128.5-129.6 except many fossil molds and casts with few secondary infill of molds 128.5-129.6' - Same as 121.5-123.65 129.6-131.4' - Same as 128.5-129.6 except many fossil molds and casts with few secondary infill of molds 128.5-129.6' - Same as 121.5-123.65 129.6-131.4' - Same as 128.5-129.6 except many fossil molds and casts with few secondary infill of molds 128.5-132.6' - Palcular 131.5-131.5' - Facture 131.5-131.5' - Facture 131.5-131.5' - Facture 131.5-131.5' - Facture 132.85, 133.05, 133.1, 133.25, 133.3, 133.45' 131.5-131.5' - Facture 132.85, 133.05, 133.1, 133.25, 133.3, 133.45' 131.5-131.5' - Facture 132.85, 133.05, 133.1, 133.25, 133.3, 133.45' 131.5-131.5' - Facture 132.85, 132.6' - Facture zone, horizon	secondary infill in molds 127.05-128.5' - Same as 125.45-126.5' except many fossil molds and casts with few secondary infill of molds 128.5-129.6' - Same as 121.5-123.65 129.6-131.4' - Same as 128.5-129.6 except many fossil molds and casts with few secondary infill of molds 128.5-129.6' - Same as 121.5-123.65 129.6-131.4' - Same as 128.5-129.6 except many fossil molds and casts with few secondary infill of molds 128.5-129.6' - Same as 121.5-123.65 129.6-131.4' - Same as 128.5-129.6 except many fossil molds and casts with few secondary infill of molds 128.5-129.6' - Same as 121.5-123.65 129.6-131.4' - Same as 128.5-129.6 except many fossil molds and casts with few secondary infill of molds 128.5-129.6' - Same as 121.5-123.65 129.6-131.4' - Same as 128.5-129.6 except many fossil molds and casts with few secondary infill of molds 128.5-129.6' - Same as 121.5-123.65 Fat Calcareous Clay (CH) 131.5-131.55' - yellowish gray, (5Y 7/2), moist to wet, soft, high plasticity Limestone 131.5-132.6' - yellowish gray, (5Y 7/2), strong HCl reaction, very weak to weak (R1 to R2), voids <1/4'' over 20-70% of surface, variable, cavities <1/4" diameter over 20% of surface, variable, fossil molds throughout with some infilling	_	5 ft		0			(especially at 127.05-128.5' and 129.6-131.4'), cavities (<1/4") over	
131.5 NR 131.65' - Fracture, <10 deg, rough, undulating 132.05, 132.35' - Bedding plane, horizontal, smooth, undulating, perpendicular fractures 0 and 90 degrees 132.65' - Bedding plane, horizontal, smooth, undulating, <1/4" open 132.85, 133.05, 133.1, 133.25, 133.3, 133.45' 132.85, 133.05, 133.1, 133.25, 133.3, 133.45' 133.65' - Bedding plane, horizontal, smooth, undulating 133.45-133.55' - Fracture zone, horizontal, rough, undulating 133.65' - Bedding plane, horizontal, smooth, undulating 133.05' - Fracture zone, horizontal, smooth, undulating 135.05' - Fracture, 40 deg, smooth, undulating 1	131.5 NR 131.65' - Fracture, <10 deg, rough, undulating 132.05, 132.35' - Bedding plane, horizontal, smooth, undulating, perpendicular fractures 0 and 90 degrees 132.65' - Bedding plane, horizontal, smooth, undulating, <1/4" open 132.85, 133.05, 133.1, 133.25, 133.3, 133.45' 132.85, 133.05, 133.1, 133.25, 133.3, 133.45' 133.65' - Bedding plane, horizontal, smooth, undulating 133.45-133.55' - Fracture zone, horizontal, rough, undulating 133.65' - Bedding plane, horizontal, smooth, undulating 133.05' - Fracture zone, horizontal, smooth, undulating 135.05' - Fracture, 40 deg, smooth, undulating 1				0	_	坩	secondary infill in molds	
132.05, 132.35' - Bedding plane, horizontal, smooth, undulating 132.35-132.5' - Fractures, smooth, undulating, perpendicular fractures 0 and 90 degrees 132.65' - Bedding plane, horizontal, smooth, undulating, <1/4" open 132.85, 133.05, 133.1, 133.25, 133.3, 133.45' - Bedding plane, horizontal, smooth, undulating 132.85, 133.05, 133.1, 133.25, 133.3, 133.45' - Bedding plane, horizontal, smooth, undulating 133.6' - Bedding plane, horizontal, rough, undulating, gravel <1/2", angular 136.5	132.05, 132.35' - Bedding plane, horizontal, smooth, undulating 132.35-132.5' - Fractures, smooth, undulating, perpendicular fractures 0 and 90 degrees 132.65' - Bedding plane, horizontal, smooth, undulating, <1/4" open 132.85, 133.05, 133.1, 133.25, 133.3, 133.45' - Bedding plane, horizontal, smooth, undulating 132.85, 133.05, 133.1, 133.25, 133.3, 133.45' - Bedding plane, horizontal, smooth, undulating 133.45-133.55' - Fracture zone, horizontal, rough, undulating, gravel <1/2", angular 136.5 - Bedding plane, horizontal, smooth, undulating 133.6' - Bedding plane, horizontal, smooth, undulating 133.6' - Bedding plane, horizontal, smooth, undulating 135.05' - Fracture, 40 deg, smooth, undulating 135.05' - Fracture, 40 deg	- -	131.5		(NR)			molds and casts with few secondary infill of molds 128.5-129.6' - Same as 121.5-123.65	1 K16: / minutes
R17-NO 5 ft 100% 5 ft 100% 5 ft 132.65' - Bedding plane, horizontal, smooth, undulating, 1/4" open 132.85, 133.05, 133.1, 133.25, 133.3, 133.45' - Bedding plane, horizontal, smooth, undulating 133.45-133.55' - Fracture zone, horizontal, rough, undulating, gravel < 1/2", angular 133.6' - Bedding plane, horizontal, smooth, undulating 135.6' - Fracture, 40 deg, smooth, undulating 135.05' - Fracture, 40 deg, smooth, undulati	R17-NO 5 ft 100% 5 ft 100% 5 ft 132.65' - Bedding plane, horizontal, smooth, undulating, 1/4" open 132.85, 133.05, 133.1, 133.25, 133.3, 133.45' - Bedding plane, horizontal, smooth, undulating 133.45-133.55' - Fracture zone, horizontal, rough, undulating, gravel < 1/2", angular 133.6' - Bedding plane, horizontal, smooth, undulating 135.6' - Fracture, 40 deg, smooth, undulating 135.05' - Fracture, 40 deg, smooth, undulati	-			>10	132.05, 132.35' - Bedding plane, horizontal, smooth, undulating 132.35-132.5' - Fractures, smooth,		with few secondary infill of molds No Recovery 131.4-131.5'	
- Bedding plane, horizontal, smooth, undulating 133.45-133.55' - Fracture zone, horizontal, rough, undulating, gravel <1/2", angular 133.6' - Bedding plane, horizontal, smooth, undulating 135.05' - Fracture, 40 deg, smooth, undulating 135.05' - Fracture, 40 de	- Bedding plane, horizontal, smooth, undulating 133.45-133.55' - Fracture zone, horizontal, rough, undulating, gravel <1/2", angular 133.6' - Bedding plane, horizontal, smooth, undulating 135.05' - Fracture, 40 deg, smooth, undulating 135.05' - Fracture, 40 de	-	5 ft		1	degrees 132.65' - Bedding plane, horizontal, smooth, undulating, <1/4" open		131.5-131.55' - yellowish gray, (5Y 7/2), moist to wet, soft, high plasticity Limestone	
rough, undulating, gravel <1/2", angular 136.5 rough, undulating, gravel <1/2", angular rough, undulating, gravel	rough, undulating, gravel <1/2", angular 136.5 rough, undulating, gravel <1/2", angular rough, undulating, gravel					- Bedding plane, horizontal, smooth, undulating		7/2), strong HCl reaction, very weak to weak (R1 to R2), voids <1/4" over	R17: 6 minutes
100.00 - Hadialic, 40 deg, Sillouil,	100.00 - Hadialic, 40 deg, Sillouil,	_	136.5			rough, undulating, gravel <1/2", angular 133.6' - Bedding plane, horizontal, smooth, undulating		<1/4" diameter over 20% of surface, variable, fossil molds throughout with	

APPENDIX 2BB-52 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-05	SHEET	8	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723975.3 N, 457680.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

CORING	NIE I NOD AI	ND E	JUIFIV	IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	Casiri	<u> </u>	ORIENTATION: Vertical
WATER	LEVELS: 3.5	ft bg	s on 3	06/07 START : 2/26/2007 END : 3/	1/200	LOGGER : T. Valentine, R. Bitely	J. Schaeffer
>00	(9			DISCONTINUITIES	ر ا	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
BHO	L, A	(%	FRACTURES PER FOOT		-	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
FAC AT	E R OVI	D (%)	달입	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
P.R.P.	ENCE	ø	RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ΔОШ	074	ľ		,	S		
			2	135.4' - Fracture, 30 to 50 deg, smooth,	Н	132.6-133.0' - Same as	
	R18-NQ			undulating 135.55,135.6, 135.80, 136.3, 136.5' -	т	 131.55-132.6' except light olive brown, (5Y 5/2), very fine to fine 	
_	5 ft	58	0	Fractures, <10 deg, smooth, undulating		grained, weak to medium strong (R2	
_	100%			136.65, 136.75, 137.05, 137.1, 137.2, 137.25,	₽₩	- to R3), few fossils, voids <1/4" over	
140			5	137.4, 137.6' - Bedding plane, 0 to 10 deg,	Ш	5% of surface, fossil molds <1/8"	_
-98.0				smooth, undulating	\Box	133.0-136.5' - Same as	
_				138.4' - Fracture, 15 deg, rough, undulating	₩	- 131.55-132.6' Limestone	R18: 7 minutes
-			5	139.65, 139.75, 140.0, 140.3, 140.35, 140.9, 141.1, 141.15, 141.3, 141.45, 141.5' -	Ш	136.5-137.1' - yellowish gray, (5Y	
_	141.5			Bedding plane, horizontal and <10 deg,		- 7/2), very fine to fine grained, strong	
				undulating, rough to smooth	Н	HCl reaction, very weak to weak (R1	
			1	141.65' - Bedding plane, <10 deg, smooth,	Ш	to R2), variable 0-30% 15-20% of	
-				undulating	H	- surface, cavities (<1/2"), variable	
			1	142.6' - Mechanical break	₽₩	15-20%of surface, fossiliferous, trace molds and laminated bedding, rare	
				143.35' - Fracture or mechanical break, 20	Ш	secondary infill of cavities	
	R19-NQ			deg, rough, stepped	Н	137.1-137.25' - Same as	
_	5 ft	42	4	143.65' - Fracture, horizontal, rough,	Н	136.5-137.1' except pale yellowish	
-	86%			undulating	ш	brown to moderate yellowish brown	
145			>10	144.05' - Fracture, horizontal, rough,	Н	to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), medium strong	_
-103.0			10	undulating	Н	6/2 to 101R 5/4), medium strong _ (R3)	
_			5	144.3-145.05' - Fracture zone, rough, intersecting fractures at various angles, <1"	Ш	137.25-139.75' - Same as	R19: 24 minutes
-			NR	gravel, angular, stepped to undulating, partial	╁┼	⁻ 136.5-137.1'	
-	146.5			recovery		_ 139.75-140.0' - Same as	
_			1 1	145.25' - Bedding plane, horizontal, rough,	ш	137.1-137.25' - 140.0-141.5' - Same as 136.5-137.1'	SC-6 collected at 146.5- 147.4'
			'	undulating	Н	Limestone	147.4
_				145.45' - Fracture, vertical, smooth, undulating		141.5-145.5' - dark yellowish brown	
-			0	145.55, 145.65, 146.15' - Bedding plane,	╫	to pale yellowish brown, (10YR 4/2 to	
_				horizontal, smooth, undulating	╆	_ 10YR 6/2), very fine to fine grained,	
_	R20-NQ 5 ft	90	2	145.8, 146.05, 146.35' - Fractures (3),	Н	strong HCl reaction, weak to medium strong (R2 to R3), with extremely	
	98%	90	-	vertical, smooth, undulating	Н	weak (R0) zone at 141.6-141.65',	
150				147.45' - Bedding plane, horizontal, smooth, undulating	ш	voids (<3/16") over 10-50% of	
150 <u> </u>			2	148.35' - Mechanical break	╂┼┤	 surface, cavities and fossil molds (up 	-
100.0				149.15, 149.25, 149.75, 150.0, 150.75, 151.4'	₽₩	to 1" diameter) over 40% of surface,	
			1	 Bedding plane, horizontal and <10 deg, 	Ш	about 50% of cavities have	R20: 10 minutes
	151.5		'	smooth, undulating	Н	 secondary infill, very fossiliferous (molds) 	
-	101.0		NR)		╁┼┤	145.5-145.8' - pale yellowish brown,	
-			0		Ш	 (10YR 6/2), very fine grained, strong 	
					\mathbb{H}	HCl reaction, medium strong (R3),	
				152.75, 153.2, 153.35' - Mechanical break	Ш	laminated bedding, voids (<3/16")	
_			0	102.70, 100.2, 100.00 - Meditallida biedk .	Ш	 over 0-20% of surface No Recovery 145.8-146.5' 	
-	R21-NQ				╂┼┤	Limestone	
_	5 ft	80	6	153.85, 153.9, 154.05, 154.15, 154.3, 154.35,		 146.5-151.4' - pale yellowish brown, 	
	94%		Ĺ	154.9, 155.0' - Bedding plane, 0 to 10 deg,	Щ	(10YR 6/2), very fine to fine grained,	
155				smooth, undulating	Н	strong HCl reaction, weak to medium	
-113.0			2	_	ш	strong (R2 to R3), voids (<3/16") over 0-20% of surface (voids <1/4"	-
-			\vdash	455 55 455 051 Mark 1 11 1	ш	over 80% of surface from	R21: 11 minutes
_			0	155.55, 155.65' - Mechanical break	Н	_ 150.7-151.05'), few cavities	NZT. IT Millutes
	156.5		NR		口	<3/4"x1/2", few cavities with infill,	
_			\ <u>````</u>	156.6' - Bedding plane, horizontal, smooth,	Ш	fossiliferous	SC-7 collected at 156.55-
-			1	undulating	H	_ 150.7-151.4' - Same as 146.5-150.7' except voids <1/4" over 80% of	157.55'
_					\Box	except voids <1/4" over 80% of surface	
				157.6' - Mechanical break	Ш	No Recovery 151.4-151.5'	
					П		

APPENDIX 2BB-53 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-05	SHEET	9	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723975.3 N, 457680.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

WATER	LEVELS : 3.5	ft bgs	s on 3/	/06/07 START : 2/26/2007 END : 3/	1/200	7 LOGGER : T. Valentine, R. Bitel	y, J. Schaeffer
200	(9)			DISCONTINUITIES	Т	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	E RU STH, OVER	(%) O	TT.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Ĭ	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
EV EV	CORE	ROD	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	3Y ME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	014	ш	8	157.75, 157.8, 157.9, 158.0' - Bedding plane,	10)	Limestone	
-	R22-NQ			horizontal, smooth, undulating	F	- 151.5-154.95' - Same as	-
-	5 ft 96%	71	6	158.1' - Fracture, vertical, smooth, undulating 158.15, 158.25, 158.3' - Bedding plane or	Ħ	150.7-151.05' except yellowish gray to dark yellowish brown, (5Y 7/2 to	-
160	90%			mechanical break, 0 to 90 deg, smooth, undulating	Ħ	 10YR 4/2), weak to medium strong (R2 to R3) 	-
-118.0			0	158.6, 158.65, 158.75, 158.9, 159.15' -	Ľ	151.60-151.65' - Same as	_
-			0	Bedding plane, horizontal, smooth, undulating	H	 151.5-154.95' except voids <1/4" over 60% of surface 	R22: 12 minutes
-	161.5		NR	160.1, 160.65, 161.05' - Mechanical break	╙	151.65-153.2' - Same as	-
_	101.0		INIX		Г	151.60-151.65' except no voids, few cavities <1/4" diameter	
-					1	153.2-154.2' - Same as - 151.65-153.2' except voids <1/8"	-
						over 30-60% of surface	
1 -					1	154.2-154.92' - Same as 153.2-154.2' except highly laminated	
-					1	with organics, voids <1/4" over	
1 -					1	<10-20% of surface Limestone	_
-				_	-	154.95-156.2' - Same as 154.2-154.92' except very weak to	_
-				-	1	weak (R1 to R2), voids <1/8" over	_
-					-	<pre><10-20% of surface No Recovery 156.2-156.5'</pre>	_
-				-	-	Limestone	-
-					┨	156.5-157.95' - Same as - 154.95-156.5' except pale yellowish	-
-					┨	brown to very light gray, very fine grained, voids < 1/4" over 20-40% of	-
-					1	surface	-
-					┨	157.95-158.6' - Same as 156.5-157.95' except pale yellowish	-
-					1	brown to very light gray, (10YR 6/2 to N8), very fine grained, medium	-
-					1	strong (R3), <10% voids over	-
-				_	1	surface, few cavities <1/4"x1-1/2" with infill	_
-					1	158.6-161.3' - Same as	-
-					1	- 157.95-158.6' except yellowish gray, (5Y 7/2), very fine to fine grained,	-
-					1	weak (R2), voids <1/4" over 40-70% of surface, cavities up to 1"x1/2" over	-
-					1	30% of surface	
1]						No Recovery 161.3-161.5' Bottom of Boring at 161.5 ft bgs on	
_				_	1	3/1/2007	_
1 -					1	_	_
-					1	-	-
-				_	-		_
-					-	-	_
-					-	-	-
-					-	-	-
-					+	_	-
-					\mathbf{I}	-	-
-					\vdash		-
L					1		
-					•		-



1	PROJECT NUMBER:	BORING NUMBER:					
	338884.FL	A-06	SHEET	1	OF	9	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723934.5 N, 457719.1 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8 tri-cone bit

			LQOII IVII		Official Andrews				
WATER	LEVELS	: 1.0 ft bo	s on 03/0)9/07 S	TART : 3/6/2007	END : 3/9/2007	LOGGEF	: R.	Bitely, L. Prochaska
>				STANDARD		SOIL DESCRIPTION		σ	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS					
HE HE		RECOVE	RY (ft)	TEOT HEODETO		JSCS GROUP SYMBOL, O		PIC	DEPTH OF CASING, DRILLING RATE,
ATA		TILOGVE				ONTENT, RELATIVE DENS		BO	DRILLING FLUID LOSS, TESTS, AND
FE E			#TYPE	6"-6"-6" (N)	CONSISTENCY,	SOIL STRUCTURE, MINE	ERALUGY	SYMBOLIC LOG	INSTRUMENTATION
42.5				(11)				0,	
42.5							_		_
1 7							_	1	1
-							-	1	†
-							-		-
I -							_		_
	3.5								
-	0.0				Poorly Graded Sa	and With Silt (SP-SM)		$T_i^{*}T_i$	1
-		4.0	00.4	4-4-4	$_{\lnot}$ 3.5-4.1' - dark yell	owish orange, (10YR 6/6	6), wet,		-
-		1.3	SS-1	(8)	\ loose, very fine to	fine grained, 10-15% no	nplastic /_		_
5	5.0				\tines, trace organi	cs, trace coarse sand-siz encretions, sand is silica	zea iron		
37.5			-		Clayey Sand (SC)		<i>T</i>		7
1 -					4.1-4.8' - pale yello	owish brown, (10YR 6/2)	, moist,	1	1
-					loose, very fine to	fine grained, 40% mediu	im to high -	l	-
-					plastic fines, trace	organics, sand is silica			-
I -							_		_
							_	1	1
-	0.5						-	1	†
-	8.5				Silt (ML)		_		-
-				5-5-6		owish orange, (10YR 6/6	6), wet, stiff, -	!	-
		1.0	SS-2	(11)	nonplastic, rapid d	lilatancy, moderate HCI i	eaction,		
10	10.0			(,	\ 10% very fine grai	ned sand, 5% medium to	o coarse /		
32.5					grained sand, all c	arbonate		1	
-							-	i	-
-							-		-
I -							=		4
							_		
-							-		1
-							-		
-	13.5				Silt With Sand (M	11			
_		0.8	SS-3	38-50/5.5	13.5-14.25' - gravi	L) sh orange, (10YR 7/4), r	noist to wet -		_
	14.5			(88/5.5")	¬ hard, nonplastic, r.	apid dilatancy, moderate	HCI /	ш	
15					reaction, 10-15%	very fine sand-sized, 5%	medium / -		1
27.5					sand-sized, trace	fine gravel-sized, all carb	oonate /—		-
-							-		-
-							-		
_							_		
1 7							-		1
1 -							-	1	1
-							-		Driller's Remark: Hard layer 18.0-21.0'
-	18.5 18.7	0.0	00.	F0 /0					Dillier 3 Nemark. Flaru layer 10.0-21.0
	10.7	0.2	SS-4	50/2 (50/2") /	Limestone Fragm	lents h orange, (10YR 7/4), m	ild HCI		
]				(30/2)	reaction, fragment	n orange, (1018 7/4), m s to 3/8"			1
					. sasser, magnioni	0,0		1	1
20									
1									



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-06	SHEET	2	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723934.5 N, 457719.1 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8 tri-cone bit

RILLIN	G METH	OD AND	EQUIPM	ENT : Dietrich D-5	0 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8 tri-cone bit		ORIENTATION : Vertical
ATER	LEVELS	: 1.0 ft bo	gs on 03/	09/07	TART : 3/6/2007 END : 3/9/2007 LOGGE	R : R.	. Bitely, L. Prochaska
				STANDARD	SOIL DESCRIPTION	ق	COMMENTS
SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COLL MANE TIGOG CECTED SAME OF COLOR	SYMBOLIC LOG	DEDTH OF GACING DRILLING DATE
SE SE		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	o Fi	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
EV#			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	₩B	INSTRUMENTATION
ਲ ਜ਼ੋ 22.5				(N)		Ś	
2.5							
						_	
						1	
_						1	
						1	
-	23.5					1	
-	20.0				Silty Sand (SM)	111	
-		1.1	SS-5	10-13-24	23.5-24.6' - grayish orange, (10YR 7/4), wet, dense,	111	
	05.0	'''		(37)	rapid dilatancy, moderate HCl reaction, fine to coarse sand, 47% nonplastic fines, 3/4" thick limestone lense /	411	· -
5 '.5	25.0				at 24.4-24.5', all carbonate	-	
.~ -						-	Driller's Remark: Very hard layer 25.5-27.0'
-						-	Dimor S Hemain. Very Hard layer 20.3-27.0
4						-	
4						4	
						4	
	28.5					1	
				31-50-50/5	Silt With Sand (ML) 28.5-29.9' - dark yellowish orange, (10YR 6/6), moist	1111	
		1.4	SS-6	(100/11")	to wet, hard, nonplastic, rapid dilatancy, moderate HCl		
0	29.9			` ′	reaction, 30% fine to medium sand-sized (amount varies in lenses), all carbonate	Ш	
.5					varies in lenses), all carbonate	1	Driller's Remark: Very hard layer 30.0-35.0'
						1	
						1	
-						1	
-						1	
-						1	
-	33.5					1	
-	33.8	0.3	SS-7	50/3.5	Limestone Fragments	扛	1
-				(50/3.5")	33.5-33.8' - grayish orange, (10YR 7/4), mild HCl reaction, gravel-sized fragments (1/16"-1"), 75%	1	
- 5					coverage of <1/16" voids on fragment surfaces	1	
5 5						1	
-						1	
+						-	
-						-	
-						-	
-						-	
-						-	Driller's Remark: Hard layers 38.0-38.5' and
4	38.5 38.8		00.0	F0/0		+	38.5-42.0'
4	J0.8	0.3	SS-8	50/3 (50/3") /		片	1
4					7	Τ΄	1
10						1	
			1			1	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-06	SHEET	3	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723934.5 N, 457719.1 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8 tri-cone bit

DRILLIN	G METH	OD AND	EQUIPMI	ENT : Dietrich D-5	50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical						
WATER LEVELS: 1.0 ft bgs on 03/09/07 START: 3/6/2007 END: 3/9/2007 LOGGER: R. Bitely, L. Prochaska CTANDARD SOIL DESCRIPTION COMMENTS											
				STANDARD	SOIL DESCRIPTION 5 COMMENTS						
AND A	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	OT:						
TO TO		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DEPTH OF CASING, DRILLING FLUID LOSS, TESTS, AND						
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6"	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION						
				(N)							
2.5 - - -					Limestone Fragments 38.5-38.8' - moderate yellowish brown, (10YR 5/4), mild HCl reaction, fine to coarse gravel-sized fragments up to 2" diameter, 70-80% coverage of <1/16" voids on fragment surfaces						
- - -	43.5 43.8	0.3	SS-9	50/3.5 (50/3.5") /	Limestone Fragments 43.5-43.8' - pale yellowish brown, (10YR 6/2), mild HCl reaction, coarse sand-sized to fine gravel-sized						
45 -2.5 - - -					fragments (1/16"-1"), 2" silt lense (ML) at bottom of sample						
-	48.5	1.3	SS-10	49-15-20 (35)	Limestone Fragments 48.5-49.0' - Same as 43.4-43.8' except fragments 1/2"-2"						
50 -7.5 - - -	50.0			(00)	Sandy Silt (ML) 49.0-49.8' - dark yellowish brown, (10YR 4/2), moist to wet, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 35-40% fine to coarse sand-sized, gravel-sized limestone lense at 49.6-49.8', all carbonate						
-	53.5 53.9	0.4	SS-11	50/5	Limestone Fragments						
- 55 -12.5 -				(50/5")	53.5-53.9' - light olive gray, (5Y 5/2), moderate HCI reaction, sand and gravel-sized						
- - -					Dense drilling 56.0-57.0', light chattering						
-	58.5 58.6	0.1	\SS-12 <i>)</i>	50/1 (50/1") /	Stop drilling at 18:30 on 3/6/07, set HW casing to 40'						
60				(30/1)	HCI reaction, only a single 2" fragment Begin Rock Coring at 58.5 ft bgs See the next sheet for the rock core log						
					_						
		I	I	1	I I						



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-06 SHEET 4 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723934.5 N, 457719.1 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

COMING	INICITIODA	ND L	ZOIFIN	/IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	Casiii	<u> </u>	ORIENTATION : Vertical
WATER	LEVELS : 1.0	ft ba	s on 0	3/09/07 START: 3/6/2007 END: 3/	9/200	7 LOGGER : R. Bitely, L. Prochaski	a
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)			 	<u>8</u>	EITHOLOGI	COMMENTS
SAS	-ĭZ		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	OIZE AND DEDTH OF GAGING
뿝병은	Ş ⁺ ∺	%	<u> </u>		1	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
ΞĂΈ	PES	(%) Q	F.C.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	8	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
교육		Ø	X K	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	₹	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	022	\propto	# 5	THICKNESS, SURFACE STAINING, AND TIGHTNESS	လ်	CHARACTERISTICS	i i
	58.5			50.7.50.41.84.1	Ш	Limestone	3/7/07 advanced HW
-			2	58.7, 59.4' - Mechanical break (2)	Ш	 58.5-61.4' - pale yellowish brown, 	casing to 58.5'
				58.85, 59.1, 59.5' - Bedding plane (3), 40	ш	(10YR 6/2), very fine to fine grained,	
60	R1-NQ			deg, smooth, undulating	Н	strong HCl reaction, medium strong	
-17.5	3 ft	68	4	_	Н	— (R3) at 58.5-59.0' grading to very	_
_ ''.	97%			60.25' - Bedding plane or fracture, horizontal,		weak (R1) at 59.0-61.4', 80%	_
				smooth, undulating, intersecting high angle		coverage of <1/16" voids on surface	R1: 3 minutes
-			3	fracture	ш	from 58.5-59.0', trace voids and few	-
l _	61.5		NR.	60.3' - Fracture, 75 deg, smooth, undulating	\vdash	cavities <1/4" diameter from	_
				60.8, 61.0' - Bedding plane (2), horizontal,	Н	59.0-61.4'	
-			0	smooth, undulating	Ш	- No Recovery 61.4-61.5'	-
-				60.9' - Fracture, 80 deg, smooth, undulating,		Limestone	_
				tight	Щ	61.5-66.1' - pale yellowish brown,	
-			>10	62.55, 62.65' - Bedding plane (2), horizontal,	H	- (10YR 6/2), very fine to fine grained,	
_				smooth, undulating	₽₩	moderate to strong HCl reaction,	
	R2-NQ		_	62.65-62.8' - Fracture zone, rough,	Ш	very weak to medium strong (R1 to R3), 60% coverage of <1/16" voids	
1 1	5 ft	62	2	undulating, >10 fractures at various angles		on surface from 64.75-65.25', trace	
-	92%		<u> </u>	63.1, 63.2, 63.6' - Fractures or mechanical	Ш	voids and few cavities up to	-
65				break (3), smooth to rough, undulating, low	Н	3/4"x1/12" 61.5-64.75' and	
-22.5			2	angle –	Н	65.25-66.5', trace organics in	
-				64.1, 65.0' - Bedding plane or mechanical	Н	laminations	
			10	break (2), smooth to rough		armadono	R2: 10 minutes
-	00.5		NR	64.45-65.95' - Fracture zone, rough,	Ш	No Recovery 66.1-66.5'	1
-	66.5		INIX	undulating, 5+ fractures at intersecting angles	Н	_	Many povition or lost
			>10	65.75' - Bedding plane, smooth, undulating	Н	Limestone - 66.5-70.3' - moderate yellowish	Many cavities or lost material from coring at -
			1-10	65.75' - Fracture, 40 deg, smooth, undulating	Н	brown to dark yellowish brown,	66.5-68.15'
-				66.5-67.8' - Fracture zone, rough, undulating	Н	(10YR 5/4 to 10YR 4/2), fine grained,	00.5-06.15
_			>10			- moderate to strong HCl reaction,	_
			10	angles	ш	very weak to medium strong (R1 to	
-	R3-NQ			68.05, 68.15' - Bedding plane or mechanical	ш	R3), hardness increasing with depth,	-
l _	5 ft	40	2	break (2), <10 deg, rough to smooth,	Н	- 60% coverage of <1/16" voids on	_
	76%	40	-	undulating	Н	surface, no cavities 68.15-70.3',	
				69.25, 69.4' - Bedding plane, <10 deg,	ш	67.7-67.8' silt lense, carbonate, low	-
70			0	smooth, undulating —	\Box	— plasticity	
-27.5				69.75, 71.85, 72.5, 74.9' - Mechanical break	ш	•	
-				(4)	Н	No Recovery 70.3-71.5'	R3: 8 minutes
-			NR		H	=	_
	71.5						
1 7	-				\square	Limestone]
-			1		₽	71.5-75.3' - pale yellowish brown to	-
				72.1, 72.6' - Bedding plane (2), <10 deg,	Н	very light gray, (10YR 6/2 to N8),	
1				smooth, undulating	$I \dashv$	very fine to fine grained, moderate]
-			1			 HCl reaction, medium strong (R3) at 	-
			L		口	71.5-75.15', very weak to extremely	
]	R4-NQ				ш	weak (R1 to R0) at 75.15-75.3',]
-	5 ft	68	1	74 05! Eracture 20 des amonth undulation	H	 25-75% coverage of <1/16" voids on 	
	76%		L	74.05' - Fracture, 20 deg, smooth, undulating	Н	surface, many cavities <1/4"	
75			_	74.5, 74.65' - Bedding plane (2), <10 deg,	Ш	diameter with few cavities <1/2"]
-32.5			3	smooth, undulating —		— (fossil molds), fossiliferous	_
02.0				75.15' - Fracture, 20 deg, rough, undulating	ш	- No Recovery 75.3-76.5'	_
			ND		$\vdash\vdash$	1.0 1.000 7019 7010 7010	R4: 16 minutes
-			NR		тЧ	-	
_	76.5			<u> </u>	H		_
				76.5-76.6' - Fracture zone, rough, undulating		Limestone	
-			>10			76.5-76.9' - pale yellowish brown,	
-				76.7' - Mechanical break or bedding plane,		(10YR 6/2), very fine to fine grained,	-
			.	<10 deg, rough, undulating		strong HCl reaction, very weak (R1),	
			NA	76.9, 78.25' - Clay seam (2), clay contact		- \20% coverage of <1/16" voids on]
					μП	surface	
	l		L		LI		
							-

APPENDIX 2BB-58 Rev. 7



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-06	SHEET	5	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723934.5 N, 457719.1 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

CORING	METHOD A	ND E	QUIPN	IENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	casin	g	ORIENTATION : Vertical
<u>WATER</u>	LEVELS: 1.0	ft bg	s on 0	3/09/07 START: 3/6/2007 END: 3	/9/200	7 LOGGER: R. Bitely, L. Prochask	a
				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - 80	R5-NQ 5 ft 86%	20	0	78.4' - Mechanical break or bedding plane, <10 deg, smooth, undulating 78.55' - Mechanical break or fracture, 50-70 deg, smooth, undulating 78.75, 79.2, 79.3' - Bedding plane (3), <10		Fat Clay (CH) 	Laminated organics varve- like deposition at 79.4-79.5'
-37. 5 - -	81.5		0 NR	deg, smooth, undulating		Limestone 78.25-80.8' - very light gray to dark yellowish brown, (N8 to 10YR 4/2), very fine to fine grained, weak to	R5: 10 minutes
-			>10	81.6' - Fracture or mechanical break, <10 deg, rough, undulating 81.8-82.0' - Fracture zone, rough, undulating, multiple intersecting factures at various angles		medium strong (R2 to R3), 40% coverage of <1/16" voids on surface varying/decreasing with depth, laminated organics 79.4-79.5' No Recovery 80.8-81.5'	81.5-82.75' possible bioturbation, 82.75-83.2' wormholes/bioturbation SC-1 collected at 82.25- 83.2'
- - 85_ -42.5	R6-NQ 5 ft 86%	54	82.25 fracti	82.25, 83.2, 83.4, 84.6' - Mechanical break or fractures (4), rough, stepped to undulating, variable angularities		Limestone 81.5-82.75' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), very fine to fine grained, weak to medium strong (R2 to R3), 70% coverage of <1/16" voids	
-42.5 - - -	86.5		4 NR	85.3' - Mechanical break or fracture, 0-50 deg, rough, stepped 85.55-85.8' - Fracture zone, rough, undulating, multiple (<4) fractures, various angles		on surface, 20% coverage of <1/2" cavities on surface, several cavities <1/2" with secondary infill, all acid reactive 82.75-83.2' - Same as 81.5-82.75'	R6: 16 minutes
- - - 90 -47.5	R7-NQ 5 ft 76%	58	>10 >10 0 10 NR	87.2' - Fracture, 35 deg, rough, undulating 87.35-87.8' - Fracture zone, rough, undulating to stepped, multiple fractures at various angles 87.95, 88.9, 89.3' - Mechanical break (3) 89.0' - Mechanical break or bedding plane, 40 deg, rough, undulating 89.2-89.3' - Fracture zone, rough, undulating to stepped, intersecting fractures at various angles		- except 30% coverage of <3/16" voids on surface, 15-20% coverage of <1/4" cavities on surface - 83.2-85.8' - Same as 81.5-82.75' except 80% coverage of <1/2" cavities on surface, fossiliferous No Recovery 85.8-86.5' Limestone - 86.5-90.3' - pale yellowish brown to dark yellowish brown, (10YR 6/2 to 10YR 4/2), very fine to fine grained, mild to moderate HCI reaction, very	R7: 23 minutes
- - - -	91.5 R8-NQ 5 ft	58	>10	91.6' - Fracture, vertical, rough, undulating 91.65' - Mechanical break or fracture, 15 deg, rough, stepped to undulating 91.85' - Fracture, vertical, rough, undulating 92.05-92.2' - Fracture zone, rough, undulating to stepped, multiple fractures at various angles 92.95' - Mechanical break or fracture, 25-70		weak to medium strong (R1 to R3), 60% coverage of <1/16" voids on surface, many cavities <1"x1/4" over 20-30% of surface, fossiliferous, mottled coloration, weak to moderate HCL reaction, trace organics No Recovery 90.3-91.5' Limestone 91.5-92.2' - dark yellowish brown to	
- 95_ -52.5 - -	90%		2 1 NR	deg, rough, undulating, variable fracture angle 93.3' - Bedding plane, horizontal, smooth, undulating 94.1' - Bedding plane, smooth, planar 94.25-94.35' - Clay seam, soil horizon 94.7' - Fracture, 35 deg, rough, stepped		pale yellowish brown, (10YR 4/2 to 10YR 6/1), very fine to fine grained, strong HCl reaction, extremely weak to very weak (R0 to R1), voids <3/16" over 80% of core surface, few cavities (<1/4") over 20% of surface 92.2-93.0' - Same as 91.5-92.2' except weak to medium strong (R2 to	SC-2 collected at 95.05- 95.85' R8: 29 minutes
-			1 >10	95.0' - Mechanical break, 70 deg, rough, undulating 95.05' - Clay seam, soil horizon, clay contact <1/4", potential fracture infill, open 1/4" 95.85' - Mechanical break or fracture, 15 deg, rough, stepped		R3), fossiliferous, voids <3/16" over 60% of core surface, decreasing with depth, cavities up to 2-1/2"x1" with extremely weak (R0) limestone or silt infill	96.5-96.85' hammer test for calibration (50/4") Top 4" of core lost to hammer test for calibration, measurements of core depths start from 96.85'
					\perp		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-06	SHEET	6	OF	9	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723934.5 N, 457719.1 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

				NEINT . Diethon D-50 5/14 252, mad rotary, mg tools, mv			ONLINIATION : Vertical
WATER	LEVELS : 1.0) ft ba	s on 0	3/09/07 START: 3/6/2007 END: 3/	9/2007	7 LOGGER : R. Bitely, L. Prochask	a
				DISCONTINUITIES	П	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)			<u> </u>	SYMBOLIC LOG		22
N. W.	ZAZ ZAZ		FRACTURES PER FOOT	DESCRIPTION	┛╏┃	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
	S.F.A	(%) Q	28	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	<u> </u>	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FAY.	# P S S S S S S S S S S S S S S S S S S	αD	AC.	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD
SCIE	Sää	S S	F.E.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	R9-NQ			97.5, 99.6' - Mechanical break (2)	+	Limestone	
-	5 ft	60	0	97.95' - Fracture, 60 deg, rough, undulating	\Box	- 93.0-94.1' - Same as 91.5-92.2'] -
1	82%	•••		98.0-98.6' - Fracture zone, rough, stepped,	ш	except weak to medium strong (R2 to	
100				multiple (>20) intersecting fractures at	Н	R3), trace voids <3/16" and cavities	1
-57.5			1	various angles, gravel sized fragments <3" -	+	— 94.1-95.1' - Same as 91.5-92.2'	_
				100.2' - Mechanical break	Ш	except very weak to weak (R1 to R2),	
1					H	trace voids <3/16" and cavities	R9: 7 minutes
1 -	404.5		NR		+	 95.1-96.0' - Same as 91.5-92.2' except very weak to medium strong 	1
-	101.5				ΗП	(R1 to R3), voids <3/16" over	-
I _			0		П	- 60-80% of core surface, few cavities]
1			"	101.95, 103.3, 103.6, 105.0' - Mechanical	Ш	(<1/2"x1/4"), horizon of greenish	1
-				break (4)	+	black (5GY 2/1) fat clay (moist, soft	-
1 -			1			to medium stiff, highly plastic, mild	-
1			L_	103.15' - Mechanical break or fracture, 40	Щ	HCI reaction) at 94.25-94.35'	
1 -	R10-NC			deg, rough, stepped	H	No Recovery 96.0-96.85'	1
1 -	5 ft	97	0		+	Limestone	-
1 -	99%				Д	96.85-100.6' - pale yellowish brown,	-
105					H	(10YR 6/2), very fine to fine grained, strong HCl reaction, extremely weak	
-62.5			0	_	т	to very weak (R0 to R1), 60%	-
-					ΗП	coverage of <3/16" voids on surface,	R10: 13 minutes
I _			0		Д	20% coverage of <3/4"x1/2" cavities	K 10. 13 minutes
1	106.5				Ш	on surface, fossiliferous	
1 -			NR/		Ħ	No Recovery 100.6-101.5'	1 1
-			2	106.85' - Fracture, 30 deg, rough, stepped	口	Limestone	-
I _					Щ	101.5-106.45' - pale yellowish brown,	
1 -				107.4' - Fracture or mechanical break, 70	H	(10YR 6/2), very fine to fine grained, extremely weak to very weak (R0 to	1
1 -			1	deg, smooth, stepped, open		R1), 60% coverage of <3/16" voids	1
1 -	B		<u> </u>	400 El Dadding plans berievetel area "	П	on surface, few cavities <1/2"	-
1	R11-NQ	60	2	108.5' - Bedding plane, horizontal, smooth, undulating, 1/2" open	\mathbf{H}	diameter, fossiliferous with fossil	
1 -	5 ft 94%	00	-	108.7' - Fracture or mechanical break, 60	Н	molds, trace organics	1
-	J-7/0			deg, smooth, stepped	Ш	No Recovery 106.45-106.5'	-
110_			3	109.0' - Bedding plane, horizontal, smooth, —	+	Limestone	-
-67.5			L	undulating	Н	106.5-111.2' - pale yellowish brown,	
1 -			0	110.15, 110.25' - Bedding plane (2), <10 deg,	Ш	(10YR 6/2), very fine to fine grained,	R11: 16 minutes
-				rough, stepped	口	extremely weak to weak (R0 to R2), 30-70% coverage of <3/16" voids on	-
1 -	111.5		NR	110.4' - Bedding plane, <10 deg, smooth,	₽₩	surface variable and decreasing with	-
1				undulating 110.85' - Mechanical break	H	depth, cavities up to 1/2" to 1/4",	
1 -			1			fossiliferous, fossil molds and casts] 1
1 -			<u> </u>	112.35, 112.6' - Bedding plane (2), <10 deg,	ш	No Recovery 111.2-111.5'	-
1 -			1	rough, undulating	+	Limestone	-
1			'			111.5-116.4' - pale yellowish brown,	
1 -	R12-NG				Ш	- (10YR 6/2), very fine to fine grained,] 1
-	5 ft	92	2	114.0' - Fracture, 40 deg, smooth, undulating	+	extremely weak to weak (R0 to R2), 40-70% coverage of <1/16" voids on	-
1 -	98%			114.35, 115.45' - Bedding plane (2), smooth,	H	- surface variable, fossiliferous with]
115				planar		fossil molds and casts <1/4"	
-72.5			1	_	1	diameter	-
-			_		╀┦	-	SC-3 collected at 115.45-
Ι _			0				116.2'
1 -	116.5		-	116.2' - Mechanical break			R12: 14 minutes
1 -	1 10.0		NR	110.2 - MECHANICA DIEAK	╆┸┩	No Recovery 116.4-116.5'	-
1 -			1		╂	-	-
1				117.3' - Fracture, 70 deg, smooth, planar			
1 -				117.55' - Fracture, 70 deg, smooth, planal 117.55' - Fracture or mechanical break, 30	Ш		1
-			1	deg, rough, stepped	+	-	-
				5, 5 ,	\Box		
1							
1		1	1		1 1		1

APPENDIX 2BB-60 Rev. 7



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-06 SHEET 7 OF 9

ROCK CORE LOG

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723934.5 N, 457719.1 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

WATER	LEVELS : 1.0	ft ba	s on 0	3/09/07 START: 3/6/2007 END: 3/9	9/200	7 LOGGER : R. Bitely, L. Prochask	a
				DISCONTINUITIES	ى ق	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-120 -77.5 -	R13-NQ 5 ft 98%	92	1 2 1 NR	119.45, 119.7' - Fracture or mechanical break (2), 50 deg and 80 deg, rough, undulating 119.6' - Fracture or mechanical break, 60 deg, rough, planar 120.95' - Fracture or mechanical break, <10 deg, rough, stepped		Limestone 116.5-117.5' - yellowish gray, (5Y 7/2), very fine to fine grained, very weak to weak (R1 to R2), 30-50% - coverage of <1/16" voids on surface, 1 cavity 1/2" diameter, fossiliferous (molds), trace organics 117.5-121.4' - Same as 116.5-117.5' except 50-70% coverage of <3/16" voids on surface, 20% coverage of	R13: 9 minutes -
125 -82.5	R14-NQ 5 ft 90%	70	1 1 0 2 NR	121.6, 121.65' - Bedding plane (2), <10 deg, smooth, stepped 122.0' - Mechanical break or fracture, <10 deg, rough, stepped 122.5' - Bedding plane, horizontal, smooth, undulating 122.65' - Mechanical break or fracture, 50 deg, rough, undulating 123.65, 123.9' - Fracture or mechanical break (2), 45 deg and 80 deg, rough, undulating 125.7' - Bedding plane, horizontal, smooth, planar		- 1/4" to 1" cavities on surface, highly fossiliferous (molds) No Recovery 121.4-121.5' Limestone 121.5-125.4' - very pale orange, (10YR 8/2), very fine to fine grained, strong HCI reaction, weak to very weak (R2 to R1), 50-70% coverage of <3/16" voids on surface, 10% coverage of 3/16" to 1/2" cavities on surface, highly fossiliferous (molds) 125.4-126.0' - Same as 121.5-125.4' except thinly (1/16") laminated with pale yellowish brown, (10YR 6/2),	- - - - - R14: 8 minutes
- - - - 130 -87.5	126.5 R15-NQ 5 ft 100%	42	>10 3 >10 >10	125.9' - Bedding plane, horizontal, smooth, undulating 126.5-126.83' - Fracture zone, smooth, undulating, multiple intersecting fractures, fragments up to 2" diameter 126.85' - Bedding plane, horizontal, smooth, undulating 127.15' - Bedding plane or mechanical break, rough, undulating 127.7, 127.8, 128.0' - Bedding plane (3), <10 deg, smooth, undulating 128.15' - Bedding plane or mechanical break, horizontal, rough, undulating 128.5, 128.75, 128.9, 129.0' - Bedding plane (4), horizontal, rough, undulating		very fine to fine grained, weak to medium strong (R2 to R3), organics, mild HCl reaction except for laminations No Recovery 126.0-126.5' Limestone 126.5-131.5' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, extremely weak to weak (R0 to R2), friable, 20% coverage of <1/16" voids on surface, highly fossiliferous (casts and molds)	Sample can be crushed between fingers to silt size material (calcerous)
	R16-NQ 5 ft 100%	84	5 3 0 2 2 0	129.15-129.35' - Fracture zone, rough, stepped 129.55-129.65' - Fracture zone, rough, stepped 130.2, 130.8' - Bedding plane (2), rough, undulating 131.0-131.5' - Fracture zone, rough, stepped to undulating 131.6' - Bedding plane or mechanical break, rough, undulating, 1/2" open 132.2' - Bedding plane or mechanical break, smooth, planar 132.4' - Fracture or mechanical break, <10 deg, rough, stepped 132.5, 132.55' - Bedding plane (2), horizontal, smooth, undulating 133.2, 133.55' - Bedding plane (2), <10 deg, rough, undulating 134.85, 135.1' - Bedding plane (2), <10 deg, smooth, undulating		131.5-134.7' - very pale orange, (10YR 8/2), very fine to fine grained, extremely weak to very weak (R0 to R1), trace organics, fossiliferous (casts and molds), 60-90% coverage of <3/16" voids on surface, interbedded laminated bedding up to 1" thick with trace voids and fossils 134.7-136.5' - Same as 131.5-134.7' except strong HCI reaction, 20-40% coverage of <1/16" voids on surface, trace fossil molds or casts, interbedded with highly fossiliferous lenses up to 1" thick	SC-4 collected at 134.0- 134.85' - R16: 7 minutes -

APPENDIX 2BB-61 Rev. 7



PROJECT NUMBER: BORING NUMBER: 338884.FL A-06 SHEET 8 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723934.5 N, 457719.1 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

				2/02/07 CTART - 2/0/0207 FAIR - 2/			
WATER	LEVELS : 1.0	πbgs	s on U		9/200		
30₽	<u>(</u> (%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	CIZE AND DEDTH OF CACING
ᆱ끯은	R., / R.	(%) Q	공원	DEDTIL TYPE OPIENTATION POLICINESS	1 ⋈	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
F A A	SGE	0	PÄ	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	₩ W	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
		A Q	동변	THICKNESS, SURFACE STAINING, AND TIGHTNESS	5	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
				125 0 125 05! Eractura or machanical	97	Limestone	
I _	R17-NQ 5 ft	100	0	135.9, 135.95' - Fracture or mechanical break (2), 60 deg, rough, undulating,	Н	Limestone - 136.5-141.5' - very pale orange,	
	100%	100	"	intersecting	ш	(10YR 8/2), very fine to fine grained,	
140				l	1—1	extremely weak to weak (R0 to R2),	1
140 <u> </u>			1	139.65' - Bedding plane or mechanical break, smooth. undulating	H	— <1/16" voids, highly fossiliferous	-
-57.5				Simootii, diiddiatiiig	Ш	_ (molds), interbedded with horizontal	<u> </u>
					Н	laminations up to 1 1/2" thick which	R17: 11 minutes
-	141 5		1	141.1' - Mechanical break, rough, undulating	Н	 are yellowish gray (5Y 7/6) and exhibit no fossils and few voids 	1
-	141.5			141.1 Wednamed break, rough, and adding	ш	<1/16", large fossil cast 1" in	-
l _			1		Н	- diameter at 141.1'	<u> </u>
			l '	142.2' - Fracture or mechanical break, 20	Н	141.5-144.95' - yellowish gray to very	
_				deg, rough, stepped, 1/2" open	ш	pale orange, (5Y 7/2 to 10YR 8/2),	SC-5 collected at 142.5-
-			0	5, 11 3 , 111 pr 1 - 1 - 1 - 1 - 1	口	very fine grained, medium strong	143.75' -
-	_				₽₩	(R3), 40-50% coverage of voids on	_
	R18-NQ			142 9' Machanical break	Ш	surface, solution cavities up to 1 1/2" with secondary infill of fine grained	
	5 ft 88%	68	2	143.8' - Mechanical break 144.1, 144.3' - Mechanical break or fracture	П	limestone with voids over 80-90% of	1
	0070			(2), <10 deg, rough, undulating to stepped,	Н	surface, all fossiliferous with multiple	-
145			>10	1/4" open —	\Box	casts in matrix and secondary infill,	_
-102.5				144.6, 144.7, 144.9' - Mechanical break or		organic staining occuring on fresh	
			0	fracture (3), horizontal, rough, undulating,	Ш	surface at 144.1-144.95'	R18: 38 minutes
-			NR	organic staining	Н	 144.95-145.9' - yellowish gray to very pale orange, (5Y 7/2 to 10YR 5/2), 	-
l -	146.5		INIX	144.9-144.95' - Fracture zone, smooth to rough, undulating to stepped, organic staining		very fine to fine grained, medium	
			3	145.6' - Mechanical break	ш	strong (R3), 20-40% coverage of	1/4" clay infill at 151.2'
			ا	146.9' - Mechanical break or bedding plane,	Н	<1/16" voids on surface, trace	1
-				<10 deg, smooth, undulating, 1/4" open		fossils, no cavities	1
-			>10	147.0' - Mechanical break	ш	No Recovery 145.9-146.5'	-
l _				147.2, 147.45, 147.65, 147.7, 147.8, 147.9,	Н	Limestone	
	R19-NQ			148.15, 148.2, 148.3, 148.35, 148.5' -	ш	 146.5-151.4' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 3/2), fine 	1
-	5 ft	60	1	Mechanical break or bedding plane (11), <10 deg, smooth to rough, undulating	ш	grained, very weak to medium strong	1
-	98%			149.05' - Fracture, 40 deg, rough, undulating	Н	(R1 to R3), 50-80% coverage of	-
150			0	_		<1/16" voids on surface, moderately	
-107.5			"		ш	fossiliferous, trace laminations, trace	
-				•	$^{\rm H}$	- mottling/potential secondary infilling	R19: 8 minutes
-			1		口	on cavities <1 1/2"	Stop drilling at 18:00 on
_	151.5		NR.	151.2' - Clay seam, horizontal, 1/4" open,	Ш	No Recovery 151.4-151.5'	3/8/07
				1/4" clay infill	Н	Limestone	Resume drilling at 08:15 on
			0			151.5-153.8' - pale yellowish brown,	3/9/07 - Driller's Remark: Depth to
-				152.45' - Mechanical break	ш	(10YR 6/2), very fine to fine grained,	water before drilling at 1'
-			1		H	moderate HCl reaction, weak to	below ground surface –
			.	153.3' - Fracture or mechanical break,	H	medium strong (R2 to R3), 30-60%	
1 7	R20-NQ			horizontal, smooth, undulating, 1/4" open	Ш	 coverage of <3/16" voids on surface variable, fossiliferous, fossil molds 	1
-	5 ft	73	5	153.8' - Fracture or mechanical break,	H	and casts up to 1/2" to 1/4"	-
-	95%		<u> </u>	horizontal, smooth, undulating	口	- 153.8-155.4' - pale yellowish brown	-
155			\10	153.95-154.65' - Mechanical break	Ш	to dark yellowish brown, (10YR 6/2 to	
-112.5			>10	134.1, 134.13, 134.2, 134.3, 134.33 -	\mathbb{H}	10YR 4/2), very fine to fine grained,	7
-				Bedding plane (5), <10 deg, smooth,	Ш	extremely weak to weak (R0 to R2),	-
-			0	undulating, <1/4" open 154.65' - Fracture or mechanical break, <10	Ш	poorly laminated bedding, highly	-
	156.5		NR	deg, rough, undulating	Н	fossiliferous, fossil molds and casts	
]			$\overline{}$	155.3-155.4' - Fracture zone, <10 deg, rough,	Ш	 <1/4", organics on laminar partings, 60% coverage of <3/16" voids on 	R20: 27 minutes
-			2	stepped to undulating	Ш	surface, 20% coverage of <3/4"	-
-			<u> </u>	156.1' - Mechanical break	₩	- cavities on surface, 1" carbonate	-
			4	156.65' - Bedding plane or mechanical break,	┟┼┤	derived silt lens at 155.3-155.4'	
			→	horizontal, smooth, undulating, 1/4" open	Ш]
					П		

APPENDIX 2BB-62 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-06	SHEET	9	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723934.5 N, 457719.1 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: B. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS : 1.0) ft bgs	s on 0	3/09/07 START : 3/6/2007 END : 3/9	9/200	D7 LOGGER : R. Bitely, L. Prochask	a
				DISCONTINUITIES	П	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	E RU	(%) O	TUR -00-	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Ĭ	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
LEV.	SORE	RQD	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	X WE	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
000	R21-NQ		шш	157.05' - Fracture or mechanical break, 30	0)	155.4-156.25' - Same as	
-	5 ft	76	5	deg, rough, stepped, 1/2" open, silt size infill -	F	– 151.5-153.8'	-
-	99%			158.0' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/4" open	Ħ	No Recovery 156.25-156.5' Limestone	-
160_ -117.5			1	158.25, 158.35, 158.45' - Fractures or —	世	— 156.5-157.8' - yellowish gray to pale	-
-				mechanical break (3), horizontal, smooth to rough, undulating, 1/4" open	⊬	yellowish brown, (5Y 7/2 to 10YR 6/2), very fine to fine grained,	SC-6 collected at 160.45-
-			0	158.6' - Bedding plane, rough, undulating, -	H	 moderate HCl reaction, weak to medium strong (R2 to R3), 40-70% 	161.45' – R21: 27 minutes
-	161.5			│ 1/4" open │ 158.8, 158.83, 158.85, 158.9' - Bedding plane	F	coverage of <3/16" voids on surface,	RZ1. Z7 IIIIIIules
-				or mechanical break (4), smooth to rough, undulating, 1/4" open	1	- fossiliferous with molds and casts 157.8-159.0' - yellowish gray, (5Y	-
-				159.45' - Fracture, 60 deg, rough, undulating,	1	7/2), very fine grained, mild HCl	
-				1/4" open 160.45' - Mechanical break	1	reaction, medium strong (R3), interbedded, 10-30% coverage of	-
-				_	1	<1/16" voids on surface, few fossils	
-				-	1	159.0-161.4' - Same as 156.5-157.8' No Recovery 161.4-161.5'	1
-				-	1	Bottom of Boring at 161.5 ft bgs on	1
-				_	1	— 3/9/2007	
-				_	1]
]
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APPENDIX 2BB-63 Rev. 7



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-07

SHEET 1 OF 14

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724100.8 N, 457649.4 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical

					S/N 340253, Initia fotally, auto fiaminer, Avvj fous, 3-7/6 til-cone bit ORIENTATION . Vertical
WATER	LEVELS	. ∠.ɔ π bo	us on 03/0		START : 2/25/2007 END : 3/8/2007 LOGGER : J. Schaeffer, R. Gomez SOIL DESCRIPTION COMMENTS
30₽				STANDARD PENETRATION	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
EV.			#TYPE	6"-6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
김징급				(N)	
42.3	0.0				Topsoil
				1-2-2-1	\\\ 0.0-0.1' - wood debris \\\ \begin{align*} - \\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
-		1.0	SS-1	(4)	0.1-1.0' - pale yellowish brown, (10YR 6/2), moist,
-					very loose, no HCl reaction, very fine to fine grained / -
-	2.0				\silica sand to <1/16", trace nonplastic fines, trace \nR=No Recovery
-					\\\ 2.0-2.4' - Same as 0.1-1.0' except color darkens with \ \ -
-		1.4	SS-2	3-3-4-5	
I _				(7)	Poorly Graded Sand With Silt (SP-SM)
	4.0				2.4-3.4' - dark yellowish orange, (10YR 6/6), moist, loose, very fine to fine grained, nonplastic, no HCl
					\reaction, 5-10% nonplastic fines, trace fine organics \(/ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
5		1.0	SS-3	2-2-50/5 (52/11")	\ \land roots, mottled, sand is silica \ \frac{1}{2} \ \frac{1}
37.3	5.4			(02/11)	Silty Sand (SM) 4.0-4.4' - moderate yellowish brown, (10YR 5/4),
-					∥ moist, loose, very fine to fine grained, low plasticity, ∥ - □
-	6.0	0.4	SS-4	50/5	no HCI reaction, 30% low plastic fines, trace organics,
-	6.4	0.4	33-4	(50/5")	Clayey Sand (SC)
_					∭4.4-4.7' - pale green, (10G 6/2), moist, loose, no HCl
_					reaction, 20-25% medium to high plastic fines, trace
	8.0				organics at contact with next material Silt With Sand (ML)
					4.7-5.0' - yellowish gray, (5Y 8/1), moist, hard,
-				45-3-2-1	nonplastic, very rapid dilatancy, moderate HCl
-		0.8	SS-5	(5)	reaction, 15-20% sand-sized, very fine to fine and scattered coarse-sized, all carbonate
-				(-,	Silt (ML)
10 32.3	10.0				6.0-6.4' - yellowish gray, (5Y 8/1), wet, hard,
32.3					nonplastić, very rapid dilatancy, moderate HCl reaction, some yellowish staining, 5-10% very fine to
I _		1.9	SS-6	2-1-2-4	fine sand-sized, trace coarse sand-sized, all
		1.0		(3)	carbonate
	12.0				Sandy Silt And Limestone Fragments (ML) 8.0-8.5' - Same as 6.0-6.4' except some yellowish
-					staining, 30-35% coarse sand to fine limestone
-		1.5	SS-7	4-5-50/6	fragments sized carbonate material, has the
-		'.5	55-7	(55/12")	appearance of beds, may be extremely weak
-	13.5				Silt (ML)
-	14.0	0.0	20.0	50/2	8.5-è.8' - Same as 6.0-6.4'
-		\	<u>SS-8</u>	50/2 (50/2")	10.0-10.6' - Same as 6.0-6.4' except soft, 5-10% very fine sand sized, all carbonate
15				(22.2)	Silt With Sand (ML)
27.3					10.6-11.9' - Same as 10.0-10.6' except 10-15% fine to
1 7	16.0				medium sand sized, trace fine gravel sized carbonate
					material, trace limestone lenses <1/2" thick 12.0-13.5' - yellowish gray, (5Y 8/1), wet, soft, Driller's Remark: 16.0-18.0' is hard, cuttings
-				14 14 0 0	nonplastic, very rapid dilatancy, sand-sized content - are brown limestone fragments
-		1.1	SS-9	14-14-3-2 (17)	varies, trace scattered fine gravel-sized, 1/6" thick
-				(.,,	lenses of limestone from 13.4-13.6', moderate HCI reaction in fines, mild to moderate HCI reaction in
-	18.0				larger particles, all carbonate
_					No Recovery 14.0-14.2' Driller's Remark: Softer at 18.0'
		1.7	SS-10	2-3-6-3	
		'./	33-10	(9)	
20					├ _╢

APPENDIX 2BB-64 Rev. 7



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-07

SHEET 2 OF 14

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724100.8 N, 457649.4 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical

					TART : 2/25/2007 END : 3/8/2007 LOGGER : J. Schaeffer, R. Gomez
VVAIER	LLVLLO	. <u> </u>	gs on 03/0		SOIL DESCRIPTION COMMENTS
<u>\$</u> 9€	SAMPI F	INTERVA	L (ft)	STANDARD PENETRATION	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
DEPTH BELOW SURFACE AND ELEVATION (ft)	O WII EE	RECOVE		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,
TH E		RECOVE		011 011 011 011	MOISTURE CONTENT, RELATIVE DENSITY OR ONSISTENCY, SOIL STRUCTURE, MINERALOGY SINSTRUMENTATION
DEP SUR ELE			#TYPE	6"-6"-6" (N)	CONSISTENCT, SOIL STRUCTURE, MINICIPALOST
22.3	20.0			, ,	Silt (ML)
-				1-2-27-50	16.0-17.1' - yellowish gray, (5Y 8/1), wet, very stiff, nonplastic, very rapid dilatancy, moderate HCl
-		1.6	SS-11	(29)	reaction, 5-10% fine to coarse grained sand, all
-	00.0				carbonate -
-	22.0 22.2	0.2	SS-12	50/2	18.0-19.7' - Same as 16.0-17.1' except 40% sand Driller's Remark: 22.0-23.6' hard, becomes
-				(50/2")	sized trace gravel sized to 1", voids 1/16" and fossil -
-					Silty Sand (SM)
-					20.0-21.6' - grayish orange, (10YR 7/4), wet, medium
-	24.0				dense, fine to coarse grained, moderate HCl reaction,
-		1.1	SS-13	9-26-50/2	<pre> <1/4" thick, all carbonate</pre>
25 17.3	25.2			(76/8")	22.0-22.2' - Same as 20.0-21.6' except silt and fine to coarse gravel sized limestone pieces
''					Silty Sand With Limestone Fragments (SM)
-	<u> 26</u> .9	0.1	\SS-14 <i>)</i>	50/1	24.0-25.1' - grayish orange, (10YR 7/4), wet, very dense, fine to coarse grained, moderate to strong HCl
-		(0.1 /	(33-14)	(50/1")	reaction, 35% nonplastic fines, 15% fine gravel-sized
-					to 1", trace white limestone fragments This in drilling at 16:00 on 4/25/07 Silt (ML) Silt (ML) Silt (ML) S
_					26.0-26.1' - white to yellowish gray, (N9 to 5Y 8/1), silt /
_	28.0				and a 1" iron nodule, silt may be slough
_		0.6	SS-15	6-50/5	Sandy Silt With Limestone Fragments (ML) 28.0-28.6' - pale yellowish brown, (10YR 6/2), wet,
_	28.9			(56/11")	very dense, fine to coarse grained, moderate to strong /
_					HCl reaction, 16% nonplastic fines, limestone fragments to 2"
30	30.0				Inagmento to 2
12.3					Limestone Fragments 30.0-30.1' - pale yellowish brown, (10YR 6/2), mild to
		4.0	SS-16	3-7-13-6	moderate HCl reaction, coarse gravel-sized pieces,
		1.3	33-10	(20)	\surface covered in 1/16" voids, some fossil molds, \rightarrow\ri
	32.0				Silty Sand (SM)
-					\\\\ 30.1-31.3' - dark yellowish orange, (10YR 6/6), wet, \ \bigcup \ \frac{1}{1}\ \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
-			00.4=	2-3-3-4	√medium dense, fine to coarse grained, moderate HCl / - 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
		2.0	SS-17	(6)	Silty Sand With Limestone (SM)
-	34.0				32.0-32.8' - Same as 30.1-31.3' except mild HCl reaction, intact limestone fragments to 1" in silt and
1 -		0.4	SS-18	45-50/1	sand sized matrix
35	34.6	.		(95/7")	Sandy Silt (ML) 32.8-33.5' - dark yellowish orange, (10YR 6/6), wet,
7.3					very soft, moderate HCl reaction, 30-35% sand-sized
-	36.0				fragments, very friable, trace medium sand-sized
-	50.0	0.0	SS-19	50/0	white particles, trace black streaks Silty Sand With Limestone (SM)
-				(50/0")	33.5-33.7' - Same as 32.0-32.8' Shut down at 10:11 2/26/07 due to hydraulic
-					33.7-34.0' - yellowish gray, (5Y 8/1), wet, medium dense, mild HCl reaction, intact limestone fragments
-	00.0				to 1" in silt and sand-sized matrix, fragments have
-	38:9	0.1	\SS-20 /	50/1	many fossil molds/casts, all carbonate Resume drilling 2/27/07 12:00
-				(50/1")	Sandy Silt (ML) Driller's Remark: 38.0-40.0' hard, but no chatter
-					Silty Sand (SM)
-					34.2-34.4' - Same as 32.0-32.8' No Recovery 36.0'
40					PRO INCOVERY VO.V

APPENDIX 2BB-65 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-07	SHEET	3	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724100.8 N, 457649.4 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION : Vertical

DRILLIN	GIVIETH	OD AND	EQUIPIN	ENT . CIVIE 550X	S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 2.5 ft b	gs on 03/0	07/07	START : 2/25/2007
>				STANDARD	SOIL DESCRIPTION 2 COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
HOE TOE		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTA N			#TYPE	6"-6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
SU ELE				(N)	\S \
2.3	40.0				Limestone Fragments (40)/D 4/0)
		4.0	00.04	6-8-33-50/5	\ \ \ 38.0-38.1' - dark yellowish brown, (10YR 4/2), \ \ \ \ - \ \ \ \ \ \ \ \ - \ \ \ \ \ \
-		1.9	SS-21	(41)	wafer shaped, abundant fossil casts/molds
-	43.8				Silty Sand (SM)
-	42:0				40.0-41.9' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), wet, dense,
-		1.3	SS-22	21-38-50/5	fine to coarse grained, moderate to strong HCl - -
-		1.3	33-22	(88/11")	reaction, 30-40% silt-sized, limestone fragments in
_	43.4				\thin bedded appearance at 41.6-41.9', sand-sized \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
	44.0				Sandy Silt (ML)
					42.0-43.0' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), stiff, low
45				14-15-17-24	
-2.7		1.4	SS-23	(32)	black streaks, 30% fine sand-sized
-	40.0				Silty Sand With Limestone Fragments (SM) 43.0-43.3' - moderate vellowish brown to dark
-	46.0 46.3	0.3	SS-24	50/4	yellowish brown, (10YR 5/4 to 10YR 4/2), dense,
-		0.0	30 2.	(50/4")	moderate to strong HCl reaction, trace black streaks,
-					predominately sand-sized material with 30% silt-sized, limestone fragments in last 0.3' with bedded
_					appearance, carbonate materials
	48.9				Sandy Silt (ML)
		0.1	SS-25	50/1	44.0-45.4' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), moist to
-				(50/1")	
-					│ ││HCl reaction, 40% fine sand, 1/2" limestone lens at ││
	50.0				44.2' Silty Sand (SM)
50 -7.7	50.0				□ 46.0-46.3' - moderate yellowish brown to dark
-					│ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │
-		1.5	SS-26	46-31-49-41	dense, fine to coarse grained, strong HCl reaction, 40% medium plastic silt, last 0.1' has gravel-sized
_				(80)	│ ∥imestone fragment
I _	52.0				Limestone Fragments
				4-14-50/4	48.0-48.1' - strong HCl reaction, 80% coverage of voids 1/16" or less on surface of fragments
		0.9	SS-27	(64/10")	Sandy Silt (ML)
1 -	53.3			<u> </u>	50.0-51.5' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), moist to
-	540				wet, hard, fine to coarse grained, moderate HCl
-	<u>54</u> :9	0.0	SS-28	50/1	reaction, 55% nonplastic fines, 3/4" to 1/2" limestone
				(50/1")	enses Silty Sand (SM)
55 <u> </u>					
-12.7					plastic fines, 1/2" poorly indurated limestone lens at
_	56:9		00.00	5011	52.3' No Recovery 54.0-54.1'
		0.1	SS-29	50/1 (50/1")	Limestone Fragments Dillier's Remark: Very nard 56.0-57.0', softer
				(30/1)	\ \ 56.0-56.1' - dark yellowish brown, (10YR 4/2), \ \ moderate HCl reaction, fragments to 1", 60%
					coverage of 1/16" voids on surface, black streaks
-	58.0				
-	50.0			25 50/6	☐ Limestone Fragments
-		0.8	SS-30	25-50/6 (75/12")	\ 58.0-58.1' - moderate yellowish brown, (10YR 5/4), - } }
-	59.0			(. 0. 12)	moderate HCl reaction, 60% coverage of 1/16" voids Driller's Remark: Very hard 59.0-60.0'
-					Weak
60					

APPENDIX 2BB-66 Rev. 7



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-07

SHEET 4 OF 14

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724100.8 N, 457649.4 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical

					5/N 540255, Hidd Totally, auto Hammer, AVV5 1005, 5-7/8 tir-corie bit ORIENTATION : Vertical
WATER	LEVELS	: 2.5 ft bo	gs on 03/0	07/07 S	TART : 2/25/2007 END : 3/8/2007 LOGGER : J. Schaeffer, R. Gomez
2001				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
BUSE		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
F A A A			#TYPE	6"-6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
SU				(N)	\ \sigma
-17.7	60.0			5-50/6	Silty Sand (SM)
1 7	61.0	0.9	SS-31	(55/12")	58.1-58.8' - moderate yellowish brown, (10YR 5/4), wet, very dense, fine to coarse grained, moderate HCI
1 -	01.0				reaction, black streaks, 35-40% low plastic fines,
-					carbonate
-	62.9		SS-32	50/4	Silt With Sand (ML) 60.0-60.9' - moderate yellowish brown, (10YR 5/4),
		0.0_/	(33-32)	50/1 (50/1")	wet, low to medium plasticity, rapid dilatancy, strong
				(00/.)	∦HCl reaction, hard, 15-20% fine sand-sized carbonate // _
					particles, trace black streaks, trace coarse sand-sized
1 7	64.0				limestone fragments No Recovery 62.0-62.1'
-	04.0			44-50/3	Silty Sand (SM)
	64.8	0.8	SS-33	(94/9")	64.0-64.8' - Same as 58.1-58.5' except 50% silt sized
65 <u> </u>					carbonate material, 2 limestone lenses 1" thick, last
-22.1					streaks
	66.0				
		0.0	SS-34	50/0	Limestone Fragments 66.0' - moderate yellowish brown, (10YR 5/4), hard,
1 7				(50/0")	very fine grained, mild to moderate HCl reaction,
1 7					voids (1/16") over <5% of surface, few fragments
-					recovered, fragments are 1/4" size
-	68.0			17-50/2	Silty Sand (SM)
-	68.7	0.7	SS-35	(67/8")	↑ 68.0-68.4' - Same as 64.0-64.8' except 2 limestone
1 _				(= -)	\\pieces to 1/2" in size, 80% coverage of voids 1/16" on \frac{1}{1}
					Surface
70	70.0				Silt With Sand (ML) 68.4-68.7' - grayish orange, (10YR 7/4), moist, hard,
-27.7	70.3	0.2	SS-36	50/4	low plasticity, rapid dilatancy, moderate HCl reaction, Driller's Remark: Some chatter 70.0-71.0',
-				(50/4")	\\20% sand-sized, carbonate materials \\/ - \ softer at 71.0' faster drilling
-					Silt With Sand (ML) 70.0-70.2' - Same as 68.4-68.7' except 25%
-					sand-sized Driller's Remark: Hard at 71.5'
-	72.0				
				14-9-50/5	Sandy Silt With Limestone Fragments (ML) 72.0-72.7' - moderate yellowish brown, (10YR 5/4),
		0.7	SS-37	(59/11")	√ wet, hard, mild to moderate HCl reaction, 68% fines,
1 7	73.4			` ′	2" lense of limestone, scattered pieces to 3/8", 80%
	74.0				coverage of voids 1/16" on surface
-	14.0				Lean Clay (CL)
-				2-3-7-50/4	74.0-74.9' - pale yellowish brown, (10YR 6/2), moist,
75 <u> </u>		1.8	SS-38	(10)	low to medium plasticity, no dilatancy, strong HCl reaction, stiff, 10-15% fine to medium sand-sized Driller's Remark: Very hard at 75.0'
-52.1	75.0			` '	naticles trace black snots to 1/16" carbonate
	75:8		00.00	50/0	material Driller's Remark: Finish drilling at 18:10 on 2/27/07, will switch to rock coring at 76.0'
]		0.0	SS-39	50/0 (50/0")	Sandy Silt (ML)
]				(55/5)	74.9-75.8' - yellowish gray, (5Y 8/1), moist to wet, stiff,
-					reaction, 20-30% sand-sized material, carbonate
-					Limestone Fragments
-					75.9-76.0' - dark yellowish brown, (10YR 7/2), moderate HCl reaction, some with voids 1/16", others
					without voids
					Begin Rock Coring at 76.0 ft bgs
					See the next sheet for the rock core log
80					11
					11

APPENDIX 2BB-67 Rev. 7



PROJECT NUMBER: BORING NUMBER: A-07

ROCK CORE LOG

SHEET 5 OF 14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724100.8 N, 457649.4 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

				MENT . CIVIE 350X 3/N 340253, Mud Totally, HQ tools, HV		-5	ORIENTATION : Vertical		
WATER LEVELS: 2.5 ft bgs on 03/07/07									
				DISCONTINUITIES	(0	LITHOLOGY	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE COLOR			
	N.Y.Y.	(%	FRACTURES PER FOOT	BEOGNI HON	-	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,		
A SEE		(%) □	L S S	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	g	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD		
무류의		Ø	ZAC ER I	PLANARITY, INFILLING MATERIAL AND	Į ≅ I	AND ROCK MASS	DROPS, TEST RESULTS, ETC.		
E S E	222	ď	# #	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS			
	76.0			76.2-76.3' - Mechanical break, multiple	ш	Limestone	Install HW casing to 76.0'		
-			4	<u> </u>	+	- 76.0-81.0' - pale yellowish brown to	Not able to retrieve inner		
I -	_			76.7' - Fracture, smooth, undulating, <3/4" silt	+	very pale orange, (10YR 6/2 to 10YR	core last interval due to		
l _			3	infilling or silt seams	Ш	8/2), strong HČI reaction, no noticeable fossils, no solution	catcher not grasping inner		
			ا	77.2' - Fracture, horizontal, smooth, planar, <1-3/16", thick clayey silt	Н	cavities from 76.0-79.0', 16%	core barrel Begin rock coring at 76.0'		
-	R1-HQ			77.4' - Fracture, horizontal, smooth, planar,		coverage of solution cavities 3/8" or	After pulling core barrel,		
I -	5 ft	73	1	<3/16" fines	ш	 less in diameter at 79.0-81.0', 1-2 	used A rods to flush hole		
l _	100%			77.9' - Fracture, horizontal, smooth, planar,	Щ	perfect elongate spherical solution	with water to extract slough		
				<3/8" silt	Н	cavities, limestone is fine grained at			
			1	78.2' - Fracture, 1-2 deg, rough, stepped,		- 76.0-76.9' and 79.2-81.0' (very pale			
-37.7				<3/4" friable fines	╂	orange), limestone becomes silty from 77.2-77.9'	D4: 40 milioreta a		
-31.1			1	79.2' - Fracture, rough, stepped, <3/16" fines 80.3' - Fracture, 30-40 deg, rough, stepped,	Н	110111 77.2-77.9	R1: 12 minutes		
	81.0		'	<3/16" fines	Ш		SC-1 collected at 80.0-		
-	01.0			-0/10 111100		81.0-81.3' - very pale orange, (10YR	81.0'		
I -			1		Н	- 8/2), strong HCl reaction, fine	-		
				81.6' - Fracture, 1 deg, smooth, undulating,	Н	grained limestone, no fossils, no			
1 -				<5% fines, laminated organics		solution cavities	1		
-			2	82.3' - Fracture, 20-25 deg, rough, stepped,	ш	- 81.3-86.0' - pale yellowish brown,			
-				20-30% mix of fines and sand sized grains 82.9, 83.5' - Fracture (2), horizontal and 5-10	╆╫	(10YR 6/2), moderate to strong HCI	-		
l _	R2-HQ	92	1	deg, rough, stepped, 20-30% mix of fines and		reaction, 20-30% microfossils, 50-70% silty matrix, 60-70%			
	5 ft 100%	92	'	sand sized grains	ш	coverage of solution cavities 1/16" or	1		
-					╆	less, 81.5-81.6' zone laminated	SC-2 collected at 83.7-		
-			1			 dusky brown (5YR 2/2) organics 	84.7'		
85				84.8' - Fracture, rough, undulating, 20-30% —	Щ	_			
-42.7				mix of fines and sand size grains	Н		R2: 8 minutes		
-	000		0	•		_	1 1		
-	86.0				╂┸┤	_ 86.0-88.0' - moderate yellowish	1 -		
l -			1	86.4' - Fracture, 30 deg, sand to gravel size	Н	- brown, (10YR 5/4), 30-50% fossil	_		
				limestone grains		shells, molds and casts, 50-60%			
-				innociono granio	ш	coverage of 3/8" or less solution	1		
-			1	07.01	+	 cavities, 87.6' infilling of fat clay (CH) 	1		
I -				87.6' - Fracture, 25 deg, rough, stepped, <3/4" fractured carbonate grains and up to		bluish gray (5B 9/1) to light bluish	4		
1	R3-HQ	00	4	1-3/16" void filled with fat clay (CH)	ш	gray (5B 7/1), high plasticity and very			
I -	5 ft 100%	93	1	88.4' - Fracture, horizontal, smooth,	1 + 1	 moist 88.0-88.4' - pinkish gray, (5YR 8/1),] 1		
1 -	100 /0			undulating, <3/8" silty infilling		dry, dense, strong HCl reaction,	-		
1 -			0		ДП	- extremely weak to very weak (R0 to			
90			Ľ		\mathbb{H}	R1)	SC-3 collected at 89.6-		
-47.7				_		88.4-90.6' - pinkish gray, (5YR 8/1),	90.6'		
1 -			1	00.61 Padding plans, harizantal amasth	Ш	- dry, dense, strong HCl reaction, very	R3: 11 minutes		
I -	91.0			90.6' - Bedding plane, horizontal, smooth, undulating	H	weak (R1) 590.6-91.0' - pinkish gray, (5YR 8/1),] -		
			0	andulating		strong HCl reaction, 70-90% silty]		
1			ا		Ш	matrix, no fossils observed	SC-4 collected at 91.7-		
-					╂┼┤	91.0-94.0' - Same as 90.6-91.0'	92.6'		
-			2	02 El Franturo horizontal amanth places		except weak to medium strong (R2 to			
I -				92.5' - Fracture, horizontal, smooth, planar 92.8' - Fracture, horizontal, rough, undulating,	Ш	R3), noticeable fossil (shell]		
1 -	R4-HQ			infilled with 3/4" of medium plasticity clay/silt	\vdash	fragments, casts), 10-20% coverage of voids 1/8" or less]		
1 -	5 ft	70	<7	93.3-93.7' - Fracture zone, rough, undulating,	11	_ 01 v0103 1/0 01 1635	1		
1 -	100%		-	multiple fractures, low to high angle	Ш	Q4 0 96 0' moderate vellewish	-		
I -			0]	\mathbb{H}	94.0-96.0' - moderate yellowish - brown, (10YR 5/4), 30-50% fossil]		
95			"		H	shells, molds and casts, 50-60%]		
95_ -52.7				_	口	coverage of solution cavities up to	R4: 12 minutes —		
1 -			1		╂┼┤	- 3/8"	Driller's Remark: 95.0-96.0'		
	96.0				H		soft		
1									

APPENDIX 2BB-68 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-07

SHEET 6 OF 14

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724100.8 N, 457649.4 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 2.5 ft bgs on 03/07/07 START: 2/25/2007 END: 3/8/2007 LOGGER: J. Schaeffer, R. Gomez DISCONTINUITIES LITHOLOGY COMMENTS DEPTH BELOW SURFACE AND ELEVATION (ft) 9 CORE RUN, LENGTH, AND RECOVERY (%) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 95.4' - Fracture, planar, <2" thick, clays and Limestone 96.0-97.0' - pinkish gray, (5YR 8/1), >10 silts strong HCI reaction, 70-90% silty 96.0-98.0' - Fracture zone, 0-90 deg, fractured material, most likely mechanical matrix, non fossiliferous Driller's Remark: Sand No Recovery 97.0-100.0' lense 97.0-100.0'; core loss assumed to be from that R5-HQ interval 5 ft 0 NR No recovery in core barrel 40% but residual material appears to be very fine to fine grained sand, poorly graded, white to light brown 100 in color -57.7 Limestone Driller's Remark: Advance >10 100.0-101.0' - medium yellowish brown, (10YR 5/4), strong HCI HW casing past sand lense 101.0 reaction, very weak (R1), 30-50% to 101.0' R5: 13 minutes 1 fossils shells, molds and casts. 101.6' - Mechanical break, horizontal, rough, Insert and set surface 50-60% solution cavities stepped, 3/4" of relief, open casing to 101.0' 101.0-105.3' - Same as 100.0-101.0' Stop drilling at 17:30 except solution cavities up to 3/4" in 0 2/28/07 length (fossil molds) Resume drilling at 15:52 R6-HO 0 3/6/07 5 ft 86 86% SC-5 collected at 102.4-103 4 0 105 0 -62.7 R6: 8 minutes 105.3' - Mechanical break No Recovery 105.3-106.0' NR 106.0 Limestone 106.0-111.0' - very pale orange, (10YR 8/2), strong HCl reaction, 0 weak to medium strong (R2 to R3), 1 20-40% coverage of solution cavities 107.5' - Mechanical break, 2-6 deg, rough, up to 3/16", no apparent bedding, planar SC-6 collected at 107.9silty matrix when reduced with rock R7-HQ 0 hammer, 10-20% fossil evidence 5 ft 100 100% Driller's Remark: Softer Ω drilling 109.0-111.0' 110 -67.7 R7: 14 minutes 0 111.0 111.0-116.0' - Same as 106.0-111.0' Very weak to weak interval 0 identified as 109.0-111.0' except Very weak to weak (R1 to R2) on field log, it is assumed that 114.0-116.0' was at 114.0-116.0 0 intended R8-HO 100 0 5 ft 100% SC-7 collected at 113.7-114 6 0 115 -72.7 R8: 7 minutes 0 116.0



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-07	SHEET	7	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724100.8 N, 457649.4 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 2.5 ft bgs on 03/07/07 START: 2/25/2007 END: 3/8/2007 LOGGER: J. Schaeffer, R. Gomez DISCONTINUITIES LITHOLOGY COMMENTS 9 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS Limestone 116.0-121.0' - very pale orange, 0 (10YR 8/2), 60-80% coverage of broken shells, fossil molds and casts, 0 20-30% coverage of 3/4" diameter solution cavities from 116.0-117.5'. 20-40% silty and sandy matrix, black R9-HQ SC-8 collected at 118.2-118.3. 119.5. 120.8' - Fractures (3). 100 1 and translucent crystals very fine to 5 ft 119.2' 100% horizontal, rough, stepped fine grained, not the typical moderate vellowish brown fossiliferous limestone encountered towards upper portion 120 -77.7 R9: 9 minutes 1 121.0 121.0-123.4' - light olive gray, (5GY 121.2, 121.6' - Mechanical break (2) 2 6/1), very fine to fine grained, strong HCl reaction, 30% coverage of 1/6" to 3/16" voids, 5% coverage of 0 cavities 1/4" or less are dissolved fossils, fossiliferous R10-H0 SC-9 collected at 124.8-2 96 125 8 5 ft 123.4-126.0' - yellowish gray, (5Y 123.4' - Fracture, smooth, undulating, 100% 8/1), very fine grained, strong HCl reaction, 15% coverage of voids limestone contact 123.5' - Fracture, 60 deg 1 124.3' - Fracture, 1-2 deg, smooth, 1/16" or less, laminated bedding of 125 undulating light silts as well as undulating 124.6' - Fracture, 75 deg, rough, stepped, -82.7 laminae from 124.0-125.5' R10: 13 minutes 1 tight Stop drilling at 17:58 3/6/07 126.0 125.8' - Fracture, 0-1 deg, rough, undulating 126.0-127.7' - pale yellowish brown, (10YR 6/2), strong HCl reaction, 0 Resume drilling at 08:03 10-20% coverage of fossil shells and 3/7/07 casts, no solution cavities, 10-30% 0 coverage of voids 1/6" or less 50-60% sand-sized matrix with black grains 1/16" or less R11-HQ 0 127.7-129.8' - very pale orange, 88 5 ft 100% (10YR 8/2), strong HCl reaction, very weak to weak (R1 to R2), 30-40% 129.1, 129.5' - Fractures (2), 5 deg, rough, coverage of 3/8" or less solution 3 planar cavities 130 129.9, 130.1' - Fractures (2), 5 deg, smooth, 129.8-130.1' - pale yellowish brown, R11: 7 minutes -87.7 SC-10 collected at 130.0-(10YR 6/2), fine grained, medium 1 strong (R3), no fossils 130.1-131.0' - Same as 127.7-129.8' 131.0-132.8' - very pale orange to 131.0' 131.0 131.2' - Bedding plane, horizontal, smooth, 2 planar pale yellowish orange, (10YR 8/2 to 131.99' - Fracture, rough, stepped 10YR 8/6), strong HCI reaction, extremely weak to very weak (R0 to 3 132.4, 132.5, 132.7' - Fractures (3), 7-20 deg, R1), medium to coarse quartz grains rough, stepped, irregular, minor silt infilling, SC-11 collected at 132.8and sand-sized carbonate grains, R12-H0 open to 1/4 30-40% fossils, 20-40% coverage of 0 5 ft 80 1/16" or less voids 100% 132.8-134.4' - very pale orange, (10YR 8/2), strong HCl reaction, very weak (R1), 10-20% fossils, voids 134.2' - Mechanical break, rough, stepped 1 135 (<1/16") over 10-20% of surface -92.7 R12: 17 minutes 135.1, 135.3, 135.6' - Bedding plane (3), 0-7 3 deg, smooth, planar 136.0

APPENDIX 2BB-70 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-07 SHEET 8 OF 14

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724100.8 N, 457649.4 E (NAD83)

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

				IENT . CIVIE 330X 3/N 340233, Mud Totally, Fig tools, Fiv		<u> </u>	ORIENTATION . Vertical	
WATER LEVELS: 2.5 ft bgs on 03/07/07 START: 2/25/2007 END: 3/8/2007 LOGGER: J. Schaeffer, R. Gomez								
				DISCONTINUITIES	Т	LITHOLOGY	COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)				SYMBOLIC LOG			
NA FILE	₹ _{AN}	_	FRACTURES PER FOOT	DESCRIPTION	J	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,	
E SE	SE, F	(%) _Q	58	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	긍	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND	
£ 7. ₹ ¥	유달성		25.5	PLANARITY, INFILLING MATERIAL AND	Æ	AND ROCK MASS	SMOOTHNESS, CAVING ROD	
		S. O.	뜻	THICKNESS, SURFACE STAINING, AND TIGHTNESS	<u>∑</u>	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.	
	014				1 07	1 become		
			0		\vdash	Limestone - 134.4-135.5' - pale yellowish brown,		
			"		т	(10YR 6/2), very fine grained, strong		
-	R13-HQ 5 ft 82%			137.5, 137.8' - Fractures (2), horizontal, smooth, planar, silty infilling <1/16"		HCl reaction, laminar bedding, 5-6	1	
l _			2		1	☐ 3/8" in diameter solution cavities	_	
			-		ш	following silty laminae, <10%	00.40	
-		62			╀┴	coverage of voids 1/16" or less on	SC-12 collected at 137.8-	
l -			0		╂	- surface	138.7'	
						135.5-137.5' - grayish orange pink,		
					ш	(10R 8/2), weak to medium strong		
-			0		╁	(R2 to R3), fine grained with some	Driller's Remark:	
140				_		medium to coarse sand-sized	Circulation lost at 139.5'	
-97.7						particles, sporadic 1/16" pyrite	R13: 13 minutes	
-			NR		1_	grains, 10-15% coverage of 1/16" or less voids	-	
	141.0				₽		-	
			1		Н	Silt (ML) - 137.5-137.8' - pale brown, laminar		
I -			'			bedding	1	
-			\vdash	141.8' - Fracture, 12-15 deg, rough,	╨	Limestone	1	
l _			3	undulating, open up to 1/4", minor silt sized	ᅪ	- 137.8-139.5' - pale orange, (10YR		
				particle infilling	\vdash	8/2), weak to medium strong (R2 to		
-	R14-HQ			142.2, 142.3, 142.7' - Fractures (3), 5-10 deg,		R3), 10-25% voids coverage of 1/16"	Driller's Remark:	
-	5 ft	52	>10	rough, planar, apparent orientation of fractures with solution cavities	-	or less, 10-20% fossils, 3/4" solution	Continuous circulation loss -	
	100%			142.8-143.8' - Fracture zone, variable	\vdash	cavity with fat clay infilling at 139.5'	even while adding water to	
				orientation, fragments range from 1/2" to 2	┰	139.5-140.1' - grayish orange, (10YR	mud tub	
-			2	1/2"		- 7/4), fine grained, weak to medium	-	
145				143.9' - Bedding plane, horizontal, smooth,	\perp	strong (R2 to R3), 10-20% fossil		
-102.7				planar	\vdash	casts	R14: 11 minutes	
I -			>10	144.2, 144.6' - Bedding plane (2), horizontal,	1-	- No Recovery 140.1-141.0'	1	
-	146.0			smooth, planar	-	Limestone 141.0-144.0' - pale brown, (5YR 5/2),	SC-13 collected at 146.0-	
			0	144.6-146.0' - Fracture zone, fragments		very weak to weak (R1 to R2),	147.05'	
	1		'	range from 1/2" to 3"x1" or larger	\vdash	20-30% coverage of 3/4" voids on	147.03	
-					T	surface, intact fossil casts and	1	
_			0			 molds, no broken fossil shells, 	-	
			•	147.6, 155.7' - Mechanical break (2), load	ш	becomes more fossiliferous towards		
-	R15-HQ			tests and machine breaks	Ъ	base (143.5-144.0') and increases in	1	
-	5 ft	98	0		╀	 sand-sized grains, dense limestone 	-	
I _	100%				\Box	but density decreases 143.2-144.0'		
I [3			as granularity increases	1	
				149.5, 149.6' - Bedding plane (2), 5-8 deg,	╨	144.0-145.5' - pale yellowish brown,	1	
150_				rough, planar, <1/16" thick silty infilling on —	╁┼	(10YR 6/2), very fine to fine grained, no visible fossils, laminar to thin	D45: 0it	
-107.7			ا ہ ا	bedding plane partings		bedded, 5-10% coverage of voids	R15: 9 minutes	
]	151.0		0	149.75' - Fracture, 80 deg, smooth, planar,	\coprod	1/16" or less	1	
-	151.0			tight	╁	145.5-146.0' - pale brown, (5YR 5/2),	SC-14 collected at 151.0-	
_			0		\vdash	strong HCl reaction, weak (R2),	152.1'	
						10-30% sand-sized grain matrix	102.1	
-				152.1, 152.5' - Fractures (2), horizontal,	1—	146.0-146.7' - very pale orange to	1	
-			2	rough, planar, <3/8" thick unconsolidated silt	╨	grayish orange, (10YR 5/2 to 10YR	-	
				Tough, planar, 50/0 thick unconsolidated silt	\perp	7/4), medium to coarse grained,		
I -	R16-HQ 5 ft	į		153.1' - Bedding plane, planar, undulating		weak to medium strong (R2 to R3),	1	
-		100	1	2000g plants, plants, and statisting	ш	fossils up to 3/8", sand to gravel-sized grains	-	
_	100%		0		┰	gravei-sized grains 146.7-147.0' - fine grained, strong	_	
					\vdash	HCl reaction, weak (R2), silty		
						laminae, silty matrix, no fossils, 15%	1	
155_				_	\Box	coverage of voids 1/16" or less	D40: 44	
-112.7				155.2' - Fracture, rough, stepped, <1/16" silty	\vdash		R16: 14 minutes	
	156.0		1	infill	\vdash		1	
-	130.0		\vdash		广			
					1			
				1			1	

APPENDIX 2BB-71 Rev. 7



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-07

SHEET 9 OF 14

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724100.8 N, 457649.4 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

WATER	LEVELS : 2.5	ft bgs	s on 03	3/07/07 START: 2/25/2007 END: 3/	8/200	7 LOGGER: J. Schaeffer, R. Gom	ez
≩Q.⊋	(%)			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
ELO E AN ON (f	NA ANG	(ZES JT	DESCRIPTION	O C		SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-			0			Limestone - 147.0-149.7' - grayish orange to very pale orange, (10YR 7/4 to 10YR 5/2),	-
-	R17-HC 5 ft 100%		1	157.5, 160.4' - Fractures (2), 0-5 deg,	H	mottled and variegated, fine to medium grained, strong HCI reaction, 10-20% 1/16" or less voids,	SC-15 collected at 157.5-
-		100	0	smooth, undulating		sporadic echinoderms 3/8" to 9/16" 149.7-151.0' - fine grained, weak to medium strong (R2 to R3), 5-10%	158.4' -
- 160	100 70		0	·		fossil casts, 5-10% coverage of 1/8" or less voids 151.0-151.8' - Same as 149.7-151.0'	-
-117.7 -	101.0		1	_	Ħ	except very fine to fine grained 151.8-152.4' - moderate yellowish brown, (10YR 5/4), strong HCI	R17: 9 minutes
-	161.0		0			reaction, very weak to weak (R1 to R2), 10-20% coverage of voids 1/16" or less, silty matrix]
-	R18-HC 5 ft 100%		0		Ħ	152.4-153.1' - brown, (10YR 5/4), alternating silt and sand-sized carbonate layers at less than 1/8"	SC-16 collected at 162.5-
-		86	0			thick, 5-10% coverage of 1/8" or less solution cavities, fossil molds at base, undulant to broadly undulant,	163.4' -
- - 165			1	40471.5		thin to laminar bedding, unit exhibits slow but moderate HCl reaction, strong HCl reaction in very fine	-
-122.7 -	400.0		3 min	64.7' - Fracture, horizontal, smooth, planar,ninor silt infilling 65.3' - Fracture, horizontal, stepped, 1/8" elief, lithology contact, silt and sandy infill, 3/8" thick 65.6, 165.8' - Fractures (2), horizontal,		grained layers, exhibits differential compaction in very fine grained layers, dissolved fossils at/near	Driller's remark: Feels - gritty like sand
-	166.0		6			center of bedding features 153.1-155.0' - Same as 149.7-151.0' except very fine to medium grained 155.0-156.6' - moderate orange pink to pale yellowish brown, (5YR 8/4 to 10YR 6/2), very weak to weak (R1 to	gritty like saird
-	R19-HQ 5 ft 100%		0	rough, planar, very fine to fine sandy infill, <3/8" thick 166.1-166.4' - Bedding plane, 0-5 deg, rough,			-
		90	1 168 step <3/	planar		- R2), voids 3/8" or less, 10-20% fossils (30% at 155.3') 156.6-161.0' - very pale orange,	A variety of rock, mainly
470				168.9' - Bedding plane, horizontal, smooth, stepped, consolidated silt/clay laminae, <3/16" thick		- (10YR 8/2), strong HCl reaction, very weak to weak (R1 to R2), 30-50% coverage of voids 1/8" or less, 1-3% coverage of 3/8" or less solution cavities at base (161.0'), 15-20% silty matrix	limestone and shell fragments up to 1/4" x 1.3" in random distribution but sub parallel in deposition, the long axes are aligned with apparent flow, the high
170 <u> </u>				170.15' - Bedding plane, horizontal, rough, stepped, <3/16" thick			
- -	R20-HC		2	171.2, 171.9' - Mechanical break or bedding plane (2), 0-3 deg, planar, rough to smooth		- 161.0-165.3' - Same as 156.6-161.0' except very thin laminar bedding planes from 163.6-164.9', brown	energy (relatively) – deposition is from 167.2- 168.25', where the bedding
- -			4	172.1' - Fracture, horizontal, smooth, undulating, silty infill <1/8" thick		laminae increase in frequency from 164.4-164.9' 165.3-165.6' - fine to medium	becomes laminar to thin with very fine to fine grained laminae
-		68	0	172.2' - Fracture, horizontal, smooth, planar 172.5, 172.8' - Fractures (2), 10-15 deg, rough, planar	Ħ	grained, moderate HCl reaction, very fine to fine grained laminae 165.6-166.0' - medium gray, (N5),	R19: 12 minutes – SC-17 collected at 170.15-171.0'
-	100%		2	174.1' - Fracture, 5 deg, rough, stepped 174.6' - Fracture, 12 deg, rough, planar		medium to coarse grained, strong HCl reaction, weak to medium strong (R2 to R3), no visible fossils, no	SC-18 collected at 172.7- 174.0'
175 <u> </u>	170.0		6	174.6 - Fracture, 12 deg, rough, planar 175.1' - Fracture, 1-2 deg, rough, planar, <1/8" thick silty infill	#	solution cavities 	R20: 8 minutes
_	176.0				ľ		

APPENDIX 2BB-72 Rev. 7



PROJECT NUMBER:	BORING NUMB	BER:	
338884.FL	A-07	SHEET 10 OF 14	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724100.8 N, 457649.4 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

COMING	WETTOD A	ND LC	XOII IV	MENT . CIVIE 330X 3/N 340233, Mud Totally, Fig tools, Fi	rv casii	.9	ORIENTATION : Vertical
WATER	LEVELS: 2.5	ft bg	s on 0	3/07/07 START: 2/25/2007 END: 3	/8/2007	LOGGER : J. Schaeffer, R. Gome	ez
				DISCONTINUITIES	\top	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)			 	SYMBOLIC LOG	252501	33EIII
N S S Z	- ZZ >		FRACTURES PER FOOT	DESCRIPTION		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
凿병은	S-FE	(%) Q	I 뜻 o		ן בֻׂן	MINERALOGY, TEXTURE,	FLUID LOSS, CORING RATE AND
₽₩¥	# P O) O	PF	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	 ₩	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
유용필		Ø	RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
Δош	075	ď	шФ		ဟ	OTAL CAOTE (AOTO	
				175.4-175.5' - Bedding plane, 0-3 deg,	ш	Limestone	
-	1		5	smooth, planar, 1/4" to 1/2" wafers	╂┯╂	- 166.0-167.5' - moderate yellowish	1
I -				176.1-176.3' - Bedding plane, 0-3 deg, rough,	╂┷┫	brown, (10YR 5/4), strong HCl	
1				planar, recrystallized carbonate on plane	Ш	reaction, sandy and silty sized matrix,	
-	1		2	176.8' - Fracture, horizontal, rough, stepped,		fossil casts at base, 10-20% voids	1
-				enlarged solution cavity fractures at	+	3/16" or less, iron oxide stains and	-
	R21-HQ			depositional contact	H	grains of pyrite	
_	5 ft	53	2	177.45' - Fracture, horizontal, smooth, planar 177.6' - Fracture, horizontal, rough, planar,	1	- 167.5-168.5' - grayish orange, (10YR 7/4), strong HCl reaction, 20-40%	1
-	100%			very fine grain infilling	477	fossils, 20-40% coverage of solution	SC-19 collected at 178.95-
			1	177.95, 178.3, 178.5' - Fractures (3),		- cavities 3/8" or less, 20-30%	180.0'
180]		'	horizontal, rough, planar, lithology contact,	1111	coverage of voids 1/16" or less	100.0
-137.7				<1/16" thick very fine sandy infill	╂┼┼	168.5-169.8' - alternating very pale	R21: 10 minutes
-13/./_]		3	180.1, 180.4, 180.6' - Fractures (3),	+	orange and pale yellowish brown,	1121. 10 IIIIIIules
1	181.0			horizontal, rough, planar, <1/8" thick	Ш	(10YR 8/2 to 10YR 6/2), thinly	1
1 -	101.0			carbonate recrystallization infilling		laminated bedding	-
I -			4	181.1' - Fracture, horizontal, smooth, planar	┸┸	169.8-171.0' - strong HCl reaction,	_
			~	181.5, 181.7, 181.7' - Fractures (3),	H	very weak to weak (R1 to R2), no	
1 -				horizontal, planar, smooth to rough, trace	111	laminae, no visible fossils, 40-50%	SC-20 collected at 181.8-
I -			0	infilling	┦	coverage of voids 1/16" or less	182.95'
1			ਁ			171.0-172.2' - grayish orange, (10YR	
-	R22-HQ				1111	7/4), moderate HCl reaction, 1	1
l -	5 ft	45	2	183.2' - Fracture, horizontal, rough, planar,	+	solution cavity up to 3/8" wide and 1	-
1	100%			trace silty infilling	HH	3/16" long across surface, increase	
-				183.5, 185.3, 185.4, 185.7, 185.8, 185.9' -	1	in silts below 172.0', becoming dark	1
-			4	Bedding plane (6), 5 deg 184.2, 184.5' - Fractures (2), horizontal,	\Box	yellowish orange, voids 5/16" or less	-
185_				rough, undulating -	┵	172.2-172.5' - grayish orange, (10YR	
-142.7				rough, undulating	H	 7/4), very fine to fine grained, carbonate derived silt-sized particles 	R22: 8 minutes
-			5		+	172.5-175.0' - Same as 171.0-172.2'	1
I -	186.0				$-\Box$	175.0-175.5' - Same as 171.0-172.2'	-
1			_	186.1-186.3' - Fracture zone, horizontal,	+	except fine grained, mild HCl	
-	1		5	smooth, planar	1-1	reaction, laminated	1
l -			_	186.6' - Fracture, horizontal, rough, planar,	╂┯╂	175.5-176.0' - pale yellowish brown,	-
l _			1	lithology contact	Ш	(10YR 6/2), strong HCl reaction,	
			'	186.9' - Fracture, 10 deg, rough, undulating	Ш	weak to medium strong (R2 to R3),	1
-	R23-HQ			187.8' - Fracture, 8 deg, rough, undulating,	╂┯╂	- <2% coverage of voids 1/16" or less,	
l _	5 ft	66	2	silty infilling from formation matrix	╁┼┨	no visible fossils	
1	100%	00	-	188.3, 188.7, 189.9' - Fractures (3),	ш	176.0-176.9' - fine grained, strong	SC-21 collected at 188.6-
-				horizontal, rough, planar, trace silty infilling		- HCl reaction, weak to medium strong	189.8'
1 -			1		$+\Box$	(R2 to R3), silty matrix with very fine	-
190			'		H	sand (<10%), very fine to medium	
-147.7				1	╂╨╂	 sand-sized lense, void filling with mica mineral, 10-15% coverage of 	R23: 18 minutes
-			3	100 5 100 7 100 01 Freetures (2) 5 40 de-		tubular solution cavities on surface	
1	191.0			190.5, 190.7, 190.9' - Fractures (3), 5-40 deg,	口	- 176.9-177.6' - pale yellowish brown,	
1 -				trace silty infilling	Ш	(10YR 6/2), fine grained, strong HCl	1
-			>10	191.0-192.4' - Bedding plane, 0-10 deg,	+	reaction, weak to medium strong (R2	-
]		L	smooth, planar to undulating, numerous partings, irregular	\mathbb{H}	to R3), <10% noticeable fossils,	
1 -					\Box	<10% coverage of voids 1/16" or less	1
-			>10	192.4-195.05' - Fracture zone, 0-90 deg,	口	177.6-181.0' - moderate vellowish	-
I -				rough, multiple fracture zones, irregular, may	Щ	brown, (10YR 5/4), mild to moderate]
	R24-HQ			exhibit recrystallization on the surface	H	HCl reaction, very weak to weak (R1]
1 -	5 ft	13	>10		+++	to R2), silty matrix, 5-10% coverage	Numerous rock fragments
1 -	100%				╁┼┦	of 3/8" or less solution cavities	indicate possible cavity
1						181.0-183.5' - Same as 177.6-181.0'	filling debris from at least
			>10		\Box	except dark brown silty organic	195.5-196.0' but probably
195_			<u> </u>	<u>-</u>	╁┼┤	laminae (1-3/16" thick)	193.4-196.0'
-152.7				195.05, 195.2' - Fractures (2), horizontal and	HH		R24: 6 minutes
1 -	106.0		4	7 deg, smooth, planar	$\uparrow \uparrow \uparrow$	-	1
	196.0				\Box		
	1		ı	l .	1 1		l l

APPENDIX 2BB-73 Rev. 7



PROJECT NUMBER:

33884.FL BORING NUMBER:

A-07 SHEET 11 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724100.8 N, 457649.4 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 2.5 ft bgs on 03/07/07 START: 2/25/2007 END: 3/8/2007 LOGGER: J. Schaeffer, R. Gomez DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT DESCRIPTION ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 195.6, 195.8' - Fractures (2), horizontal and Limestone 183.5-185.0' - very pale orange, 5 15 deg, rough, undulating 196.0-196.3' - Fracture zone, random orientations, fragments 1/4" to 3/4" (10YR 8/2), strong HCl reaction, very weak to weak (R1 to R2), 40-50% 196.6' - Fracture, 30-50 deg, rough, planar 197.3, 197.4' - Fractures (2), horizontal, 4 fossil shells, casts and molds up to 1"x 9/16", 20-40% coverage of voids rough, planar, solution cavity fractures 1/16" or less R25-HQ 198.05, 198.1, 198.4, 198.5' - Fractures (4), 185.0-186.0' - very fine to medium 10 5 5 ft grained, very strong HCI reaction, 0-7 deg, smooth, planar 70% 198.6' - Fracture, horizontal, smooth, planar, 15-20% coverage of voids 1/16" or >10 lithology contact 199.0-199.5' - Fracture zone, orientations are 186.0-191.0' - pale yellowish brown, 200 random, rock fragments range from 1/8"x1/2" (10YR 6/2), mild to moderate HCI -157.7 R25: 9 minutes NR to 2"x1"x1 1/2" reaction, very weak to weak (R1 to R2), 10-30% fossil casts and molds, 201.0 5-10% coverage of solution cavities 201.0-201.5' - Fracture zone, random Widely disseminated 3/8" or less, 30-50% coverage of >10 orientation oxidized pyrite grains voids 1/16" or less, 189.0-190.0 201.5-202.1' - Fracture zone, 25-90 deg, alternating dark brown and pale rough, non separated fracture, indistinctly The unit appears as yellow brown laminae 5 extends into underlaying unit random clast orientations 191.0-192.4' - pale yellowish brown, (10YR 6/2), very fine to medium 201.5' - Fracture, 10 deg, rough, planar in variably hard matrix, it is 202.1' - Fracture, horizontal, rough, stepped, R26-H0 either fluvial or infill of an lithology contact 202.7-203.0' - Fracture zone, multiple grained, moderate to strong HCI 5 36 5 ft undetermined void. it reaction, laminar to thin bedded, 80% exhibits very low density and apparent strength 10-20% coverage of solution cavities fracture orientation 203.1-203.3' - Fracture zone, multiple 3/8" or less >10 192.4-193.4' - very pale orange, fractures broken along fragment edges 205 (10YR 8/2), strong HCl reaction, very weak to weak (R1 to R2), 20-30% 203.7' - Fracture, 2 deg, rough, planar R26: 7 minutes 162.7 NR coverage of voids 1/16" or less, 206.0 20-40% fossil casts and molds 206.2, 206.3, 201.7, 206.9' - Fractures (4), 193.4-196.0' - pale yellowish brown, 4 (10YR 6/2), very fine to coarse grained, strong HCl reaction, slightly 0-10 deg, smooth, planar 207.0-208.5' - Fracture zone, 75-80 deg, mottled, light to moderately dense >10 multiple fractures 207.5-208.0, fragments up rock, 10-15% coverage of voids to 2 1/2"x1 to 1/4"x1/2" 1/16" or less, abundant fossils, R27-HQ >10 indistinct bedding, multiple lithologic 5 ft 10 fragments 50% 196.0-198.0' - grayish orange, (10YR 7/4), medium to coarse grained, moderate HCI reaction, very weak NR 210 (R1), 30-40% fossils, 10-20% -167 7 R27: 11 minutes coverage of solution cavities 3/8" or Stop drilling 17:28 3/7/07 211.0 198.0-198.5' - alternating grayish orange and light brown, (10YR 7/4 to Water level 2.5' below 211.0-213.0' - Fracture zone, no >10 distinguishable orientation ground surface 5YR 5/6), fine grained, strong HCI reaction, weak to medium strong (R2 Resume drilling 08:50 to R3), medium to coarse grained at >10 3/8/07 alternating laminae 198.5-199.5' - strong HCl reaction, extremely weak (R0), large amount R28-H0 0 5 ft of non carbonate silt to clay-sized 40% particles, 10% coverage of voids 1/16" or less, pyrite grains on and NR define laminar silt beds 215 No Recovery 199.5-201.0' -172.7 R28: 23 minutes 216.0

APPENDIX 2BB-74 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-07

SHEET 12 OF 14

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724100.8 N, 457649.4 E (NAD83)

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER LEVELS: 2.5 ft bgs on 03/07/07 START: 2/25/2007 END: 3/8/2007 LOGGER: J. Schaeffer, R. Gomez DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT DESCRIPTION ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 216.0-216.4' - Fracture zone, multiple >10 Limestone 201.0-202.1' - grayish orange, (10YR fractures, fragments range from 1/4" to 7/4), strong HCl reaction, weak to medium strong (R2 to R3), carbonate Driller's Remark: Soft and rapid drilling at 216.5derived silt-sized grains 202.1-205.0' - pale yellowish brown, (10YR 6/2), mild to moderate HCl 220 0' NR Assume loss of recovery is R29-HQ reaction, extremely weak to very 0 216.4-219.7' based on 5 ft weak (R0 to R1), 10-20% sand-sized driller's report of soft and 34% matrix, 5-15% fossils, 30-40% rapid drilling at 216.5coverage of voids 3/16" of less 220.0' No Recovery 205.0-206.0 220 >10 Limestone -177 7 R29: 8 minutes 206.0-207.0' - grayish orange, (10YR 5 7/4), strong HCl reaction, very weak 221.0 (R1), thin to laminar bedding, very 221.0-222.5' - Fracture zone, 2-3 of the Driller's Remark: Drilling low density, no visible fossils, 5-15% >10 fractures are smooth and planar bedding action intermittently coverage of voids 1/16" or less, no plane partings becomes hard and soft solution cavities The final 0.5' recovered is >10 207.0-208.5' - dark yellowish orange to grayish orange, (10YR 6/6 to 10YR 7/4), moderate to strong HCl an agglomeration, appears to have 60-80 deg planar features that may indicate R30-H0 reaction, 10-20% coverage of voids subsidence infill 0 5 ft 1/8" or less, slightly friable, worm 30% burrows in very fine grained NR limestone 207.2-208.0' No Recovery 208.5-211.0' 225 Limestone 182.7 R30: 4 minutes 211.0-213.0' - very pale orange to pale yellowish brown, (10YR 8/2 to 226.0 10YR 6/2), very fine to fine grained, 226.0-227.5' - Fracture zone, multiple very weak to weak (R1 to R2), >10 fractures no visible orientations 30-40% fossil shell fragments, casts. and molds, 20-40% coverage of >10 voids 1/6" or less, 5-10% coverage of solution cavities 3/8" or less, low to moderate density R31-HQ No Recovery 213.0-216.0' 0 5 ft Limestone 30% 216.0-216.4' - pale yellowish brown NR and grayish orange, (10YR 6/2, 10YR 7/4), fine grained, strong HCI 230 reaction, pale yellowish brown -187 7 R31: 5 minutes material is weak to medium strong (R2 to R3), non fossiliferous, grayish 231.0 orange material is very weak to weak (R1 to R2) with 30-40% fossils Discuss drilling to 265.0', 231.0-231.6' - Fracture zone, random >10 conclusion continue drilling orientations, fragments range from 1/4" to No Recovery 216.4-219.7 to 265.0' even though very Limestone low recovery and 0% RQD 219.7-221.0' - grayish orange, (10YR 7/4), strong HCl reaction, very weak to weak (R1 to R2), 40-50% fossils, for the last 5 runs (25') in hopes that borehole stavs open R32-HQ 20% coverage of voids 3/8" or less. 5 ft 0 trace organics, abundant fossil casts NR 12% and molds, low to moderately dense, 15% coverage of 1/16" or less voids 235 192.7 R32: 8 minutes 236.0

APPENDIX 2BB-75 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-07

SHEET 13 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724100.8 N, 457649.4 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.5	ft bgs	on 00	3/07/07 START: 2/25/2007 END: 3/	3/8/2007 LOGGER : J. Schaeffer, R. Gomez								
≥0₽	. (%			DISCONTINUITIES	၂ ဖွ	LITHOLOGY	COMMENTS						
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.						
-			>10 5	236.0-236.1' - Fracture zone, 3/4" fragments 236.4' - Fracture, horizontal, rough, planar 236.5' - Fracture, 60 deg, rough, planar 237.2, 237.3, 237.5, 237.6, 237.85' - Bedding plane (5), 0-5 deg, rough		Limestone 221.0-222.5' - grayish orange, (10YR 7/4), strong HCl reaction, very weak (R1), 10-20% fossils, 10-20% coverage of voids 1/16" or less on surface, thin to laminar bedded,	- - -						
- 240 -197.7	R33-HQ 5 ft 40%	22	NR	- - - -		silt-sized particles No Recovery 222.5-226.0' Limestone 226.0-227.5' - very pale orange, (10YR 8/2), very fine to fine grained, strong HCl reaction, weak to medium strong (R2 to R3), no visible fossils, voids, or solution cavities No Recovery 227.5-231.0'	- - R33: 4 minutes						
-			>10	241.0-242.1' - Fracture zone, fragments range from 3/8" to plates 1/4"x3/8" thick and 1 1/2"x1 1/2"		Limestone 231.0-231.6' - pale yellowish brown, (10YR 6/2), 20-40% fossils, 30-40% coverage of voids 1/16" or less No Recovery 231.6-236.0'	-						
- - - 245 -202.7	R34-HQ 5 ft 22%	0	NR	-		Limestone 236.0-238.0' - very pale orange to grayish orange, (10YR 8/2 to 10YR 7/4), very fine to medium grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), low to moderate density, 15% of rock is medium grained, thin to laminar bedding with organics along bedding	- - - - R34: 5 minutes						
-	246.0		>10	246.0-247.0' - Fracture zone		partings, bedding ranges from horizontal to 10 degrees, 5-15% coverage of voids 1/16" or less No Recovery 238.0-241.0'	-						
-	R35-HQ	0	4	247.05, 247.2, 247.35, 247.4' - Bedding plane (4), 0-7 deg		 Limestone 241.0-242.1' - grayish orange to pale yellowish brown, (10YR 7/4 to 10YR 6/2), strong HCl reaction, very weak 	- - -						
- 250 -207.7	5 ft 30%					0	0	0	0	NR	- - - - -		to weak (R1 to R2), 10-20% coverage of voids 1/8" or less, very fine to medium grained (medium grains constitute 30% of the unit), the unit exhibits no bedding until 241.7' —then thin (up to 1/4") to laminar beds that are thumbnail soft No Recovery 242.1-246.0'
-	251.0		>10	251.25, 251.6' - Bedding plane (2) 251.6-252.3' - Fracture zone, fragments from 1/4" to 1"x1" to 1/4"x3/8" (bedding planes), fragments are generally small		Limestone 246.0-247.5' - very pale orange to pale yellowish brown, (10YR 8/2 to 10YR 6/2), very fine to fine grained, strong (P2 to P3), fooglifferous	- - - -						
-	R36-HQ - 5 ft 48%	13	2	252.45, 252.6, 252.8, 252.95, 253.2, 253.4' - Fractures (6), 0-7 deg, smooth, planar, fractures or partings along bedding planes		strong (R2 to R3), fossiliferous, 5-10% coverage of voids 1/16" or less No Recovery 247.5-251.0'	-						
- 255_ -212.7 -	256.0		NR	- - -		- -	R36: 7 minutes -						
													

APPENDIX 2BB-76 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-07	SHEET	14	OF	14	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724100.8 N, 457649.4 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 2.5 ft bgs on 03/07/07 START: 2/25/2007 END: 3/8/2007 LOGGER: J. Schaeffer, R. Gomez DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS Limestone 256.1, 256.3, 256.4, 256.6, 256.7, 256.8, 7 251.0-253.4' - pale yellowish brown, 256.9' - Fractures (7), horizontal, rough, (10YR 6/2), very fine to medium planar, fractures along laminae grained, moderate to strong HCI 257.15, 157.35, 157.7, 157.9' - Fractures (4), reaction, very weak to weak (R1 to R2), moderately dense, some coarse grained material, 25-40% fossil casts 4 rough, planar, fractures along bedding plane R37-HQ . 258.1, 258.2, 258.4, 258.75' - Bedding plane and molds. 30% coverage of voids 25 4 5 ft (4), 0-10 deg, smooth, undulating 1/16" of less, 5-10% solution cavities, 90% moderately friable at both ends of 259.1, 259.25, 259.4, 259.5, 260.0' ->10 Fractures (5), horizontal, rough, planar, along No Recovery 253.4-256.0' 260 laminae Limestone -217.7 R37: 4 minutes >10 260.0-260.5' - Fracture zone, random 256.0-260.5' - very pale orange to orientation, fragments 1"-2" NR grayish orange, (10YR 8/2 to 10YR 7/4), very fine to medium grained, 261.0 261.0-263.0' - Fracture zone moderate to strong HCl reaction, >10 261.6, 261.99' - Fractures (2), rough, planar extremely weak (R0), light to moderately dense, laminar to thin (up 262.1, 262.3, 262.6, 262.9' - Fractures (4), to 1" thick) beds that locally contain >10 rough, planar, hard to distinguish minor amounts of organic material that grade from very fine moderately R38-HQ dense limestone to very thin very 8 5 ft weak laminae with undulating beds, 40% 20-30% fossils, 20-30% coverage of voids 3/16" or less, 5-10% solution NR cavities, friable, 30-50% silty and 265 sand-sized grain matrix, coarse R38: 7 minutes -222.7grained limestone Removed inner core barrel, No Recovery 260.5-261.0' driller pulled 10' of outer 266.0 casing and tagged depth to 266.0', hole stayed open Limestone 261.0-263.0' - very pale orange, (10YR 8/2), very fine grained, overnight, outer core barrel medium strong (R3), 15-20% coverage of voids 1/16", interbedded with light fossil rich friable intervals, stayed at 256.0 fossil casts and molds abundant in friable interbeds, rock has moderate HCI reaction in medium strong intervals and strongly HCl reaction in friable intervals No Recovery 263.0-266.0' Bottom of Boring at 266.0 ft bgs on



PROJECT NUMBER: BORING NUMBER:

338884.FL A-08

SHEET 1 OF 15

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724017.2 N, 457734.1 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION : Vertical

STAND Production Production STAND Production STAND Production STAND Production STAND Production STAND Production P						S/N 340233, IIIIdu fotally, auto fiaminier, AWJ fotos, 3-7/6 til-corie bit Onicin Familia Di Carra Di Managaria Di Carra Di Carr
SAMPLE INTERVAL (t)	WATER	LEVELS	: 3.4 ft bg	gs on 03/1		START: 3/12/2007 END: 3/21/2007 LOGGER: C. Wallestad, R. Gomez, R. McComb, L. Prochaska
1.0 SS-1 C-2-3 C-2-3 C-2-3 C-3-3	ŞQ⊋	CALADI	INTERV	1 (6)		SOIL DESCRIFTION 5
1.0 SS-1 C-2-3 C-2-3 C-2-3 C-3-3	ELO ON (SAMPLE				SOIL NAME. USCS GROUP SYMBOL. COLOR.
1.0 SS-1 C-2.2 C-2.3 C-2.2 C-2.3	H B		RECOVE	ERY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
1.0 SS-1 C-2-3 C-2-3 C-2-3 C-3-3	EP1			#TYPE		CONSISTENCY, SOIL STRUCTURE, MINERALOGY
1.0 SS-1 2-2-3 (4) 2.2-3 (4) 2	42.1	0.0			(14)	
1.0 Ss-1 (4) Sand is silica Poporty Graded Sand With Silit (SP-SM) O.3-1.0" medium light gray (NS), moist, very loose, very fine to fine grained, no HCI reaction, 5% Poporty Graded Sand With Silit (SP-SM) O.3-1.0" medium light gray (NS), moist, very loose, very fine to fine grained, no HCI reaction, 10-15% O.3-4." moderate brown, (SYR 444), well, loose, very fine to fine grained, no HCI reaction, 10-15% O.4-3." modum light gray (NS), moist, soft, very fine to fine grained, no HCI reaction, 35% modum to high plastic fines, trace organics, sand is silica O.4-3." modum light gray (NS), moist, soft, very fine to fine grained, no HCI reaction, 35% modum to high plastic fines, trace organics, sand is silica O.5 SS-6 O.2-1.12 O.5 SS-6 O.2-1.12 O.7 Z-grayish orange, (10YR 7/4), wet, very stiff, reorplastic, very rapid distancy, mild to moderate HCI derived O.7 SS-6 O.2-1.12 O.7 Z-grayish orange, (10YR 7/4), wet, very stiff, reorplastic, very rapid distancy, mild to moderate HCI derived O.7 SS-6 O.2-1.12 O.7 SS-6 O.7 SS-6 O.2-1.12 O.7 SS-6 O	-					│
1.4 SS-2 3-3-2-1	-		1.0	SS-1		
1.4 SS.2 3-3-2-1	-				(+)	
1.4 SS-2 3-3-2-1 (5)	_	2.0				_ \ 0.3-1.0' - medium light gray, (N6), moist, very loose,
1.4 SS-2 3-2-1 (5) Poority Graded Sand With SIIT (SP-SM) 2.0-3.4" - moderate brown, (FVR 4/4), wet, loose, very fine to fine grained, no HCl reaction, 10-15% nonplastic fines, sand is silica Clayer Sand (SC) 40-49 medium to high plastic lines, trace organics, sand is silica Clayer Sand (SC) 40-49 medium to high plastic lines, trace organics, sand is silica Silit (ML) 6.0-7.2" - grayish orange, (10YR 7/4), wet, very stiff, nonplastic, very rapid dilatancy, mild to moderate HCl reaction, 5-10% very line sand-sized, carbonate derived derived Silit (ML) 8.0-8.8" - Same as 6.0-7.2" except very soft Silit (ML) 12.0 5.5 SS-7 (75/11*) Silit (ML) 12.0 12.5" - Same as 6.0-7.2" except soft, 10-15% very fine to line sand-sized Sand Silit (ML) 12.0 12.0 12.0 12.0 12.0 12.0 12.0 12.0 13.0	_					
4.0 (9)	_		1.4	SS-2		Poorly Graded Sand With Silt (SP-SM)
1.0 0.9 SS-3 0-1-2-2 (3) 0-10-2-2 (3) 0-1	_			55 -	(5)	
1.2 SS-4 3-10-12-13 Sit (ML) 6.0-7.2" grayish orange, (10/YR 7/4), wet, very stiff, nonplastic, very rapid dilatancy, mild to moderate HCl reaction, 5.9% medium to high plastic fines, trace organics, sand is silica		4.0				
1.2 SS-4 3-10-12-13 (22) Sit (ML) (3.0 + 1						Clayey Sand (SC)
1.2 SS-4 3-10-12-13 Silt (ML) Solution S			0.0	86.3	0-1-2-2	fine to fine grained, no HCl reaction, 35% medium to
1.2 SS.4 3-10-12-13 (22) 3-10-12-13 (22) (3) (22) (3) (3) (3) (1) (4)	37.1		0.9	33-3	(3)	high plastic fines, trace organics, sand is silica
1.2 SS-4 3-10-12-13 (22) 3-10-12-13 (22) 16-24-5-3 (29) 10 10.0 32.1 10.0 10.0 32.1 12.0 0.5 SS-6 (29) 12.9 0.5 SS-7 5-50/5 (55/11") 14.0 14.5 0.5 SS-8 50/6 (50/6") 15.0 16.0 16.3 0.1 SS-9 50/3 (50/3") 18.0 19.9 grayish orange to dark yellowish orange, (10YR 7/4) to 1VR 6/6), met per page to dark yellowish orange, (10YR 7/4 to 1VR 6/6), met per page to dark yellowish orange, (10YR 7/4 to 1VR 6/6), met per page to dark yellowish orange, (10YR 7/4 to 1VR 6/6), met per page to dark yellowish orange, (10YR 7/4 to 1VR 6/6), met per page to dark yellowish orange, (10YR 7/4 to 1VR 6/6), met per page to dark yellowish orange, (10YR 7/4 to 10YR 6/5), met per page to dark yellowish orange, (10YR 7/4 to 10YR 6/5), met per page to dark yellowish orange, (10YR 7/4 to 10YR 6/5), met per page to dark yellowish orange, (10YR 7/4 to 10YR 6/5), met per page to dark yellowish orange, (10YR 7/4 to 10YR 6/5), met per page to dark yellowish orange, (10YR 7/4 to 10YR 6/5), met per page to dark yellowish orange, (10YR 7/4 to 10YR 6/5), met per page to dark yellowish orange, (10YR 7/4 to 10YR 6/5), met per page to dark yellowish orange, (10YR 7/4 to 10YR 6/5), met per page to dark yellowish orange, (10YR 7/4 to 10YR 6/5), met per page to dark yellowish orange, (10YR 7/4 to 10YR 6/5), met per page to dark yellowish orange, (10YR 7/4 to 10YR 6/5), met per page to dark yellowish orange, (10YR 7/4 to 10YR 6/5), met per page to dark yellowish orange, (10YR 7/4 to 10YR 6/5), met per page to dark yellowish orange, (10YR 7/4 to 10YR 6/5), met per page to dark yellowish orange, (10YR 7/4 to 10YR 6/5), met per page to dark yellowish orange, (10YR 7/4 to 10YR 6/5), met per page to dark yellowish orange, (10YR 7/4 to 10YR 6/5), met per		6.0				11
1.2 SS-4 3-10-12-13 (22) nonplastic, very rapid dilatancy, mild to moderate HCl derived (22) nonplastic, very fine to medium sand-sized, carbonate (22) (3) Silt (ML) (30-8.8° - Same as 6.0-7.2° except very soft (32) (29) (31) (30-10.7° - Same as 6.0-7.2° except soft, 10-15% very fine to fine sand-sized (33) (29) (31) (30-10.7° - Same as 6.0-7.2° except soft, 10-15% very fine to fine sand-sized (34) (35) (35) (35) (35) (35) (35) (35) (35						
1.2 SS-4 (22) reaction, 5-10% very fine sand-sized, carbonate derived derived Sitt (ML) 8.0-8.8' - Same as 6.0-7.2' except very soft	-				3-10-12-13	6.0-7.2' - grayish orange, (10YH 7/4), wet, very stiff,
Sit (ML) 8.0-8.8' - Same as 6.0-7.2' except very soft	_		1.2	SS-4		reaction, 5-10% very fine sand-sized, carbonate
10	-	9.0				\derived -
10	-	0.0				
10	-				10.04.5.0	8.0-8.8' - Same as 6.0-7.2' except very soft
10	-		0.8	SS-5		
32.1 0.7 SS-6 0.2-1-12 12.0 12.0 0.5 SS-7 12.9 0.5 SS-7 12.9 14.0 14.0 14.5 15 27.1 16.0 16.3 16.3 16.3 16.3 17-28-39-22 (67) 18.0 Individual part of the sand-size to the s	-				` ′	
12.0 12.0 12.0 12.0 12.0 13.0 15.5 15.5 15.5 15.5 15.5 14.0 14.0 15.5 16.0 16.3 16.1 16.0 16.3 16.3 16.3 16.3 17.28-39-22 (67) 19.9 19.9 10.0-10.7' - Same as 6.0-7.2' except soft, 10-15% very fine to fine sand-sized 10.0-10.7' except 10-15% very fine to fine sand-sized. 10.0-10.7' - Same as 10.0-10.7' except 10-15% very fine to fine sand-sized, 5% coarse sand-sized 10.0-10.7' - Same as 6.0-7.2' except soft, 10-15% very fine to fine sand-sized. 11.0-12.0' - Same as 6.0-7.2' except soft, 10-15% very fine to fine sand-sized. 11.0-12.5' - Same as 6.0-7.2' except soft, 10-15% very fine to sand-sized. 10.0-10.7' - Same as 6.0-7.2' except soft, 10-15% or sand sand-sized. 10.0-10.7' - Same as 6.0-7.2' except soft, 10-15% very fine to sand-sized. 10.0-10.7' - Same as 6.0-7.2' except soft, 10-15% very fine to fine sand-sized. 11.0-12.5' - Same as 10.0-10.7' except 10-15% very fine to sand-sized. 11.0-14.5' - grayish orange, (10YR 7/4), wet, hard, nonplastic, very rapid dilatancy, mild to moderate HCI reaction, 35% very fine to medium sand-sized. 11.0-16.0' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), mild HCI reaction, several limestone fragments of 1/4"-1/2" size 11.0-16.0' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), wet, very dense, fine to coarse grained, moderate HCI reaction, 25-30% nonplastic fines, 10-15% fine grayel-size, all		10.0				Silt (ML)
12.0 12.0 12.0 12.9 0.5 SS-7 5-50/5 (55/11") 14.0 14.5 0.5 SS-8 50/6 (50/6") 14.0-14.5' - grayish orange, (10YR 7/4), wet, hard, norplastic, very rapid dilatancy, mild to moderate HCl reaction, 35% very fine to medium sand-sized, all carbonate 16.0 16.0 16.3 0.1 SS-9 50/3 (50/3") 18.0 19.9 SS-10 17-28-39-22 (67) Silt With Sand (ML) 12.0-12.5' - Same as 10.0-10.7' except 10-15% very fine to fine sand-sized, 5% coarse sand-sized 10.0+14.5' - grayish orange, (10YR 7/4), wet, hard, norplastic, very rapid dilatancy, mild to moderate HCl reaction, 35% very fine to medium sand-sized, all carbonate 16.0-16.05' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), mild HCl reaction, several limestone fragments of 1/4"-1/2" size Silty Sand (SM) 18.0-19.9' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), wet, very dense, fine to coarse grained, moderate HCl reaction, 25-30% nonplastic fines, 10-15% fine gravel-size, all	-					10.0`-10.7' - Same as 6.0-7.2' except soft, 10-15% -
12.0	-		0.7	SS-6		very fine to fine sand-sized
12.9 0.5 SS-7 5-50/5 (55/11") Silt With Sand (ML) 12.0-12.5' - Same as 10.0-10.7' except 10-15% very fine to fine sand-sized, 5% coarse sand-sized 14.0 14.5 0.5 SS-8 50/6 (50/6") Sandy Silt (ML) 14.0-14.5' - grayish orange, (10YR 7/4), wet, hard, nonplastic, very rapid dilatancy, mild to moderate HCI reaction, 35% very fine to medium sand-sized, all carbonate 16.0 16.3 0.1 SS-9 50/3 (50/3") Limestone Fragments 16.0-16.05' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), mild HCl reaction, several limestone fragments of 1/4"-1/2" size Silty Sand (SM) 18.0-19.9' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), wet, very dense, fine to coarse grained, moderate HCl reaction, 25-30% nonplastic fines, 10-15% fine gravel-size, all	-				(0)	
12.9 0.5 SS-7 (55/11") 12.0 12.5' - Same as 10.0-10.7' except 10-15% very fine to fine sand-sized, 5% coarse sand-sized 14.0 14.5 0.5 SS-8 50/6 (50/6") 15.27.1 Sandy Silt (ML) 14.0 14.5' - grayish orange, (10YR 7/4), wet, hard, nonplastic, very rapid dilatancy, mild to moderate HCl reaction, 35% very fine to medium sand-sized, all carbonate 16.0 16.3 0.1 SS-9 50/3 (50/3") 18.0 Limestone Fragments 16.0-16.05' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), mild HCl reaction, several limestone fragments of 1/4"-1/2" size Silty Sand (SM) 18.0-19.9' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), wet, very dense, fine to coarse grained, moderate HCl reaction, 25-30% nonplastic fines, 10-15% fine gravel-size, all	-	12.0				Silt With Sand /MI \
14.0 14.0 14.5 0.5 SS-8 50/6 (50/6") 14.0-14.5' - grayish orange, (10YR 7/4), wet, hard, nonplastic, very rapid dilatancy, mild to moderate HCI reaction, 35% very fine to medium sand-sized, all carbonate 16.0 16.0 16.3 0.1 SS-9 50/3 (50/3") Limestone Fragments 16.0-16.05' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), mild HCI reaction, several limestone fragments of 1/4"-1/2" size Silty Sand (SM) 18.0-19.9' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), wet, very dense, fine to coarse grained, moderate HCI reaction, 25-30% nonplastic fines, 10-15% fine gravel-size, all	_		0.5	SS-7		12.0-12.5' - Same as 10.0-10.7' except 10-15% very
14.5 0.5 SS-8 50/6 (50/6") 15. 27.1 Sandy Silt (ML) 14.0-14.5' - grayish orange, (10YR 7/4), wet, hard, nonplastic, very rapid dilatancy, mild to moderate HCl reaction, 35% very fine to medium sand-sized, all carbonate 16.0 16.3 0.1 SS-9 50/3 (50/3") Limestone Fragments 16.0-16.05' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), mild HCl reaction, several limestone fragments of 1/4"-1/2" size 18.0 Silty Sand (SM) 18.0-19.9' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), wet, very dense, fine to coarse grained, moderate HCl reaction, 25-30% nonplastic fines, 10-15% fine gravel-size, all	_	12.9			(00/11)	\fine to fine sand-sized, 5% coarse sand-sized
14.5 0.5 SS-8 50/6 (50/6") 15. 27.1 Sandy Silt (ML) 14.0-14.5' - grayish orange, (10YR 7/4), wet, hard, nonplastic, very rapid dilatancy, mild to moderate HCl reaction, 35% very fine to medium sand-sized, all carbonate 16.0 16.3 0.1 SS-9 50/3 (50/3") Limestone Fragments 16.0-16.05' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), mild HCl reaction, several limestone fragments of 1/4"-1/2" size 18.0 Silty Sand (SM) 18.0-19.9' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), wet, very dense, fine to coarse grained, moderate HCl reaction, 25-30% nonplastic fines, 10-15% fine gravel-size, all	-					
14.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0	-	14.0			FC/2	
nonplastic, very rapid dilatancy, mild to moderate HCI reaction, 35% very fine to medium sand-sized, all carbonate 16.0 16.3 0.1 SS-9 50/3 (50/3") Limestone Fragments 16.0-16.05' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), mild HCI reaction, several limestone fragments of 1/4"-1/2" size Silty Sand (SM) 18.0-19.9' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), wet, very dense, fine to coarse grained, moderate HCI reaction, 25-30% nonplastic fines, 10-15% fine gravel-size, all		14.5	0.5	SS-8		
16.0 16.3 0.1 SS-9 50/3 Limestone Fragments 16.0-16.05' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), mild HCl reaction, several limestone fragments of 1/4"-1/2" size 18.0 Silty Sand (SM) 18.0-19.9' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), wet, very dense, fine to coarse grained, moderate HCl reaction, 25-30% nonplastic fines, 10-15% fine gravel-size, all					(55/5)	\ nonplastic, very rapid dilatancy, mild to moderate HCI /
16.0 16.3 0.1 SS-9 (50/3") Limestone Fragments 16.0-16.05' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), mild HCl reaction, several limestone fragments of 1/4"-1/2" size Silty Sand (SM) 18.0-19.9' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), wet, very dense, fine to coarse grained, moderate HCl reaction, 25-30% nonplastic fines, 10-15% fine gravel-size, all	27.1					
18.0 1.9 SS-10 SS-10 (50/3") 16.0-16.05' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), mild HCl reaction, several limestone fragments of 1/4"-1/2" size Silty Sand (SM) 18.0-19.9' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), wet, very dense, fine to coarse grained, moderate HCl reaction, 25-30% nonplastic fines, 10-15% fine gravel-size, all		16.0				
18.0 1.9 SS-10 SS-10 SS-10 SS-10 Silty Sand (SM) 18.0-19.9' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), wet, very dense, fine to coarse grained, moderate HCl reaction, 25-30% nonplastic fines, 10-15% fine gravel-size, all		16.3	0.1	SS-9		Limestone Fragments 16 0-16 05 - gravish grange to dark vellowich grange
Silty Sand (SM) 1.9 SS-10 17-28-39-22 (67) SS-10 (67) SS-10 17-28-39-22 (67) SS-10 (67) SS-10 (10)					(50/3)	\(10YR 7/4 to 10YR 6/6), mild HCl reaction, several / _
Silty Sand (SM) 18.0-19.9' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), wet, very dense, fine to coarse grained, moderate HCl reaction, 25-30% nonplastic fines, 10-15% fine gravel-size, all]					\limestone fragments of 1/4"-1/2" size
Silty Sand (SM) 18.0-19.9' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), wet, very dense, fine to coarse grained, moderate HCl reaction, 25-30% nonplastic fines, 10-15% fine gravel-size, all]	18.0				11
1.9 SS-10 SS-10 17-28-39-22 (10YR 7/4 to 10YR 6/6), wet, very dense, fine to coarse grained, moderate HCl reaction, 25-30% nonplastic fines, 10-15% fine gravel-size, all	1 7					Silty Sand (SM)
coarse grained, moderate HCl reaction, 25-30% nonplastic fines, 10-15% fine gravel-size, all]				17-28-39-22	18.0-19.9 - grayish orange to dark yellowish orange, 1111 (10YR 7/4 to 10YR 6/6), wet, very dense, fine to
			1.9	SS-10		coarse grained, moderate HCl reaction, 25-30%
20 Carovinato	20					
	20					- COLLEGIANO - COLLEGIA - COLLEGI

APPENDIX 2BB-78 Rev. 7



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-08	SHEET	2	OF	15

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724017.2 N, 457734.1 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical

DITTELLIT	<u>a wil ii k</u>	JD AND	LQUII IVII	LINT . CIVIL 330X	3/N 340233, Illuu Totai	iry, auto hammer, AWJ rods,	3-7/0 til-cone b	ıı	ORIENTATION: Vertical
WATER	LEVELS	: 3.4 ft bo	gs on 03/2	22/07	START : 3/12/2007	END: 3/21/2007	LOGGER	: C.	Wallestad, R. Gomez, R. McComb, L. Prochaska
1.				STANDARD		SOIL DESCRIPTION		(T	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION				SYMBOLIC LOG	
SEL ON ON		RECOVE		TEST RESULTS		USCS GROUP SYMBOL, C		임	DEPTH OF CASING, DRILLING RATE,
FAC		INLOOVE	<u> </u>			CONTENT, RELATIVE DENS		8	DRILLING FLUID LOSS, TESTS, AND
E E E			#TYPE	6"-6"-6"-6" (N)	CONSISTENCY	Y, SOIL STRUCTURE, MINE	RALOGY	λ	INSTRUMENTATION
22.1	20.0			(14)	Silty Sand (SM)			1111	
	20.0					e as 18.0-19.9' except der	ise -		-
_		1.5	SS-11	10-15-17-16			_		
			00	(32)					
	22.0								
-					Silty Sand (SM)			Ш	1
-		1.0	00 10	17-19-49-50/1	22.0-23.6' - Same	e as 18.0-19.9' except ver	y dense –		1
-		1.6	SS-12	(68)			_		1
-	23.6							Ш]
_	24.0						_		_
	24.4	0.4	SS-13	50/5 (50/5")	Silty Gravel With	h Sand (GM) e as 22.0-23.1' except mile	HCI (\mathbb{I}]
25				(30/3)		sample is several wafer s]
25 <u> </u>					limestone fragme			1	
-	00.0							1	
-	26.0				Silty Sand (SM)			717	Sample SS-14 is similar to SS-12 and
-					26.0-27.6' - dark	yellowish orange, (10YR 6	6/6), wet, -		above, but darker in color
_		1.6	SS-14	10-11-7-11	medium dense, fi	ine to medium grained, mi	ld to		
		1.0		(18)		action, 35% nonplastic fine ne gravel-size, trace white			
	28.0					cles, all carbonate	_	11111]
_					Silty Sand And L	Limestone (SM)			1
-				8-11-10-50/5		e as 26.0-27.6' except a fe	ew 1/4"]
-		0.7	SS-15	(21)	water snaped iim	nestone fragments	/ -	1	Chatter at 29.0'
-				,			-		- Orialioi di 20.0
30	38:8		00.10	50/4					
12.1	30.3	0.0	SS-16	50/4 (50/4")	Limestone Fragr	ments rse sand-size limestone fra	agmente /-	H	_
				(30/4)	\recovered	ise sand-size iiinestone iii	ginents		
								1	1
-	32.0						_	i	1
-	32.0				Silty Sand With	Gravel (SM)		111	-
-					32.0-33.5' - dark	yellowish orange, (10YR 6			-
-		1.5	SS-17	23-36-27-28		to coarse grained, mild to			1
				(63)	nonplastic fines,	-20% fine gravel-size, 20-2	:0% 	Ш	
	34.0	<u></u>						L]
]		0.0	00 10	28-50/5	Silty Sand With]
35	34.9	0.6	SS-18	(78/11")	34.0-34.6' - Same	e as 32.0-33.5' except severage fragments	eral coarse /=	1111	1
7.1					ystaver-size iiilies	none magnificities	/	1	⊣
-							-	ł	-
-	36:P	0.0	\ SS-19 /	50/1	No Possyany 06	0'			Hopey chatter at 26 27'
		/	33-19	(50/1")	No Recovery 36.	.υ			Heavy chatter at 36-37'
				\			_]
]
	38.P						_	1	1
-	38:4	0.0	SS-20	50/0.5	\ \ \ Limestone Fragr		Γ	一	†
-				(50/0.5")	\ 38.0-38.04' - light	t olive gray, (5Y 5/2), mild	HCI /-	ł	-
-					reaction, tragmer	nts to 1/2" size, fragments	are / _	ł	-
-					Subliger than pre	oviousiy			
40									

APPENDIX 2BB-79 Rev. 7



PROJECT NUMBER:

33884.FL BORING NUMBER:

A-08 SHEET 3 OF 15

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724017.2 N, 457734.1 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical

					S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 3.4 ft bo	gs on 03/2		START : 3/12/2007 END : 3/21/2007 LOGGER : C. Wallestad, R. Gomez, R. McComb, L. Prochaska SOIL DESCRIPTION COMMENTS
<u></u>	SAMPLE	INTERVA	d (ft)	STANDARD PENETRATION	GOIL DESCRIPTION GOVERNMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	JAMII LE	RECOVE		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SOMMENTO DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
TH E		TILOUVE	#TYPE	6"-6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR ONSISTENCY, SOIL STRUCTURE, MINERALOGY SINSTRUMENTATION
SUF ELE			#11PE	(N)	
2.1	40.0			24-24-50/3	Silty Sand (SM) 40.0-41.3' - light olive brown to moderate olive brown,
_		1.3	SS-21	(74/9")	(5Y 5/2 to 5Y 4/4), wet, very dense, fine to coarse
_	41.3				grained, mild HCl reaction, 30% nonplastic fines, 5-10% fine gravel-size, all carbonate
_	42.0			50/0	
_	42.5	0.5	SS-22	50/6 (50/6")	Silty Sand (SM) 42.0-42.5' - Same as 40.0-41.3' except 30% size
_					\limestone pieces \\ _
-					
-	44.0 44.3	0.1	SS-23	50/3	\ Silty Sand (SM)
		<u> </u>	00 20	(50/3")	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
45 -2.9					
-	46.0				
-	46.0 46.2	0.1	SS-24	50/2	│ Limestone Fragments
-				(50/2")	\delta 46.0-46.05' - moderate yellowish brown, (10YR 5/4), mild HCl reaction, 2 wafer shaped limestone pieces,
-					1/8"-1/4" thick, voids up to 1/16" over 30% of surface
_	48.0				1
-	48.4	0.3	SS-25	50/5 (F0/F")	Silty Sand (SM) \(\sqrt{48.0-48.3'} - \sqrt{5ame as 42.0-42.5'} \) except more
				(50/5")	\\limestone fragments
50	50.P				
-7.9 -		0.0_/	\SS-26	50/1 (50/1")	Limestone Fragments 50.0' - recovered one 1/4" limestone fragment
_					
-					
_	52.0				Silty Sand (SM) Sample SS-27 and similar samples may be
-					52.0-53.7' - Same as 48.0-48.3' - extremely weak limestone
-		1.7	SS-27	14-25-24-16 (49)	│
-	54.0			, ,	<u> </u>
-	54.0	0.2	SS-28	50/4	Silty Sand (SM)
55				(50/4")	\54.0-54.2' - Same as 52.0-53.7'
-12.9					-
	56.9				<u> </u>
	5 0.1	0.0	SS-29	50/1 (50/1")	Limestone Fragments Stopped drilling for the day 3/12/07 at 17:50, at 56'
				(30/1)	Surface collapse 3/13/07 at 07:45, driller
_					rebuilding surface with dirt; will insert HW casing
_	58.0			04.50/3	HW casing set to 14' at 09:40
-	58.6	0.4	SS-30	24-50/1 (74/7")	Silty Sand With Gravel (SM) S8.0-58.4' - Same as 52.0-53.7' except moderate Resume drilling at 10:15 on 3/13/07
-					\ \ yellowish brown, (10YR 5/4), wet, hard, nonplastic, \ \ \ very rapid dilatancy, mild HCl reaction, 20-25% fine to \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
-					coarse sand-size, 30% fine gravel-size, all carbonate
60					
				-	

APPENDIX 2BB-80 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-08	SHEET	4	OF	15	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724017.2 N, 457734.1 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical

					5/N 340233, mud rotary, auto nammer,			ONIENTATION : Vertical
WATER	LEVELS	: 3.4 ft bo	gs on 03/2	22/07	TART: 3/12/2007 END: 3/21/		R : C.	Wallestad, R. Gomez, R. McComb, L. Prochaska
> = =				STANDARD	SOIL DESCRIPT	ION	g	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS			SYMBOLIC LOG	
표상인		RECOVE	ERY (ft)	1	SOIL NAME, USCS GROUP S	YMBOL, COLOR,	۱ ا	DEPTH OF CASING, DRILLING RATE,
TH ₹FA(#TYPE	6"-6"-6"	MOISTURE CONTENT, RELAT CONSISTENCY, SOIL STRUCTU		ABC	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			#IYPE	(N)	0011010121101, 0012 01110010	TIE, MINITER DIEGOT	S.	INCOMENTATION.
-17.9	60.0	0.5	CC 21	27-50/1	Silty Sand With Gravel (SM)		111	
-	60.0 60.6	0.5	SS-31	(77/7")	\neg 60.0-60.5' - Same as 58.0-58.4' e	xcept 20% fine to		-
-					coarse sand-size, 30-35% gravel	-size limestone	4	
I _					fragments in wafer shapes		┛	_
	62.0							
-	62.3	0.2	SS-32	50/3		Γ	Ħ	1
-				(50/3")	62.0-62.2' - dark yellowish brown	(10YR 4/2), mild	1	-
-					HCl reaction, 1/4" thick wafer sha	ped ilmestone	-	-
-					iraginents		-	-
	64.0						<u> </u>	.
	64.4	0.2	SS-33	50/5 (50/5")	Limestone Fragments	_	#	64-64.7' heavy chatter
65				(50/5")	\64.0-64.2' - Same as 62.0-62.2'		1]
-22.9						_	1	-
-	66.0	0.0	00.01	EO/E	Cilty Cond (CM)		+	-
-	66.3	0.3	SS-34	50/5 (50/5")	Silty Sand (SM) \[\begin{align*} \text{66.0-66.3'} - moderate yellowish begin{align*} \end{align*}	rown to dark		65.7-66' no chatter, softer
_				(55/5)	yellowish brown, (10YR 5/4 to 10)	YR 4/2), wet, fine to /.	1	
					coarse grained, mild HCI reaction	, 30-35% nonplastic		
					fines, 20% fine size, all carbonate		1	
_					Begin Rock Coring at 66.0 ft bgs See the next sheet for the rock of	are loa	1	1
-					dee the flext sheet for the fock of	ine log	┨	-
-							-	-
-							1	_
70								
-27.9							1	
-							1	-
-							-	-
-							4	_
_						•	1]
-							1	1
-							1	-
-							-	-
_							1	
75								
-32.9						_	1]
-						•	1	1
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-							1	
80								

APPENDIX 2BB-81 Rev. 7



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-08

SHEET 5 OF 15

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724017.2 N, 457734.1 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 3.4 ft bgs on 03/22/07 START: 3/12/2007 END: 3/21/2007 LOGGER: C. Wallestad, R. Gomez, R. McComb, L. Prochaska DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS Geophysical testing 66.0 66.0-66.2' - Fracture zone Limestone <10 66.3' - Fracture, horizontal, smooth, planar, 66.0-70.6' - moderate yellowish performed prior to rock brown, (10YR 5/4), very fine to fine coring, depth tagged at open 66.8-67.0' - Fracture, 50-55 deg, rough, grained, mild HCI reaction, very weak to weak (R1 to R2), <1/16" voids on 3 planar, tight 67.2' - Mechanical break 15-20% of surface 67.3-67.9' - Fracture, 10-50 deg, rough, R1-HQ 5 ft 65 1 planar tight 68.2' - Fracture, 10 deg, rough, planar, open 68.4-68.55' - Mechanical break, 30 deg, 92% SC-1 collected at 69.4-3 smooth, planar, open <1/16" 68.95-69.0' - Fracture, 30 deg, smooth, 70 -27.9 planar, silt and/or clay sized infilling, <3/16" R1: 8 minutes 0 thick, open NR 69.4, 69.5' - Fractures (2), horizontal No Recovery 70.6-71.0' 71.0 smooth, planar, silt infilling, open Limestone 70.5' - Fracture, horizontal, smooth, 0 71.0-75.2' - Same as 66.0-70.6' undulating, open except 5-10% solution cavities up to 71.4' - Fracture, 20 deg, rough, undulating, 3/8" at 72.6-75.2', weak to medium SC-2 collected at 71.4trace red laminated staining, open 72.35' - Fracture, horizontal, rough, planar 2 strong (R2 to R3) at 74.0-75.0' 72 85 72.75, 72.9' - Fractures (2), 30 deg, rough, R2-HQ 3 planar, tight 5 ft 73 73.0' - Fracture, horizontal, rough, stepped, 96% trace silt and/or clay infilling 73.3-73.6' - Fracture, 80 deg, rough, 0 undulating, tight 75 73.6' - Fracture, horizontal, rough, undulating, -32.9 R2: 7 minutes 75.2-75.8' - moderate yellowish 2 73.6-74.25' - Fracture, 60 deg, rough, brown, (10YR 5/4), fine grained, mild 76 O NR undulating, tight HCl reaction, extremely weak to very 75.3, 75.5' - Fractures (2), horizontal, rough, weak (R0 to R1), trace voids to 1/8" >10 stepped, <3/16" silt infilling, open 1/8" trace casts/ cavities up to 3/8"x9/16" 75.5-75.8' - Fracture, 75 deg, rough, No Recovery 75.8-76.0' SC-3 collected at 76.9undulating, tight 76.0-76.05' - Clay seam, dark organic rich Limestone 3 76.0-78.9' - light gray to very pale orange, (N7 to 10YR 7/2), very fine to fine grained, moderate HCl reaction, 77.8 clav R3-HQ 76.05-76.6' - Fracture zone 5 ft 23 76.8-76.9' - Mechanical break or fracture, 15 weak (R2), trace voids to 1/16", trace casts/cavities to 3/4"x3/8" 64% deg, rough, undulating, open Clay (CL) 78.9-79.2' - grayish brown, (5YR 3/2), 77.7' - Fractures, multiple vertical fractures 77.8-78.2' - Fracture, 75 deg, smooth, 80 undulating, tight 77.8-78.2' - Fracture, rough, planar, mild HCl reaction, organic, laminated NR -37 9 R3: 8 minutes No Recovery 79.2-81.0' orthogonal to above, tight 81.0 78.2-78.9' - Fracture, vertical, rough, Limestone undulating, trace black powdery staining, tight 1 78.9-79.2' - Bedding plane, horizontal, smooth, undulating, 1/4"-1/2" thick, open 1/8" 81.7' - Fracture, 15 deg, rough, planar, 81.0-83.3' - moderate vellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, weak (R2). SC-4 collected at 82.4-15% voids <1/16", 5-10% solution cavities up to 3/8", 10-15% fine sand 1 <1/16" thick silt or/and clay sized infilling, 1/4" open with limestone, weak (R2), same R4-HQ 82.4' - Fracture, 15 deg, rough, undulating, 88 3 color 20-25% voids 5 ft open 100% 83.3-83.6' - transition zone as rock 83.3, 83.6, 84.3' - Fractures (3), horizontal, from 81.0-83.3' grades into material rough, planar, silt and/or clay sized infilling, at 83.6-86.4' 1 open 85 83.6-83.7' - Fracture zone -42.9 R4: 7 minutes 84.8' - Mechanical break 0 86.0

APPENDIX 2BB-82 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-08

SHEET 6 OF 15

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724017.2 N, 457734.1 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 3.4 ft bgs on 03/22/07 START: 3/12/2007 END: 3/21/2007 LOGGER: C. Wallestad, R. Gomez, R. McComb, L. Prochaska DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS Limestone 86.2' - Fracture, 10 deg, rough, undulating, 0 83.6-86.4' - pale yellowish brown, (10YR 6/2), fine grained, moderate HCI reaction, weak (R2), 20-25% SC-5 collected at 88.6coverage of voids up to 1/16", 25% casts/ cavities up to 3-1/8"x1-9/16" at 83.6-84.8', trace casts/cavities (up to 4 87.35' - Fracture, horizontal, smooth, undulating, 1/4" hard infill, tight 87.6' - Fracture, horizontal, smooth, R5-HQ 3/4"x3/8") throughout, single large undulating, silt and/or clay sized infilling, 1" 71 2 5 ft (2-3/4"x3/4") cavity at 86.0' 86.4-91.0' - moderate yellowish 100% thick infilling, tight 87.75' - Fracture, horizontal, smooth, brown, (10YR 5/4), fine grained, undulating, 1/2" silt infill, tight to 1/2" open 88.0' - Fracture, horizontal, smooth, strong HCI reaction, very weak to -47.9 undulating, silt and/or clay sized infilling, weak (R1 to R2), fossil casts and R5: 7 minutes tight, 1/2" silt infill, 1/4" open 88.35' - Fracture, horizontal, smooth, molds, 3/16" voids on 15% of 1 surface, 10% solution cavities up to 91.0 3-1/8"x3/4" stepped, tight 91.0-92.9' - moderate yellowish 88.6' - Fracture, horizontal, smooth, 0 brown mottled very pale orange, (10YR 5/4 mottled 10YR 6/2), fine undulating, 1/8"-1/2" open 89.8' - Mechanical break SC-6 collected at 94.0grained, moderate HCl reaction, very 90.5' - Fracture, 2-4 deg, smooth, undulating, 1 94 9' weak to weak (R1 to R2), 10-20% weak to weak (RT to R2), 10-20% voids <1/8", 5-10% solution cavities up to 1-3/16"- 1-9/16", partially to completely infilled with white to yellowish gray (5Y 5/1) carbonate, 92.6' - Fracture, 5-7 deg, rough, planar, <3/8" R6-HO thick infilling, carbonate silt, open 3 93 5 ft 93.0' - Fracture or mechanical break, 100% horizontal, rough, undulating, white infilling extremely weak (R0) material 92.9-96.0' - yellowish gray to very 1/16" thick, tight 2 93.2, 93.6' - Mechanical break (2) 94.0, 94.9' - Fractures (2), horizontal, rough, 95 pale orange, (5Y 8/1 to 10YR 8/2), -52.9 R6: 15 minutes undulating, open fine grained, strong HCI reaction, 2 weak to medium strong (R2 to R3), 95.2' - Fracture, horizontal, smooth, planar, 96 O dark brown clay infilling 3/4" thick 5% voids, 2-5% solution cavities 95.9-96.0' - Fracture or mechanical break, 30 96.0-101.0' - very pale orange to 2 yellowish gray, (10YR 8/2 to 5Y 7/2), fine grained, strong HCl reaction, very weak (R1), 10-15% voids up to 1/16", trace casts/cavities up to 3/8" deg, rough, planar, tight 96.25-96.35' - Fracture, 45 deg, rough, SC-7 collected at 98.15planar, open 3 98.9' 96.95' - Fracture, horizontal, smooth, planar, diameter, 10% irregular black fractured along contact R7-HQ laminae/inclusions at 96.5-97.5' 97.05' - Fracture, horizontal, rough, planar, 5 ft 58 1 tight 100% 97.4, 97.6, 98.9' - Fractures (3), 0-5 deg, rough, undulating, up to 1/8" open 2 99.3' - Mechanical break 100 99.6' - Fracture, 0-30 deg, rough, undulating, -57.9 R7: 6 minutes tiaht 2 100.0' - Mechanical break 101.0 100.5-101.05' - Fracture, 70 deg, rough, undulating, open 1/8"-1/4" Poorly Graded Sand (SP) NA 101.0-101.4' - grayish orange, (10YR 7/4), very fine to fine grained, strong 101.4' - Fracture, 30 deg, rough, undulating, 1 sand/rock contact HCl reaction, 80% carbonate, 20% SC-8 collected at 103.05-102.25' - Fracture, horizontal, rough, planar, 3 silicate tiaht Limestone 102.8' - Fracture, 10 deg, rough, undulating, 101.4-106.0' - very pale orange to R8-HQ open grayish orange, (10YR 8/2 to 10YR 7/4), fine grained, strong HCl 46 2 5 ft 102.85-103.05' - Fracture, 60 deg, rough, 100% undulating reaction, extremely weak to very weak (R0 to R1), trace voids up to 103.95' - Fracture, 20-25 deg, rough, planar, >10 open 1/16", no visible casts/cavities 105 103.95-104.2' - Fractures (3), rough, -62.9 R8: 10 minutes undulating, open >10 104.5' - Mechanical break 106.0

APPENDIX 2BB-83 Rev. 7



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-08

SHEET 7 OF 15

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724017.2 N, 457734.1 E (NAD83)

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS : 3.4	ft ba	s on 0	3/22/07 START : 3/12/2007 END : 3/2	21/200	D7 LOGGER : C. Wallestad, R. Gorr	nez, R. McComb, L. Prochaska	
				DISCONTINUITIES		LITHOLOGY	COMMENTS	
AND N (#)	0%) √ND √ND		ES-	DESCRIPTION] ŏ	ROCK TYPE, COLOR,	CIZE AND DEDTH OF CACINO	
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.	
-			3	104.65-105.0' - Fracture zone 105.3-105.45' - Fracture, 45 deg, rough, undulating, open	H	Limestone - 106.0-111.0' - very pale orange to yellowish gray, (10YR 8/2 to 5Y 7/2),	-	
-			3	105.45-106.0' - Fracture zone 106.0-106.1' - Fracture, vertical, rough, -		fine grained, strong HCl reaction, very weak to weak (R1 to R2), 20%	SC-9 collected at 110.0- 111.0'	
- -	R9-HQ 5 ft	66	2	undulating, 1/4" open 106.1, 106.3' - Fractures (2), vertical, smooth, planar, open	H	voids up to 1/16" on surface, casts/cavities up to 1-9/16" on 10% of surface		
-	100%		3	107.3, 107.5' - Fractures (2), horizontal, smooth, planar, <3/16" open 107.9, 108.25-108.3' - Fractures (3), 30 deg,	Ħ	_	_	
110_ -67.9				smooth, undulating, tight 109.0' - Fracture, horizontal, rough, undulating, open	Ħ	_	R9: 6 minutes	
-	111.0		0	109.45' - Fracture, horizontal, smooth, undulating, 1/8" open	H	- - 111.0-116.0' - very pale orange to		
-			2	109.6' - Fracture, 10 deg, rough, stepped, 1/8" open 109.7' - Fracture, 10 deg, rough, undulating,	Ħ	yellowish gray, (10YR 8/2 to 5Y 7/2), fine grained, strong HCl reaction, very weak (R1), trace voids to 1/16",	SC-10 collected at 113.65-	
-	D40 U0			0	open 110.0' - Fracture, horizontal, rough, undulating	厈	- trace cavities to 3/8" diameter at 113.6'	114.55'
- -	R10-HQ 5 ft 100%	90	3	111.3' - Mechanical break, horizontal 111.65-111.85' - Fracture, 45 deg, rough,		_		
- 115			1	planar, tight 113.2' - Fracture, horizontal, rough, stepped, 1/8" open		-	Driller's Remark: Lost circulation at 115'	
-72. 9	116.0		1	113.4' - Mechanical break 113.65, 114.55' - Fractures (2), horizontal, rough, undulating		-	R10: 8 minutes	
-	110.0		4	115.5' - Fracture, horizontal, smooth, undulating, open 116.1, 116.25' - Mechanical break (2)	Ħ	116.0-121.0' - very pale orange to pale yellowish brown, (10YR 8/2 to 10YR 6/2), fine to medium grained, strong HCl reaction, very weak (R1), voids (1/16") on 10% of surface, 15-20% casts/cavities, single cavity (2"x1-3/16") at 114.5', poorly fossiliferous		
- -			7	116.25-116.8' - Fractures (2), 75 deg, rough, undulating, 10% black stain, open 116.8' - Fracture, 30 deg, rough, undulating,	Ħ		SC-11 collected at 120.2- 121.0'	
-	R11-HQ 5 ft	33	3	open - 117.1-117.2' - Fracture, 52 deg, rough,	Ħ			
_	100%		4	planar, 1/8" open 117.35' - Fracture, horizontal, rough, planar 117.65-117.9' - Fracture, rough, planar, 1/8"		_		
120 -77.9				open 117.9-118.2' - Fracture zone 118.8, 119.5, 119.3' - Fractures (3), 10 deg,		_	R11: No runtime recorded	
_	121.0		1	smooth, undulating, tight 118.9' - Fracture, 20 deg, rough, undulating, tight		- 121.0-122.65' - Same as		
- -			5	197.3, 197.5' - Fractures (2), <5 deg, rough, stepped, open	Ħ	- 116.0-121.0' except trace cavities up to 9/16"x3/16"	SC-12 collected at 123.7-	
- -			3	119.7-119.8' - Fracture, 30 deg, rough, undulating, open 119.9-120.0' - Mechanical break	Ħ	122.65-126.0' - very pale orange,	124.5'	
-	R12-HQ 5 ft 100%	34	2	120.2' - Mechanical break 121.15, 121.2' - Fractures (2), horizontal, smooth, planar, open 1/4" to tight	Ħ	(10YR 8/2), fine grained, strong HCI reaction, very weak (R1), trace voids to 1/16", 25-30% casts up to		
- 125			2	121.15-121.4' - Fracture, 60 deg, rough, undulating, 30% black staining	Ħ	3/8"x3/4" at 122.65-123.7', highly fossiliferous		
-82.9 -	-82.9		>10	121.7' - Bedding plane, horizontal, smooth, planar, <1/8" open 121.95' - Fracture or bedding plane,		-	R12: 5 minutes	
-	126.0			horizontal, smooth, planar, <1/8" open	Ħ			

APPENDIX 2BB-84 Rev. 7



PROJECT NUMBER: BORING NUMBER: 338884.FL A-08 SHEET 8 OF 15

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724017.2 N, 457734.1 E (NAD83)

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing

DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams ELEVATION: 42.1 ft (NAVD88)

ORIENTATION: Vertical WATER LEVELS: 3.4 ft bgs on 03/22/07 START: 3/12/2007 END: 3/21/2007 LOGGER: C. Wallestad, R. Gomez, R. McComb, L. Prochaska DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT DESCRIPTION ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 122.25-122.6' - Fracture, 60 deg, rough, Limestone >10 stepped, tight 126.0-129.5' - fine grained, strong HCI reaction, very weak to weak (R1 to R2), voids <1/16" on 3-5% of 122.6-122.7' - Fracture, 25 deg, rough, undulating 123.3-123.6' - Fracture, 75 deg, rough, 10 surface, trace fossils (molds/casts), undulating, tight rare intraclasts 124.5' - Fracture, 35 deg, smooth, planar R13-HQ 124.8-126.0' - Fracture zone 5 ft 70% 0 10 126.0-127.0' - Fracture zone, 0-60 deg, rough, undulating to stepped, open 10 127.0, 127.25' - Fractures (2), <5 deg, rough, No Recovery 129.5-131.0' stepped, open 130 -87.9 127.45' - Fracture, 60 deg, smooth, R13: 6 minutes NR undulating, open 127.7-128.0' - Fracture, 60-90 deg, smooth, 131.0 stepped, tight, vertical from 128.0 to 128.3 Limestone 128.3' - Fracture, horizontal, rough, stepped, 10 131.0-131.5' - pale yellowish brown, open (10YR 6/2), medium to coarse 128.75' - Fracture, 60 deg, rough, stepped, grained, strong HCI reaction, very 5 open weak (R1), 50-60% voids up to 3/8", 129.0-129.25' - Fracture zone, horizontal, smooth, undulating to stepped, tight to open 131.2' - Fracture, <5 deg, rough, undulating 131.45' - Fracture, <5-30 deg, rough, fossils (molds/casts) common 131.5-133.8' - grayish orange, (10YR R14-HO 7/4), fine to very fine grained, strong HCl reaction, weak to medium strong >10 15 5 ft 56% stepped, open (R2 to R3), chalk like 131.45-131.65' - Fracture zone, various No Recovery 133.8-136.0' orientations, rounded gravely limestone 135 NR 131.65-132.0' - Fracture, <5-90 deg, rough, -92.9 R14: 4 minutes undulating, open 132.0-132.3' - Fracture zone, 60 deg, rough, 136.0 stepped, intersected by 40 deg inclined Limestone fracture, tight 136.0-137.3' - pale yellowish brown alternating with very pale orange >10 132.5' - Mechanical break 132.75-133.0' - Fracture, 70 deg, rough, laminae, (10YR 6/2 alternating with 10YR 8/2), fine grained, weak to medium strong (R2 to R3), 15-20% nudulating, tight 133.0-133.2' - Fractures (2), vertical, rough, undulating, vertical and horizontal interporting for the second >10 silty matrix, voids <1/16" on 10-15% R15-HQ intersecting fractures >10 of core surface, trace fossils 0 5 ft 133.25, 133.35, 133.4' - Bedding plane (3), 76% (echinoderms) horizontal, smooth, open 137.3-139.8' - Same as 136.0-137.3' 133.4-133.6' - Fracture zone, various >10 except densely fractured, laminated orientations, gravel sized limestone rock to massive bedding, fossils rare to 140 fragments, angular -97.9 absent, incipient fractures common. R15: 5 minutes 136.0-139.8' - Fracture zone, multiple NR "chalky" appearance fractures ranging from horizontal to vertical, No Recovery 139.8-141.0' 141.0 stepped to undulating, rough, tight to open Limestone 141.0-141.1' - Fracture zone, various 141.0-143.8' - light gray, (N7), fine to very fine grained, mild HCl reaction, 5 orientations, producing limestone rock fragments medium strong to strong (R3 to R4), SC-13 collected at 141.4-141.5, 142.8, 143.4' - Fractures (3), 5-10% voids <1/16", 15-20% solution cavities up to 1-3/6" heavily 1 horizontal, rough, undulating bioturbated especially in upper R16-H0 48 5 section, fossil casts/molds common 5 ft 100% 143.7-143.9' - Fracture zone, 0-90 deg. 143.8-145.0' - fine to medium rough, undulating to stepped grained, mild HCI reaction, very weak >10 144.0' - Fracture, <5 deg, rough, open 144.3' - Fracture, <5 deg, rough, stepped, to weak (R1 to R2), brecciated 145 appearance, fossils rare to absent. -102.9 R16: 16 minutes open 1-2% voids to <1/16", occasional thin 10 black organic laminae 146.0

> APPENDIX 2BB-85 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-08

SHEET 9 OF 15

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724017.2 N, 457734.1 E (NAD83)

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER LEVELS: 3.4 ft bgs on 03/22/07 START: 3/12/2007 END: 3/21/2007 LOGGER: C. Wallestad, R. Gomez, R. McComb, L. Prochaska DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 144.3-145.2' - Fracture zone, rough to Limestone 2 smooth, various orientations, open to tight, 145.0-146.0' - dark yellowish brown, limestone rock fragments (10YR 4/2), fine grained, moderate to strong HCl reaction, weak to medium 145.2' - Bedding plane, horizontal, smooth, SC-14 collected at 146.8strong (R2 to R3), laminated bedding alternating between pale yellowish 0 147 9 open 145.4' - Fracture, <5 deg, smooth, undulating, tight, black crystalline-like grains brown (10YR 6/2) and dark yellowish brown (10YR 6/6), incipient hairline R17-HQ over 10-15% of surface 90 1 5 ft 146.1' - Fracture, <5 deg, rough, stepped to fractures throughout length of interval 100% 146.0-151.0' - mottled yellowish gray undulating, open 146.35' - Fracture, 10 deg and vertical, to grayish orange, (5Y 7/2 to 10YR 0 rough, planar, tight 7/4), fine to very fine grained, 150 148.3' - Fracture or mechanical break, moderate HCI reaction, weak to -107.9 R17: 5 minutes horizontal, rough, undulating medium strong (R2 to R3), thinly 1 150.6' - Fracture, horizontal, rough, planar, laminated to massive bedded, rare 151.0 solution cavities, 5-10% voids up to 151.0-152.3' - Fracture, vertical, rough, 1/16", rare macro fossils 1 undulating, tight, tiny black crystalline-like 151.0-153.3' - yellowish gray, (5Y grains 7/2), fine grained, strong HCI SC-15 collected at 155.05reaction, very weak to medium strong (R1 to R3), voids (1/16") over 3-5% of surface, trace cavities, trace 2 156.0' 152.74' - Fracture, <10 deg, rough, stepped, R18-H0 black tiny crystals over 2% of surface, open fossil casts becoming thinly >10 80 5 ft 153.3, 153.6' - Fractures (2), <10-40 deg, laminated with depth, some mottling 100% rough, planar to stepped, open 153.7-154.1' - Fracture zone, stepped to 153.3-153.8' - Same as 151.0-153.5' except with cavities and voids on >10 planar, horizontal to slightly inclined, bedding 20-25% of surface, few thin laminae 155 laminae, open 153.8-156.0' - mottled yellowish gray -112<u>.9</u> 154.25' - Fracture, 20 deg, smooth, R18: 8 minutes to yellowish gray, (5Y 7/2 to 5Y 8/1), 1 undulating, tight 154.64' - Fracture, horizontal, rough, fine grained, strong HCI reaction, 156.0 very weak to weak (R1 to R2), thinly stepped, tight laminated, numerous bedding plane 0 155.05' - Fracture, horizontal, rough, planar, separations in upper 1/3 of interval, open, silty infilling becoming chalk-like with depth, SC-16 collected at 158.4fossils rare to absent 1 150.3' 156.0-161.0' - very pale orange to grayish orange, (10YR 7/4 to 10YR 157.8' - Fracture, 5 deg, smooth, planar, tight R19-HQ 8/2), very fine grained, strong HCl 2 100 5 ft 158.4, 158.8' - Fractures (2), 2 deg, rough, reaction, very weak to weak (R1 to R2), 10-15% fossil shells/casts 100% stepped, tight decreasing with depth, voids (1/16") 0 over 1-3% of surface, rare cavities, 160 occasionally thinly laminated, -117 9 R19: 7 minutes chalk-like texture at 158.4-158.8' 0 161.0 161.0-165.7' - Same as 156.0-161.0' 5 except voids up to 30-40% on upper 1' of interval, voids becoming less 161.7-162.0' - Fracture zone, horizontal and dense with depth, massive bedding SC-17 collected at 163.85vertical, smooth, planar to undulating, open 3 with thin laminae near base 162.0-162.5' - Fracture, 80 deg and vertical, rough, planar to undulating, open 162.55-163.0' - Fracture, 70 deg, rough, R20-HC 0 5 ft 68 undulating, open 94% 1 165 164.9' - Fracture, horizontal, smooth, planar, -122.9 R20: 8 minutes 3 3/16" thick silt and/or clay sized infilling, open NR 166.0 No Recovery 165.7-166.0'

APPENDIX 2BB-86 Rev. 7



PROJECT NUMBER: BORING NUMBER: 338884.FL

A-08

SHEET 10 OF 15

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724017.2 N, 457734.1 E (NAD83)

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS: 3.4	ft bgs	s on 0	3/22/07 START : 3/12/2007 END : 3/2	21/20	D7 LOGGER : C. Wallestad, R. Gom	nez, R. McComb, L. Prochaska
≩O⊋	(%			DISCONTINUITIES	၅	LITHOLOGY	COMMENTS
BELO CE ANI	KUN, H, AND ERY (9	(%	JRES OT	DESCRIPTION	LIC LC	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-			3	165.4, 165.72, 165.78' - Bedding plane (3), horizontal, smooth to undulating, rough to loose	=	Limestone - 166.0-166.8' - very pale orange, (10YR 8/2), very fine grained, strong	-
-			>10	166.2, 166.8, 166.9' - Fractures (3), horizontal, smooth, planar, fractured along laminated bedding, open		HCl reaction, very weak to weak (R1 to R2), up to 3/8" solution cavities on 3-4% of surface, up to 1/16" voids on	SC-18 collected at 168.3- 169.65' -
-	R21-HQ 5 ft	52	2	167.0-168.0' - Fracture zone, horizontal, smooth, planar, fractured along laminated -		15-20% of surface 166.8-169.2' - moderate yellowish brown, (10YR 5/4), fine grained, mild	_
-	100%		1	bedding, open 168.1, 168.4, 169.95' - Fractures (3), 1-2 deg, smooth to rough, trace of silt		to moderate HCl reaction, very weak (R1), 15-20% voids, 1-2% solution	-
170 -127.9 -			2			cavities up to 3/8", gradational contact with interval below 169.2-171.0' - Same as 166.0-166.8'	R21: 7 minutes End of shift; stop drilling
-	171.0		1	170.65' - Fracture, 5-10 deg, rough, undulating, trace silt, open 170.8' - Fracture, 1-2 deg, rough, stepped, -	H	171.0-173.6' - moderate yellowish brown, (10YR 5/4), mild to moderate	3/15/07 at 10:00 - Bottom of hole tagged at _
-			4	open 171.25, 171.4, 171.8' - Fracture zone (3), 70 deg, rough, planar, cobble size fragments -		HCl reaction, strong (R4), voids over 15-20% of surface, up to 3/4"x3/8" cavities	171' Resume drilling 3/20/07 at - 12:22
-	R22-HQ 5 ft	66	3	172.75' - Fracture, 20 deg, rough, undulating, open	-	R. McComb begins logging hole -	
-	100%	00		173.05, 173.7' - Fractures (2), horizontal, rough, planar to stepped, open 173.55' - Fracture, <5 deg, smooth,		173.6-173.9' - Same as 171.0-173.6 except no voids, no cavities, finely laminated	SC-19 collected at 171.45- 172.75' -
175 -132.9				undulating, brown silty clay over 60% of surface 174.0-174.3' - Fracture, 70 deg, planar to	H	173.9-177.75' - Same as	R22: 10 minutes
-	176.0		3	undulating, tight 174.3' - Fracture, horizontal, smooth, planar, _ open		-	-
-	-		5	174.6' - Fracture, 70 deg, rough, planar, tight 174.73' - Fracture, horizontal, smooth, planar, tight			SC-20 collected at 178.65-
-	R23-HQ		3	175.85' - Fracture, <5 deg, smooth, undulating, clay infilling, silty clay infilling 176.3' - Fracture, <5 deg, rough, undulating		177.75-178.1' - moderate olive	179.45'
-	5 ft 100%	52	1	176.6-176.85' - Fracture zone, horizontal, smooth, planar, open		brown, (5Y 4/4), fine grained, no to mild HCl reaction, extremely weak (R0), 1/16" voids over 10-15% of	_
180_			3	177.03' - Fracture, horizontal, smooth, planar, open - 177.45, 177.6' - Fractures (2), horizontal,		surface, 3/8"- 1-3/16" cavities, friable 178.1-179.45' - yellowish gray, (5Y 7/2), fine grained, mild to moderate	
-137 <u>.9</u> -	181.0		5	smooth, planar, open 178.4' - Fracture, <5 deg, rough, stepped, - 3/8"-3/4" open		HCÍ reaction, weak (R2), up to 1/16" voids over 10-15% of surface, 10-15% 3/8" to 1-3/16" cavities	R23: 4 minutes
-			3	179.0' - Fracture, <5 deg, smooth, stepped, brown silty clay infilling, 3/4"-1-3/16" open 179.25-179.43' - Fracture zone, <10 deg,	H	179.45-180.4' - pale yellowish brown, (10YR 6/2), fine grained, moderate to strong HCl reaction, weak to medium	-
-			5	smooth, stepped, zone of soft friable rock fragments, inclined to horizontal, clay over 10-15%		strong (R2 to R3), voids over 1-2% of surface 180.4-184.80' - dusky yellow, (5Y	SC-21 collected at 184.8- 185.7'
-	_ 100%	66	3	179.85' - Fracture, <5 deg, smooth, stepped 180.0-180.3, 180.55-181.6' - Fractures (2), horizontal, smooth, planar		6/4), fine to very fine grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), voids over 10-15%]
185			2	181.5 - Fracture, 70 deg, smooth, planar, tight 181.8, 181.95' - Fractures (2), horizontal,		of surface and increasing to 30-40% of surface below 183.5', thinly laminated at 182.2-182.4', trace]
-142.9 -	-		1	smooth, planar, open 182.1' - Fracture, <5 deg, smooth, stepped, open		voids from 184.65-184.8'	R24: 5 minutes
	186.0				П		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-08

ROCK CORE LOG

SHEET 11 OF 15

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724017.2 N, 457734.1 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

				2/20/07 CTART : 0/40/2007 FAIR : 0/1			ORIENTATION . Vertical
WATER	LEVELS : 3.4	rπ bgs	s on U		21/200		
≳Q⊋	CORE RUN, LENGTH, AND RECOVERY (%)			DISCONTINUITIES	_ l g l	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	ANE XANI		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
8 8 5 E	S 두유	(%) Q	15.0 15.0	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	וקֿו	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FR V	#\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	OΩ	AC R F	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD
SU	898	R	FR.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SY	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
				182.5' - Fracture, horizontal, rough, planar,	╅	Limestone	
-			7	open	\Box	- 184.8-186.5' - pale yellowish brown,	_
_				182.7-183.02' - Fracture zone, horizontal,	₽₩	(10YR 6/2), very fine to fine grained,	
			4	smooth, planar, open	Ш	mild to moderate HCl reaction, weak	SC-22 collected at 187.0-
			4	183.3' - Fracture, horizontal, smooth, planar, open to tight	Н	 to medium strong (R2 to R3), fossil cavities up to 1-1/2"x1" over 60% of 	188.5'
-	R25-HQ			184.55' - Fracture, <5 deg, rough, undulating,	╁┼┤	surface, voids up to 3/16" over 40%	_
-	5 ft	56	1	rock fragments with dark brown clay filling	╓	- of surface	_
l _	100%			184.7' - Fracture, horizontal, rough, planar,	Н	186.5-187.7' - dusky yellow, (5Y 6/4),	_
				open	Ш	fine grained, moderate HCl reaction, very weak to weak (R1 to R2), 5-10%	
190			4	185.5-185.7' - Fracture zone, <5 deg, rough, undulating, 1-3/16"-2" open	Ш	voids over surface, trace cavities,	_
-147.9				186.2, 186.35, 186.45' - Fractures (3), 0-<5	╂┼┼	trace fossil molds, up to 40-50%	R25: 9 minutes
_			1	deg, rough, open to tight	₽	 voids at 186.7-186.8' and 	
	191.0			186.64' - Fracture, horizontal, smooth, planar,	Щ	186.9-187.05'	
			,	open 186.78, 186.93, 187.0, 187.35, 187.6, 187.65,	Н	187.7-187.73' - Same as	
-			1	187.7' - Fractures (7), 0 - <5 deg, rough,	\Box	186.5-187.7' except 20-30% voids, 10-15% cavities	1
-				planar, open, vertical fracture at	╂┴╂	187.73-187.93' - light olive gray, (5Y	SC-23 collected at 191.0-
-			3	187.35-187.6', tight		6/1), fine grained, thinly laminated	191.9' -
			•	187.8' - Fracture, 70 deg, smooth, planar,	П	187.93-190.2' - yellowish gray, (5Y	
	R26-HQ			tight 189.05' - Fracture, <5 deg, rough, planar,	Н	5/2), fine grained, mild to moderate	
-	5 ft	36	3	light brown sandy clay infilling, open	Ш	HCl reaction, weak (R2), voids over 60-70% of surface with discontinuous	_
-	100%			189.6, 189.7' - Fractures (2), horizontal,	╂┯╂	laminae with less voids	_
_			6	smooth, planar, open	╀┤	_ 190.2-190.6' - yellowish gray to	_
195			•	189.9' - Fracture, <5 deg, rough, stepped to	Ш	dusky yellow, (5Y 7/2 to 5Y 6/4), fine	
-152.9				undulating — 190.6' - Fracture, horizontal, rough, stepped	Н	grained, mild to moderate HCl reaction, very weak to weak (R1 to	R26: 6 minutes
-	400.0		>10	to undulating, black organics over 90% of	ш	R2), dark wispy laminae, voids over	-
-	196.0			surface	╂┴┤	40-60% of surface	-
-			1	191.0' - Fracture, horizontal, smooth, planar,	┦	190.6-193.5' - yellowish gray to dark	_
				black coating over 100% of surface	П	yellow, (5Y 7/2 to 5Y 6/4), fine	
				191.6-191.9 ^r - Fracture, 80 deg, rough, planar, open	Н	 grained, mild to moderate HCl reaction, very weak to weak (R1 to 	SC-24 collected at 197.5-
-			2	191.9' - Fracture, <5 deg, rough, open, with	ш	R2), voids over 50-60% of surface,	198.5'
-	D27 110			stains	\blacksquare	- cavities up to 3/4"x3/8" and up to	_
_	R27-HQ 5 ft	50	2	192.3, 192.4, 192.7' - Fractures (3), <5 deg,	₽₩	_ 1-3/16" deep, voids becoming less	_
	100%			rough, undulating to stepped, open	Ш	common with depth - 193.5-196.0' - grayish yellow, (5Y	
1 7				193.25' - Fracture, <10 deg, smooth, planar to stepped, open	H	8/4), fine to very fine grained, mild to	1
			10	193.25-195.6' - Fracture zone, with low to	╁┼╂	moderate HCl reaction, very weak	
200 <u> </u>				high angle fractures, rock fragments —	╓	— (R1), voids over 20-30% of surface,	R27: 10 minutes
- 57.3			10	196.1' - Fracture, <5 deg, rough, stepped,	╁┼┦	3-5% cavities, trace fossils, trace	1327. TO Hilliages
	201.0		.	open 198.5' - Fracture, horizontal, rough, stepped,	罝	black organics 196.0-199.3' - yellowish gray, (5Y	
1 7				open	Ш	7/2), fine grained, mild to moderate	1
-			2	198.9' - Fracture, <5 deg, rough, stepped,	╂┼┼	HCl reaction, very weak (R1), thinly	
-				open	口	laminated, trace voids filled with dark	SC-25 collected at 202.5-
_			3	199.3-201.0' - Fracture zone, horizontal,	╁┴┨	organic material, voids over 20-30%	203.5' –
				smooth, open, becoming stepped and rough with depth	Н	of surface, rare cavities, trace voids fossils	200.0
	R28-HQ			201.35' - Fracture, horizontal, rough,	\Box	199.3-201.0' - yellowish gray, (5Y	1
-	5 ft	54	1	stepped, open	╂┴╂	7/2), fine to very fine grained, very	
-	100%			201.95' - Fracture, horizontal, smooth, planar,	╓	weak (R1), voids on 3-5% of surface,	_
_			4	open	H	trace black organic material as thin	
205			+	202.25' - Fracture, horizontal, rough, planar, open	Н	discontinuous laminae	
-162.9				202.35-202.5' - Fractures (2), horizontal,	⇈		R28: 8 minutes
-			2	rough to smooth, stepped, open	╂┯╂	-	
	206.0				₽		

APPENDIX 2BB-88 Rev. 7



PROJECT NUMBER:	BORING NUMBER:	
338884.FL	A-08	SHEET

ROCK CORE LOG

12 OF 15

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724017.2 N, 457734.1 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 3.4 ft bgs on 03/22/07 START: 3/12/2007 END: 3/21/2007 LOGGER: C. Wallestad, R. Gomez, R. McComb, L. Prochaska DISCONTINUITIES LITHOLOGY COMMENTS 9 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 201.0-203.0' - Same as 199.3-201.0' 203.9' - Fracture, horizontal, rough, undulating, open >10 except with void/ cavity zone from 201.3-201.6' covering 20-30% of 204.1, 204.25, 204.4, 204.5' - Fractures (4), surface, very thin dark laminae at horizontal, rough, stepped, open 205.5' - Fracture, horizontal, rough, planar, 201.8' 3 Limestone open 203.0-207.65' - dusky yellow to moderate yellow, (5Y 6/4 to 5Y 7/6), 205.8' - Fracture, <5 deg, rough, stepped, R29-HQ 25 2 open 5 ft 206.0-207.0' - Fracture zone, horizontal and 76% fine to medium grained, mild to moderate HCl reaction, very weak to vertical, rough, abundant horizontal to vertical >10 fractures, open extremely weak (R1 to R0), voids 207.3, 207.75, 207.65' - Fractures (3), over 100% of surface except rare 210 -167<u>.9</u> horizontal, rough, planar cavities from 205.1' to 205.5', some R29: No runtime recorded NR 208.25, 208.7' - Fractures (2), horizontal, cavities are 3/8" to 3/4" deep smooth, planar, open 207.65-208.8' - yellowish gray, (5Y 211.0 208.7-209.8' - Fracture zone 211.0-212.3' - Fracture zone 7/2), very fine grained, mild HCl reaction, very weak (R1), >10 voids/cavities rare to absent 208.8-209.2' - fine grained, mild HCI >10 reaction, extremely weak (R0) 209.2-209.8' - light gray, (N7), fine grained, mild to moderate HCl R30-HQ reaction, very weak to weak (R1 to 0 5 ft 26% R2), only small gravel sized fragments, voids/cavities over NR 15-20% of surface up to 3/4" -1-3/16" length, 3/16" deep 215 No Recovery 209.8-211.0' -172.9 R30: 6 minutes Limestone 211.0-212.3' - yellowish gray, (5Y 216.0 7/2), mild to moderate HCl reaction, 216 0-218 45' - Fracture zone very weak (R1), voids/cavities over >10 30-40% of surface No Recovery 212.3-216.0' Limestone 216.0-218.45' - yellowish gray, (5Y >10 7/2), fine to medium grained, mild to R31-HQ moderate HCI reaction, extremely 13 5 ft 218.45' - Fracture, horizontal, rough, planar, weak (R0), voids/cavities over 49% open 20-30% of surface, trace fossils casts interbedded with soft friable NR limestone at 217.0-218.0' 220 No Recovery 218.45-221.0' -177 9 R31: 7 minutes 221.0 221.0-223.5' - Fracture zone Limestone 221.0-222.7' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, >10 221.7' - Fracture, horizontal, rough, stepped, very weak (R1), friable along thin laminae, voids/cavities over 10-30% 222.1' - Fracture, fractured gravel sized >10 of surface, trace fossils (casts/molds) limestone 222.7-223.5' - yellowish gray, (5Y R32-HQ 8 7/2), mild to moderate HCl reaction, 5 ft 50% extremely weak to very weak (R0 to R1), voids on 1-3% of surface or NR No Recovery 223.5-226.0' 225 -18<u>2.9</u> R32: 4 minutes 226.0

APPENDIX 2BB-89 Rev. 7



PROJECT NUMBER: BORING NUMBER:

338884.FL A-08

SHEET 13 OF 15

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724017.2 N, 457734.1 E (NAD83)

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER LEVELS: 3.4 ft bgs on 03/22/0					21/200	17 LOGGER : C. Wallestad, R. Gon	nez, R. McComb, L. Prochaska		
< □ €	(%)			DISCONTINUITIES	၂ ပွ	LITHOLOGY	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) Q	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND		
DEPTH SURF/ ELEVA	CORE LENG1 RECO	RQD	FRACT PER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMB0	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.		
-			>10	226.0-228.0' - Fracture zone, with some discernible fracture planes 226.3' - Fracture, <5 deg, rough, stepped,	Ħ	Limestone - 226.0-228.0' - pale greenish yellow,	Stop drilling for the day 3/20/07 Resume drilling at 08:40 on		
-			>10	open 226.75, 226.95' - Fractures (2), horizontal,	戽	(10Y 8/2), fine to very fine grained, mild to moderate HCl reaction, very weak to weak (R1 to R2), voids over	3/21/07		
-	R33-HQ			smooth, undulating, open 226.95' - Fracture, zone of rock fragments	H	10-15% of surface, voids absent from 227.35-227.50'	-		
_	5 ft 40%	9		227.35' - Fracture, horizontal, smooth, planar, open		- No Recovery 228.0-231.0'	-		
-			NR	227.5, 227.60' - Fractures (2), horizontal, rough, planar, open	田	-			
230_ -187.9				227.52' - Fracture, zone of rock fragments 227.9' - Fracture, horizontal, smooth, planar, open	Ħ	_	R33: 5 minutes		
- - -	231.0			орен	Ш	-			
			3	231.2' - Fracture, <5 deg, rough, undulating, open	H	Limestone - 231.0-233.0' - yellowish gray to pale	-		
-			3	231.9' - Fracture, horizontal, rough, stepped, open	H	greenish yellow, (5Y 7/2 to 10Y 8/2), fine grained, mild HCl reaction, very weak to extremely weak (R1 to R0),	-		
_	D24 LIO		3	232.0' - Fracture, 40 deg, rough, undulating, open	Ħ	voids over 90% of rock No Recovery 233.0-236.0'			
-	R34-HC 5 ft 40%	20		232.4' - Fracture, <5 deg, rough, undulating, tight		NO Recovery 255.0-256.0	-		
_			NR	232.65' - Fracture, 25 deg, rough, undulating, tight	囯	-			
235 -192.9				232.8' - Fracture, <5 deg, rough, undulating, open 1-3/16"-1-9/16" —	田		R34: 5 minutes		
-	236.0				H	-	-		
_			>10	236.0-237.6' - Fracture zone, no bedding/fracture plane apparent, gravel sized	Ħ	Limestone - 236.0-237.6' - Same as 231.0-233.0'			
-			>10	limestone fragments up to 1-2" length	団	-			
_			- 10		Ħ	No Recovery 237.6-241.0'	-		
-	R35-HQ 5 ft	0			日	-	-		
-	32%		NR		H	-	-		
240				_	Ħ	-			
-197 <u>.9</u> -					日	-	R35: 6 minutes		
-	241.0			241.0-242.6' - Fracture zone, gravel sized	団	Limestone	-		
_			>10	rock fragments, fracture plane uncertain	囯	- 241.0-242.6' - yellowish gray, (5Y 7/2), fine to very fine grained, mild			
-					田	HCl reaction, extremely weak to very weak (R0 to R1), voids over 40% of	-		
-	R36-HQ				╁╣	rock, trace clay, trace fossil casts No Recovery 242.6-246.0'	-		
_	5 ft 32%	0]	-			
_			NR		Ħ	-			
245_ -202.9 				_		_	R36: 8 minutes		
					団	-	-		
					\prod				

APPENDIX 2BB-90 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-08

SHEET

ROCK CORE LOG

14 OF 15

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724017.2 N, 457734.1 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 3.4 ft bgs on 03/22/07 START: 3/12/2007 END: 3/21/2007 LOGGER: C. Wallestad, R. Gomez, R. McComb, L. Prochaska DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR. SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 246.0-246.8' - Fracture zone, rock fragments Limestone >10 246.0-247.6' - yellowish gray, (5Y 7/2), fine grained, mild to moderate 246.8' - Fracture, horizontal, rough, stepped, HCl reaction, very weak (R1), friable, 10 thin laminae present in upper 0.5' of 247.1' - Fracture, horizontal, rough, stepped, interval, voids over 10-15% of tight surface, cavities up to 3/8" rare R37-HQ 247.45' - Fracture, horizontal, rough, No Recovery 247.6-251.0' 7 5 ft stepped, open 32% 247.55' - Fracture, horizontal, smooth, planar NR 250 -207.9 251.0-251.7' - Fracture zone, rock fragments R37: 7 minutes 251.0 251.7' - Fracture, 60 deg, smooth, planar, Limestone open >10 252.2, 252.45' - Fractures (2), horizontal, 251.0-252.4' - yellowish gray, (5Y rough, planar, open 7/2), fine to medium grained, mild to moderate HCl reaction, very weak 252.7, 252.75' - Fractures (2), <5 deg, rough, 4 stepped to planar, open 252.95' - Fracture, <5 deg, rough, undulating, (R1), friable 252.4-253.5' - yellowish gray, (5Y 7/2), very weak to weak (R1 to R2), tight R38-H0 very thinly laminated with lenses up 4 253.2' - Fracture, horizontal, smooth, 45 5 ft to 1/2", voids over 100% of surface. 100% stepped, open slightly fossiliferous from 252.4-252.7, cavities up to 3/8" over 253.6' - Fracture, horizontal, smooth, planar, 3 open 10-20% 255 253.75' - Fracture, <5 deg, stepped to planar, 253.5-256.4' - yellowish gray, (5Y -212.9 open R38: 8 minutes 7/2), fine grained, very weak (R1), 254.05' - Fracture, <5 deg, smooth, 3 voids over 50-75% of surface, undulating, tight 256.0 254.5' - Fracture, horizontal, rough, planar, cavities over 30% >10 open 256.4-257.8' - Same as 253.5-256.4' 254.55' - Fracture, horizontal, smooth, planar, except laminated, cavities over open 50-60% of surface, fossiliferous 10 254.95' - Fracture, rough, planar to undulating, tight No Recovery 257.8-261.0' 255.5' - Fracture, 70 deg, rough, planar, open R39-HQ 255.7' - Fracture, rough, planar, open 0 5 ft 256.0-257.8' - Fracture zone, rough, planar, 36% fracture/joints horizontal to subhorizontal NR 261.0-261.4' - Fracture zone, rock fragments 261.4, 261.5' - Fractures (2), horizontal, 260 smooth, undulating, open -217 9 R39: 6 minutes 261.6' - Fracture, horizontal, rough, undulating, open 261.0 261.8' - Fracture, <5 deg, stepped, sand Limestone sized limestone infilling, open 3/4"-13/16" 261.0-263.8' - yellowish gray, (5Y >10 262.0' - Fracture, <5 deg, rough, undulating, 7/2), fine grained, mild to moderate rough HCI reaction, very weak (R1), voids 262.3' - Fracture, horizontal, rough, planar, over 50% of surface, very thinly laminated at 263.3' (black organics), 10 open 262.3-262.6' - Fracture zone, rock fragments some thin laminae at 261.4- 261.5' R40-H0 262.65' - Fracture, <5 deg, rough, stepped, 2 8 5 ft open 56% No Recovery 263.8-266.0' 263.0' - Fracture, <5 deg, smooth, planar, open 263.5' - Fracture, <5 deg, rough, stepped, 265 NR -222.9 R40: 6 minutes 266.0 Bottom of Boring at 266.0 ft bgs on

APPENDIX 2BB-91 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-08	SHEET	15	OF	15	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724017.2 N, 457734.1 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS : 3.4	l ft bgs	s on 00	3/22/07 START : 3/12/2007 END	: 3/21	1/20	D7 LOGGER : C. Wallestad, R. Gon	nez, R. McComb, L. Prochaska
300	·			DISCONTINUITIES	Т		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION		SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ACE ATIO	: RUI TH, /	(%) O	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,		OLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EPTI URF, LEV/	ORE ENG ECO	ΔD	ZAC.	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNE	٠. ا	YMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	0.7.5	₩.	# 5	THICKNESS, SURFACE STAINING, AND TIGHTNE	33	Ś	CHARACTERISTICS	
_					4		_	End drilling on 3/21/07, total depth 266'
_					4		<u>-</u>	
_					4		<u>-</u>	Borehole collapsed to 38' overnight; unable to re-
_					4		<u>-</u>	open hole
_					4		=	Water level at 3.4' below ground surface
_					4		<u>-</u>	
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-09	SHEET	1	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724113.8 N, 457731.4 E (NAD83)

ELEVATION: 41.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8 tri-cone bit

ORIENTATION : Vertical

DNILLIN	DRILLING METHOD AND EQUIPMENT: CME 550 S/N 1860/3, mud rotary, cathead, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical											
WATER	LEVELS	: 2.0 ft bo	s on 3/13	3/07	START: 3/13/2007	END: 3/22/2007	' LOG	GER	: T.	Stewart		
				STANDARD		SOIL DESCRIPTION			(T	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR				SYMBOLIC LOG			
HEL NON		RECOVE	RY (ft)	1L31 NESULIS					LIC L	DEPTH OF CASING, DRILLING RATE,		
THAC VAT				011 011 011	MOISTURE (CONTENT, RELATIVE Y, SOIL STRUCTURE,	DENSITY OR MINERALOGY		ИВО	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION		
			#TYPE	6"-6"-6" (N)	OCNOICTENO	T, OOIL OTTIOOTOTIL,	WIIIVELUXEOGT		SYN	INOTHOMENTATION		
41.9				· · · ·								
-								+		-		
-								-		Cathood Operator Matthew Criffin		
_								_		Cathead Operator - Matthew Griffin		
										14:17 Water level at about 2' below ground		
										surface		
I -								1		SS-1 (5.0-6.5') totally saturated (wet)		
-								1				
-								-		-		
-								-		-		
-								4		_		
5	5.0									_		
36.9					Sand With Clay	And Gravel (SP-SC)	t modium					
I -		0.5	SS-1	12-8-12	dense fine to me	ive gray, (5Y 6/1), we edium grained, no H0	t, medium Cl reaction, silica	П		_		
-	0.5			(20)	sand, 9% mediu	m plastic fines, 20%	fine to coarse	`/-		-		
-	6.5				gravel			╛		Driller's Remarks: Drill time: 4 minutes (6.5-		
-								-		10.0')		
_								_		_		
_										1		
-								-		-		
-								-		-		
10	10.0				O:It (MIL)					Deille de Describer Head deillie e et 401		
31.9				405	Silt (ML)	ish orange, (10YR 7/	4) wet medium			Driller's Remarks: Hard drilling at 13', continued circulation loss		
		0.7	SS-2	4-3-5 (8)	stiff, nonplastic,	rapid dilatancy, mode	erate HCI	П	ш	Continued on Guidation 1000		
	11.5			(0)		very fine sand, trace		/1				
_					sand-sized particles, ti	race very fine brillian	green (5G 6/6)			1		
-					Sand Sized partie	5103		۲ ا		-		
-								-		-		
-								4		-		
_								_		_		
]										Driller's Remarks: Drill time: 4 minutes (10.0-		
15	15.0							1		15.0') – 14:37 Driller's Remarks: Will insert 15' of 3"		
26.9	15.4	0.1	SS-3	50/5	☐ Limestone Frag			\forall		NW casing to seal off hole		
-	10.7			(50/5")	15.0-15.1' - gray	ish orange, (10YR 7/	4), mild to	-		Driller's Remarks: Now using a 4.5" tricone -		
-						eaction, friable with ha		14		roller drill bit with NW rod to open up the hole for 10' of 6" diameter casing		
						ainder are yellowish on the state of the sta				for 10 of 6 diameter casing 15:45 Driller's Remarks: Hole is crooked with -		
					reaction		20.410 1 101			19' NWJ in ground; Adding 10' of 6" surface		
								_ 1		casing to straighten hole		
-								-		17:17 End of drilling for the day on 3/13/07 – with 20' of 6" in place		
-	46.5							+				
-	18.5								Ш	-		
-				47-36-46				4		_		
		1.5	SS-4	(82)								
20	20.0				L							
						<u> </u>						



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-09	SHEET	2	OF 11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724113.8 N, 457731.4 E (NAD83)

ELEVATION: 41.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8 tri-cone bit

ORIENTATION : Vertical

DRILLIN	DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical											
WATER	WATER LEVELS: 2.0 ft bgs on 3/13/07											
				STANDARD	SOIL DESCRIPTION	45	COMMENTS					
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		SYMBOLIC LOG						
BEL SE A		RECOVE	RY (ft)	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,	SLIC	DEPTH OF CASING, DRILLING RATE,					
TH 3FA(#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	MBC	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION					
SUB			#1111	(N)		S						
21.9 - - - -					Sandy Silt With Gravel (ML) 18.5-20.0¹ - very pale orange, (10YR 8/2), wet, hard, nonplastic, moderate HCl reaction, 30% fine to coarse sand, 15% limestone in disc-shaped gravel size pieces, all carbonate, trace fine to medium sand-sized white particles, trace brilliant green (5G 6/6) particles		3/14/07; bottom of hole at 18.5' Will start sampling interval at 18.5' to 20.0' to avoid complicated footage counts No adapter available to reset drill rig run stroke 08:00 3/14/07 Water level is 1.8' below ground surface 09:22 03/14/07 start SPT at 18.5-20.0'					
-						┨	Driller's Remarks: Drill time: 20 minutes					
- - 25	23.5	1.2	SS-5	40-35-37 (72)	Silty Sand (SM) 23.5-24.7' - dusky yellow, (5Y 6/4), wet, very dense, very fine to medium grained, moderate to strong HCl reaction, 30-35% nonplastic fines, trace white particles as laminae and fine to medium particles,		(20.0-23.5') 09:57- Clean out mud tub from accumulated sandy cuttings, current borehole construction has 20' of 6" diameter casing, driller using N-rod (NWJ) to advance 4-1/2" tricone roller					
16.9 - - -					trace fine to medium grained sized brilliant green particles (5G 6/6); 23.75-24.0' limestone fragment, all carbonates		drill bit					
- -	28.5				Cilty Cond With Cyoung (CM)		Driller's Remarks: Drill time: 19 minutes (25.0-28.5')					
-	29.4	0.8	SS-6	36-50/4.5 (86/10.5")	Silty Sand With Gravel (SM) 28.5-29.3' - dusky yellow, (5Y 6/4), wet, very dense,	-	-					
_	29.4			(00, 10.0)	very fine to medium grained, moderate to strong HCI reaction, 20-30% nonplastic fines, 10-15%	1	-					
30 11.9 - - -					gravel-sized, poorly fossiliferous (casts) limestone fragments; trace fine black particles							
_						1	Drillanta Barrandra Drillatina a Gustina da 2 (00.0					
-	33.5	0.4	CC 7	50/E	Silty Sand With Gravel (SM)	1717	Driller's Remarks: Drill time: 6 minutes (30.0- 33.5')					
35 6.9	33.9	0.4	SS-7	50/5 (50/5") /	Silty Sand With Gravel (SM) 33.5-33.9' - dusky yellow to light olive brown, (5Y 6/4 to 5Y 5/6), wet, very fine to coarse grained, moderate to strong HCl reaction, 20% nonplastic fines, 25% fine gravel, moderately fossiliferous (molds, casts,		- - 12:48 Start run from 35.0-38.5' - heavy					
- J.9 					fragments), trace black inclusions, all carbonate	1	chatter, 5-6 minutes to drill 1/2' 13:16 Driller's Remarks: Maintaining circulation 14:04 End run from 35.0-38.5' (76 minutes)					
_	38.5	0.0	CC 1	F0/0	Limestone Evermente	_	_					
-	38.7	0.2/	SS-8	50/2 \(50/2") /	Limestone Fragments 38.5-38.7' - light olive gray, (5Y 5/2), moderate HCl reaction, coarse sand to fine gravel-sized fragments, poorly fossiliferous (casts), 15-20% fine black organic	-	14:24 Driller's Remarks: Switch to rock coring, end of soil sampling at SS-8;					
-					particles	1	\approximately 38.5' below ground surface					
					Begin Rock Coring at 38.5 ft bgs See the next sheet for the rock core log	1	-					
40						1						



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-09

SHEET 3 OF 11

ROCK CORE LOG

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724113.8 N, 457731.4 E (NAD83)

ELEVATION: 41.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW/HW casing

WATER	LEVELS : 2.0	ft bas		/13/07 START: 3/13/2007 END: 3/2			
>00	(6			DISCONTINUITIES	O	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
40 1.9 -	38.5 R1-NQ 3 ft 87% 41.5	54	1 >10 1 NR	39.5' - Bedding plane, horizontal, rough, undulating, tight — 39.6' - Bedding plane or mechanical break, horizontal, rough, undulating, tight 40.2-40.45' - Fracture zone, rock fragments up to 2-1/4" 40.75' - Fracture, horizontal, rough,		Limestone 38.5-41.1' - light olive gray, (5Y 5/2), fine grained, strong HCl reaction, very weak (R1), no fossils, moderate olive gray bedding (organics) across entire run up to 1/4-1/8" in thickness, trace of 1/16" voids No Recovery 41.1-41.5' Limestone	Start R1 at 15:50; 3 foot run to set stroke Driller's Remarks: 20' of 6" HW casing and 40' of 3" NW casing is set R1: 8 minutes
- - - - 45 -3.1 -	R2-NQ 5 ft 94% 46.5	62	2 1 0 >10 1 NR	undulating, tight 41.5' - Bedding plane, horizontal, rough, planar, fine infill 1/8", tight 42.05, 42.25' - Mechanical break (2) 42.65' - Fracture, 45 deg, rough, planar, tight 44.0' - Fracture, horizontal, smooth, planar, tight 44.2' - Bedding plane, horizontal, rough, undulating, top of extremely weak rock 44.95' - Bedding plane, horizontal, rough, undulating 45.75' - Bedding plane or mechanical break, 5 deg, rough, undulating, tight 46.5' - Bedding plane, horizontal, smooth,		- 41.5-46.2' - light olive gray, (5Y 5/2), strong HCl reaction, weak to medium strong (R2 to R3), extremely weak - (R0) 44.0'-45.0', voids (1/8"x1/8") over 25-40% of surface, poorly fossiliferous (casts), 25% of fine grained black inclusions (organics)	Driller's Remarks: Very easy drilling over last 1/2' New NQ core barrel: product shipping #370005154 new NQ drill bit is a hard rock formation drill bit serial #/product #: C36501 R2: 7 minutes
50_ -8.1	R3-NQ 5 ft 50% 51.5	27	NR >10 0 2	planar, fines on surface, open		Limestone 49.0-51.5' - Same as 41.5-46.2' except 49.0-49.1', 49.35-49.7' extremely weak rock (R0), the rest of the interval is medium strong (R3) rock, fossil casts up to 3/8-1/4"	Start R3 at 16:27
	R4-NQ 5 ft 100% 56.5	83	0 1 >10 0 1 3	horizontal, rough, undulating, tight 51.4' - Bedding plane or mechanical break, horizontal, rough, undulating, open with 1/4" infill of filnes 52.7' - Bedding plane, horizontal, smooth, undulating, tight	break, iith 1/4" ooth,		Bottom of nole is 51.5' Driller's Remarks: Core loss probably from top (sandy interval) Start R4 at 16:45 Last core run for 3/14/07 Mottling in slightly darker hue over last 2', bioturbated zones, horizontally aligned over last 2.0-2.5' of run R4-NQ R4: 10 minutes Driller's Remarks: Bottom at 56.3' below ground surface 20' of 6" casing 40' of 3" NW casing
			3	57.0' - Bedding plane, <10 deg, smooth, undulating		_	_



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-09	SHEET	4	OF	11	

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724113.8 N, 457731.4 E (NAD83)

ELEVATION: 41.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, NQ tools, NW/HW casing

ORIENTATION: Vertical WATER LEVELS: 2.0 ft bgs on 3/13/07 START: 3/13/2007 END: 3/22/2007 LOGGER: T. Stewart DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD SYMBOLIC MINERALOGY, TEXTURE RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS 57.2' - Bedding plane, horizontal, rough, 3/15/07 09:03 R5-NC Limestone 5 ft 60 3 undulating, base of weakly indurated material 56.5-57.95' - light olive gray, (5Y Water Level = 1.15' below 57.65' - Fracture, 40 deg, rough, undulating, 5/2), strong HCl reaction, extremely ground surface weak to weak (R0 to R2), tiny voids 09:15 Start R5-NQ open 1/4 - 3/4" 60 57.85' - Fracture, horizontal, rough, up to 3/16"x3/16" covering 30-40% of 1 -18.7 Driller's Remarks: undulating, open 1/4-1/2" surface, poorly fossiliferous (cast, Maintained full circulation molds) contains several inches of 57.95' - Bedding plane, horizontal, smooth, R5: 12 minutes planar, open 1/4' rock that can be indented with thumb. NR 58.65, 59.0, 59.2' - Mechanical break (3) sharp bedding plane at 57.95 61.5 57.95-60.6' - light olive gray, (5Y 59.65' - Fracture, 45 deg, smooth, undulating, Start R6 at10:04 5/2), strong HCl reaction, weak to tight Driller's Remarks: Probably NR medium strong (R2 to R3), tiny loss of core at beginning of (<1/16") voids over 10-15% of 62.75' - Fracture, horizontal, smooth, surface, trace cavities with 3 undulating, base of weakly indurated section, secondary mineral infill up to 3/4"x1/2" elliptical shape, entire R6-NQ 62.85' - Bedding plane or mechanical break, section mottled, trace black fine to 52 4 5 ft horizontal, rough, planar medium particles 78% 63.4' - Bedding plane or mechanical break, No Recovery 60.6-62.6' 65 <10 deg, rough, planar 63.8' - Bedding plane or mechanical break, Limestone 1 -23 T 62.6-63.5' - light olive gray, (5Y 5/2), fine to medium grained, moderate to horizontal, rough, undulating, black staining, tight to open 1/4" R6: 6 minutes strong HCl reaction, extremely weak to very weak (R0 to R1), crumbles 1 64.0' - Bedding plane or mechanical break, 66.5 horizontal, rough, undulating, open 1/4-1/2" under thumb pressure, silt with Start run R7-NQ at 10:26 64.4' - Bedding plane or mechanical break, organic laminations 3 horizontal, rough, undulating, tight 63.5-64.5' - light olive gray, (5Y 5/2), 64.55' - Bedding plane or mechanical break, fine to medium grained, moderate to horizontal, rough, planar, tight strong HCI reaction, extremely weak 2 65.1' - Mechanical break to very weak (R0 to R1), up to 20% 65.4' - Bedding plane, horizontal, rough, of rock has cavities up to 4" long R7-NC planar, tight 64.5-66.5' - light olive gray, (5Y 5/2), 1 5 ft 72 65.95' - Fracture, 15 deg, rough, undulating, fine to medium grained, moderate to 80% strong HCl reaction, extremely weak open 1/4" to very weak (R0 to R1), tiny voids up to 1/16"x1/8" over 25% of surface, 70 66.6' - Mechanical break 0 66.95' - Fracture, 25 deg, rough, undulating, -28.1 15-20% medium coarse sized R7: 13 minutes 67.7. 67.95' - Fractures or mechanical break grayish black inclusions, grayish NR Last core run on 3/15/07 (2), horizontal, rough, planar, open 1/4-1/2" staining on surface 66.5-70.5' - light olive gray, (5Y 5/2), 20' of 6" diameter casing 71.5 69.0' - Bedding plane, horizontal, smooth, 40' of 3" diameter NW planar, 1/4" fine infill 69.5, 70.1' - Mechanical break (2) moderate to strong HCl reaction, casing 2 weak to medium strong (R2 to R3), Bottom hole depth at 71.6' 72.1' - Fracture or mechanical break, 50 deg, poorly fossiliferous (casts), tiny voids 13:20 3/20/07 Measured >10 smooth, undulating, tight up to 3/16"x3/16" covering 20-30% of water level at 0.2' below 72.4' - Fracture, 90-80 deg, rough, surface, trace cavities with ground surface; bottom of undulating, gray staining, tight secondary mineral infill up to hole at 71.5' R8-NC 72.75' - Mechanical break or fracture, 70 deg, 2-1/2"-3/4", 1" thick carbonate silt NR Driller's Remarks: Soft 5 ft 38 rough, undulating, open 1/4-3/4 layer at 67.5', gradual change from drilling from 72.5-75.0' very fine to fine grained, medium to fine grained from 62.3-68.0', 67.3' 74.7' - Bedding plane, <10 deg, bottom of 13:45 Start run R8-NQ; has black wavy staining No Recovery 70.5-71.5 2 -33.1 core loss zone 100% circulation loss over 74.85' - Bedding plane or mechanical break, core run smooth, planar, tight End run at approximately 1 14:10 76.5 76.2' - Fracture, 70 deg, slickensided, undulating, black staining, tight
76.55, 76.7' - Bedding plane or mechanical Driller's Remarks: Running in 3rd gear, will mix a 3 denser mud for next run break, horizontal, slickensided, planar, open R8: 22 minutes 1/4-1/8' >10 14:25 Start run 76.85' - Fracture, 70 deg, rough, undulating,



WATER LEVELS: 2.0 ft bgs on 3/13/07

PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-09

SHEET 5 OF 11

ROCK CORE LOG

LOGGER : T. Stewart

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724113.8 N, 457731.4 E (NAD83)

START: 3/13/2007

ELEVATION: 41.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

END: 3/22/2007

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW/HW casing

WALLER	LLVLLS . Z.(it bg.	3 011 0		I	i	1
>00	(9)			DISCONTINUITIES	O	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		SI.	DESCRIPTION	507	ROCK TYPE, COLOR,	CIZE AND DEDTH OF CACING
HH HE	Z,4 E,A	(%	FRACTURES PER FOOT		SYMBOLIC	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
±ĕ.ĕ	# E S	(%) Q	FE	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	8	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
929	E E E	RO	RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
Δош		œ	ша		တ		
	R9-NQ			78.0' - Bedding plane, horizontal, sharp	\vdash	Limestone	
-	5 ft 94%	63	1	contact also showing mottling of rock	╁	- 71.5-73.0' - yellowish gray to light	1
l -	94%			78.2-75.5' - Fracture zone, irregular shaped cavities infilled with medium coarse grained		olive brown, (5Y 2/2 to 5Y 5/6), strong HCl reaction, very weak to	-
80			1	infill, infill of medium gray (N5)	\perp	— medium strong (R1 to R3), elongated	
-38.1			'	79.05' - Bedding plane, horizontal, rough,	Н	voids up to 3/16"x1/16" over 25-30%	
I -			4.0	undulating, open up to 3/4"	1	of surface, very irregular shaped	R9: 16 minutes
l -			>10	80.35' - Bedding plane or mechanical break,	\Box	cavities up to 3/4"x1-1/4" filled with	14:40 End ##
l _	81.5		NR	rough, undulating, tight, open up to 1/8"	\vdash	carbonate silt bearing medium to	14:42 End run Driller's Remarks: Soft
				80.8-81.2' - Fracture zone, 1-1/4"-1/4"	\vdash	coarse grained, gray inclusions or	near bottom of run at 81',
-			>10	limestone fragments		infill, poorly fossiliferous (molds)	will advance 3" NW casing
l -				81.5-82.2' - Fracture zone	╄	No Recovery 73.0-74.7' 74.7-76.5' - Same as 71.5-73.0'	to 80' due to continued -
			1	82.7' - Fracture, 50 deg, rough, undulating,	\vdash	except very weak (R1) rock and	circulation loss
			'	tight, brownish black staining	\top	yellowish gray (5Y 7/2) from	Assumed core loss from
I -	R10-NC			-	仁	74.7-74.85', more dense and more	end of run -
I -	5 ft	67	0		₽	fossiliferous from 74.85-76.5	SC 1 collected at 81.6-
	92%				\vdash	Limestone	82.45' Driller's Remarks:
85						76.5-81.2' - moderate yellowish	Continued circulation loss
-43.1			1	_	╙	brown to dusky yellow, (10YR 5/4 to	during 3" NW casing
_ '0				85.3-85.6' - Fracture zone	┢	5Y 6/4), moderate to strong HCl reaction, medium strong (R3),	advancement, soft at 81.5-
			1			_ mottled very pale orange (10YR 8/2)	84'
-	96 F		NR	-	仜	and medium gray (N5) over	R10: 9 minutes
-	86.5		IVIX	-	╂┯	78.2-78.7', tiny (1/16"x1/16") voids on	09:12 Start R11-NQ
l _			>10	86.8-87.4' - Fracture zone, yellowish gray	++	25-35% of surface, irregular shaped	03.12 Start 1(11-1)Q
				carbonate silts and up to 1-1/2" subrounded		cavities 15-20% with secondary	
-				limestone fragments	1—	mineral infill, poorly fossiliferous	1
l -			>10	-	╀	(molds), trace organics as 1/2" long	Core loss assumed from
l -	R11-NC					horizontally aligned inclusions, 10-15 deg bedding plane at 78.0', wavy	88.1 to 90.8' (2.7 ft core
	4.5 ft	0				carbonate silt and organic laminae at	loss)
-	40%			-	╨	80.0', gray staining from 80.4-81.2'	1
-			NR	-	+	No Recovery 81.2-81.5'	1
90			' '' \			Limestone	
-48.1					\vdash	81.5-86.1' - moderate yellowish	R11: 14 minutes
-	04.0			-	T	brown, (10YR 5/4), fine to medium	1
-	91.0 R12-NQ	400		-	匚	grained, strong HCl reaction, medium strong (R3), voids up to	Driller's Remarks: Very
I -	91.5 0.5 ft	100	1	91.2' - Fracture, vertical, smooth, undulating,	╨	- 3/16"x3/16" over 35-45% of surface,	hard drilling at 91.0', driller -
	\100%/			black staining, tight (runs from 90.8-91.5')	\vdash	elliptical 1/2"x1/2" shaped cavities,	pulled out of hole because
-			2	92.1' - Fracture, horizontal, smooth, stepped,	Ľ	moderately fossiliferous (casts),	he thought the core barrell
-				tight	\coprod	 subangular to subrounded inclusions 	was not spinning; another -
I -			3	92.35' - Bedding plane, horizontal, smooth,	\vdash	of yellowish gray (5Y 8/1) carbonate	core run will be made to
				undulating, 1/2" thick organic infill		silt clasts from 1/8"-2"x2"	get the remaining 1/2 foot
-	R13-NG	!		92.55' - Fracture, 80 deg, rough, undulating,	仜	- No Recovery 86.1-86.5' Limestone	The 6" core run will be – R12-NQ
-	5 ft	0	3	tight -	╂┯	86.5-88.3' - medium olive brown, (5Y	R12-NQ R12: 3 minutes
I _	100%			92.85' - Fracture, 70-80 deg, rough,	┰	4/4), strong HCl reaction, very weak	Start R13 at 09:52
95				undulating, tight 93.0' - Fracture, 70-80 deg, rough,		to medium strong (R1 to R3), voids	
-53.1			2	undulating, tight	1	up to 1/16" over 35-40% of surface;	-
-				93.2' - Bedding plane or mechanical break,	╀	 carbonate silts (yellowish gray) at 	D13: 14 minutes
I _			1	horizontal, rough, undulating	\Box	87.0'; at 87.8' medium olive brown,	R13: 14 minutes
I -	96.5		'	93.4, 93.5, 93.6' - Fractures (3), horizontal,	\Box	moderately fossiliferous (casts),	1
I -	55.5			rough, undulating, tight	╨	L black medium grained inclusions No Recovery 88.3-91.0'	-
-			1	93.5' - Fracture, 60-75 deg, rough, undulating	╀	Limestone	-
				93.75' - Bedding plane, horizontal, smooth,		_ 91.0-91.5' - yellowish gray, (5Y 7/2),	
I -				planar, <1/8" organic infill 94.5' - Bedding plane or mechanical break,	\Box	fine grained, strong HCl reaction,	1
-			1	94.5 - Bedding plane or mechanical break, horizontal, rough, undulating, tight	╂┯	medium strong (R3), trace voids,	-
				nonzoniai, rougii, unuulatiing, tigrit	+	trace black wavy laminations (>1/16")	
					1		
1			I		1	I	1

APPENDIX 2BB-97 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	A-09	SHEET	6	OF	11	

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724113.8 N, 457731.4 E (NAD83)

ELEVATION: 41.9 ft (NAVD88) $DRILLING \underline{\ CONTRACTOR: Universal\ Engineering\ Sciences,\ Gainesville,\ FL;\ Driller:\ M.\ Boatright;\ Cathead\ Operator:\ M.\ Griffinnes and Contractor and Contractor$

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW/HW casing ORIENTATION: Vertical WATER LEVELS: 2.0 ft bgs on 3/13/07 START: 3/13/2007 END: 3/22/2007 LOGGER: T. Stewart DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 9 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 95.1' - Fracture, 40-50 deg, rough, 91.5-93.75' - Same as 90.8-91.5 R14-NQ 5 ft 100 0 undulating, tight except organic interval 1/2" thick at 100% 95.5' - Fracture, 40-50 deg, rough, 92.4' gradational change from 93.45' to 93.75' undulating, tight 100 93.75-96.5' - yellowish gray, (5Y 7/2), 97.85' - Fracture, 45-55 deg, rough, 1 -58.1 fine to medium grained, strong HCI $undula\underline{ting},\,tight$ 98.9' - Fracture, 55-65 deg, rough, reaction, medium strong (R3), tiny R14: 8 minutes (1/16"x1/16") voids over 35-40% of 1 undulating, tight Continued circulation loss 100.55' - Fracture or mechanical break, surface, up to 25% organic SC-2 collected at 100.55-101.5 rough, undulating, tight laminations concentrated from 101.5' 2 101.7' - Fracture, 40-50 deg, rough, 93.8-94.7', highly fossiliferous undulating, tight (shells/casts) up to 1-1/2" fragments, 102.1' - Fracture, 40-50 deg, rough, up to 5% medium grained gray (N5) undulating, tight particles 1 96.5-101.5' - yellowish gray, (5Y 8/1), fine to medium grained, strong HCI R15-NC reaction, very weak (R1), highly 53 1 5 ft fossiliferous (molds, casts, 100% 104.35' - Fracture, 40-50 deg, rough, fragments), trace organics (soft) up 105 undulating, tight to 1-1/2" square fragments, apparent 1 $-63\overline{1}$ 104.8' - Fracture or mechanical break, bedding, fossil fragments up to 1/2", horizontal, rough, undulating, tight few whole spherical fossils, rock has R15: 8 minutes 105.4-106.5' - Fracture zone a chalk like appearance >10 101.5-106.5' - Same as 96.5-101.5' except densely bedded 106.5 R16-NQ has similar "chalk 106.7' - Bedding plane or mechanical break, 106.5-111.5' - yellowish gray, (5Y 1 like" appearance to R15horizontal, rough, undulating, tight to open 7/2), fine to medium grained, strong NQ, but no apparent HCl reaction, very weak (R1), tiny bedding spherical voids up to 1/16"x1/16" 107.75' - Fracture, 70-80 deg, rough, 1 over up to 15% of surface, poorly undulating, tight fossiliferous (casts), trace cavities up R16-NO to 1/4"x1/4", medium grained white 0 5 ft 93 and gray particles up to 35% in 100% matrix 110 0 -68.1 R16: 10 minutes 1 111.5 111.4' - Fracture or mechanical break, 40-50 111.5-116.4' - Same as 106.5-111.5' 13:29 Start run R17 dea, rough, undulating, tight except at 114.6-116.4' elongated 0 cavities rimmed with a secondary mineralization infill of the same color 0 as the matrix, medium to coarse grained medium gray (N5) inclusions over 30-40% of surface, wavy R17-NO bedding 1/4" thick near base (about 5 ft 97 0 98% 116.2') SC 3 collected at 114.0-115 114.75' - Fracture or mechanical break, 2 114 8 -73.1 50-60 deg, rough, undulating, open 1/8-1/4" 115.0' - Bedding plane or mechanical break, R17: 6 minutes horizontal, slickensided, undulating, open 0 116.5 NR No Recovery 116.4-116.5' 13:55 Start run R18 116.65' - Fracture or mechanical break. 3 Driller's Remarks: Soft rough, undulating, open 1/8-1/4" drilling from 116.5-119.5'; 117.45' - Fracture or mechanical break, medium drilling at 119.5-2 20-30 deg, rough, undulating, open 1/4" 121.5



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-09

SHEET 7 OF 11

ROCK CORE LOG

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724113.8 N, 457731.4 E (NAD83)

ELEVATION: 41.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW/HW casing

WATER	LEVELS : 2.0) ft ba	s on 3	/13/07 START : 3/13/2007 END : 3/2		07 LOGGER : T. Stewart	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SLOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ACE ATIO	TH,	Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EV.	ORE	OΩ	RAC ER F	PLANARITÝ, INFILLING MÁTERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ОΩШ		œ	╙╙		S		CC 4 collected at 147 F
-	R18-NG 5 ft	82	3	118.55' - Fracture, <10 deg, rough, undulating, tight	H	Limestone - 116.5-121.5' - very pale orange	SC 4 collected at 117.5- 118.6' -
-	100%			119.0' - Mechanical break	⊬	(10YR 8/2) from 116.5-119.8 and	1
120_			3	119.2' - Fracture or mechanical break, horizontal, rough, planar, tight —	oxdot	yellowish gray (5Y 8/1) from — 119.8-121.5', fine to medium grained,	
-78.1			Ľ	119.35' - Bedding plane or mechanical break,	口	strong HCl reaction, weak (R2), very	
l -			3	horizontal, rough, planar, open 1/8-1/4"	┢	fine well rounded grains, moderately to highly fossiliferous (casts, molds),	R18: 5 minutes
l -	121.5		Ľ	121.05, 121.2' - Bedding plane or mechanical	F	gray staining from 116.5-117.0', trace]
l _			1	break (2), horizontal, rough, undulating, open 1/4-1/8"		elliptical cavities (1/2"x1/8") rimmed with opaque secondary]
			'	121.45' - Fracture, 40-50 deg, black staining,	Н	mineralization in center, coarse	
			1	tight	Ш	appearance of rock due to micro fossils, rock has a "chalk like" feel	1
1			_	planar, tight	厂	121.5-126.3' - yellowish gray, (5Y	1
1 -	R19-NG		2	122.2' - Fracture, 30 deg, rough, planar, brownish black staining, open 1/8"		8/1), fine grained, strong HCl reaction, weak (R2), tiny voids	1
1 -	5 ft 96%	43	3	122.5' - Fracture or bedding plane, 20 deg,	\vdash	(<1/16") up to 20% of surface, trace	1
125				open 1/8-1/4" 122.55, 123.5' - Fracture (2), horizontal,	Ħ	elliptical cavities rimmed with white secondary mineralization, poorly	1
-83.1			1	rough, planar, tight		fossiliferous (casts, few molds), trace	1
-			3	123.9' - Fracture, horizontal, rough,	╙	organics as very fine discontinuous	R19: 7 minutes
-	126.5			124.2' - Bedding plane or mechanical break,	口	L laminations (<1/16"), 5-15% fine to medium grained, medium gray (N5)	1
-	120.5		NR.	horizontal, smooth, planar, open 1/8" - 124.55, 124.65' - Bedding plane or	世	particles	100% loss of circulation
-			3	mechanical break (2), horizontal, smooth,	┢	No Recovery 126.3-126.5' Limestone	continues -
-				undulating, open 1/8" 125.25' - Bedding plane or mechanical break,	Ħ	126.5-131.3' - yellowish gray (5Y 7/2)	1
-			2	horizontal, smooth, planar, open 1/8"	Ħ	from 126.5-129.7' and yellowish gray (5Y 8/1) from 129.7-131.25', strong	1
-	R20-NG	!		125.55' - Bedding plane or mechanical break, - horizontal, smooth, undulating, open 1/8-1/4"	⊬	HCl reaction, weak (R2), moderately	1
-	5 ft 96%	53	2	125.8, 125.95' - Bedding plane or mechanical	匚	to highly fossiliferous (casts, molds, microforams), black staining on rock	1
120	90 /0			break (2), horizontal, rough, undulating, open - 1/8-1/4"	口	- surface, 15-20% fine grained	1
130_ -88.1			>10	126.65' - Mechanical break or bedding plane,	╁	medium gray (N5) particles, very thinly bedded from 128.5-129.5'	
-				horizontal, smooth, planar, tight 127.2' - Bedding plane, <10 deg, rough,	╁	-	R20: 8 minutes
-	104.5		2	undulating, tight	广	-	-
-	131.5		NR	127.45' - Bedding plane or mechanical break, horizontal, rough, undulating, brown staining,	世	- No Recovery 131.3-131.5'	Start R21 at 14:42
-			5	open 1/2"	\vdash	Limestone 131.5-134.1' - fine to medium	SC-5 collected at 135.70-
-				127.95' - Fracture, <10 deg, rough, undulating, open 1/4"	匚	 grained, strong HCl reaction, very 	136.50'
-			5	128.15' - Mechanical break or fracture,	世	weak (R1), bedding up to 1/2" thick, 20% fine grained medium gray	-
-	R21-NG			horizontal, smooth, planar, tight 128.8' - Bedding plane, horizontal, rough,	\Box	– inclusions	-
-	5 ft	63	4	planar, tight	\vdash		-
	100%			129.1, 129.13' - Bedding plane (2), horizontal, rough, planar, tight	F	134.1-136.5' - fine to medium grained, strong HCl reaction, very	-
135_ -93.1			0	129.65' - Bedding plane, horizontal, rough, —	世	— weak (R1), moderately fossiliferous	-
55.1				planar, open 1/4" 129.8' - Bedding plane, horizontal, rough,	dash	(molds, casts), disconformity at 134.25'; 136.3-136.5' beds dipping at	R21: 10 minutes
-			0	undulating, open 1/2-3/4"	厂	7 deg, trace voids with calcite infill up	1\21. 10 minutes
-	136.5			130.15' - Bedding plane, horizontal, rough, planar, open 1/2-3/4"	世	to 1/6"x1/16" (white infill color), rock color is alternating, laminated to	Continued circulation loss
-			3	130.15-130.4' - Fracture zone, up to 1/2" core -	\vdash	thinly bedded yellowish gray (5Y 7/2)	Continued circulation loss
-				fragments, brownish black staining on fracture surface	F	to light olive gray (5Y 5/2) from 131.5-134.25', then yellowish gray	-
-			>10	130.75, 130.9' - Bedding plane or mechanical -	Ħ	(5Y 7/2) to the end of core run]
				break, rough, undulating, open 1/4-3/8"	H		
1							
					1		

APPENDIX 2BB-99 Rev. 7



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-09

SHEET 8 OF 11

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724113.8 N, 457731.4 E (NAD83)

ELEVATION: 41.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW/HW casing

WATER	LEVELS : 2.0	ft bgs	on 3	/13/07 START: 3/13/2007 END: 3/	22/20	07 LOGGER : T. Stewart	
≥0.0	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A B B B B B B B B B B B B B B B B B B B	RUI VEN,	(%) _Q	F. 18	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	J	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EVENT THE	ORE ING	Ω	RAC.	PLANARITY, INFILLING MATERIAL AND	₩	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
20 E	8.50	~	F F	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	2.16. 6, 120. 11202.16, 2.16.
	R22-NQ 5 ft	57	>10	131.55' - Bedding plane, horizontal, smooth,	\vdash	Limestone	
	90%	57	-10	undulating, tight 131.75, 131.8' - Bedding plane or mechanical	口	 136.5-138.3' - dusky yellow, (5Y 6/4), fine grained, strong HCl reaction, tiny 	1
140				break, horizontal, smooth, planar, tight	┰	voids up to 1/16" (spheroidal) over	1 1
-98.1			4	132.15, 132.25, 132.55, 133.1' - Bedding — plane or mechanical break (4), horizontal,		— 10% of surface, cavities up to 1/2"x1" elongated and infilled with white	1 7
-			1	rough, smooth, planar, tight	╂╵╴	minerals and medium gray	R22: 12 minutes
-			NR	133.3-133.4' - Fracture zone	ш	 secondary minerals, up to 15% 	I
-	141.5		INIX	133.45, 133.65, 133.75, 134.0, 134.1' - Bedding plane or mechanical break (5),		medium grained, medium gray particles, dipping wavy laminations	1 -
-			>10	horizontal, rough to smooth, planar, tight	╀	near 138.0'	-
_				136.6, 136.7' - Bedding plane or mechanical	片	138.3-139.6' - yellowish gray, (5Y	-
l _			0	break, horizontal, rough, planar, tight 137.2' - Fracture, horizontal, rough, planar,	╨	7/2), very fine grained, strong HCI reaction, strong (R4), moderately]
			0	open 1/4"		fossiliferous (casts, molds), trace tiny	
	R23-NQ			137.65' - Fracture, horizontal, rough, undulating, open 1/8"	\vdash	voids, reflective very fine grains inside cavities and on broken	1
-	5 ft 92%	82	2	138.3-138.85' - Fracture zone, 1"-1-1/2"	H	surfaces, fossils up to 3/4"	1 1
145				subrounded fragments		139.6-141.0' - light olive gray, (5Y	1 1
-103.1			0	139.4' - Fracture or mechanical break, — horizontal, rough, undulating, tight, (R5)	╨	5/2), strong HCl reaction, strong (R4), short (about 3/8")	I -
-			0	139.6' - Fracture, horizontal, rough,	口	discontinuous vertical stress	R23: 9 minutes
-				undulating, open 1/2-3/4", orange staining 140.0' - Fracture, horizontal, rough,	╂┰	fractures, orange staining, irregular shaped cavities up to 1-1/2"	Circulation loss (100%)
-	146.5		NR	undulating, black staining, open 1/8"		No Recovery 141.0-141.5'	has continues About 75-100% water loss
-			2	140.3' - Fracture or mechanical break,		_ Limestone	during run, 1/4 bag, quick –
-				horizontal, rough, planar, open 1/8" 140.4' - Fracture, 20-30 deg, rough,	₽	141.5-144.0' - very light gray, (N8), mild to strong HCl reaction, weak to	gel in bentonite added to
-			2	undulating, open 1/4-1/2"	\Box	_ medium strong (R2 to R3), thinly	mud Powdery, "chalk like" feel -
l _				140.9' - Fracture, horizontal, rough, undulating, open 1/2-1"	ҥ	bedded to laminated, voids up to 1/16" diameter over 10% of surface,	over upper interval,
l _	R24-NQ 5 ft	68	0	141.5-141.65' - Fracture zone, subangular	F	with very weak (R1) zones that are	translucent secondary mineralization in center,
	88%	00	U	fragments up to 3/4"		fractured, trace cavities up to 1/2"	coarse appearance of rock
150			4.0	141.85' - Bedding plane or mechanical break, horizontal	╨	diameter, organic content in very weak zones of rock 143.96-144.0',	due to microfossils
-108.1			>10	143.85' - Bedding plane or mechanical break,	ш	organic odor	1
-			>10	horizontal, rough, planar, open 1/4" 143.95' - Fracture, 60-70 deg, rough,	╁	 144.0-146.1' - yellowish gray, (5Y 8/1), strong HCl reaction, chalk 	R24: 6 minutes
-	151 5		NR	undulating, black staining, open	厂	like/powdery feel, horizontally	
-	151.5			146.65, 146.8, 148.4, 148.35' - Bedding plane		- bedded, white and yellowish gray	Start at 16:05 added more
-			2	or mechanical break (4), horizontal, rough, planar, tight	╀	matrix, texture gradually changes from medium to fine grained	quick gel.
-				149' - Mechanical break	匚	 downward with depth 	Circulation loss (mud was _ mixed as above)
-			3	150.1' - Fracture, 80 deg, rough, undulating, tight	士	No Recovery 146.1-146.5' Limestone	-
-	B0= 1::			150.25' - Mechanical break or fracture,	一	 146.5-148.6' - yellowish gray, (5Y 	-
-	R25-NQ 5 ft	73	1	horizontal, open 1/4" 150.45-150.9' - Fracture zone, 1-1/2"	L	1/2), mottled in Hue 5Y colors, thinly	
-	80%	-		150.45-150.9 - Fracture zone, 1-1/2" fragments	\vdash	bedded 148.6-150.9' - light olive gray, (5Y]
155_			1	151.55, 151.65' - Bedding plane (2),	Д	5/2), very fine grained, moderate to	
-113.1			_ '	horizontal, rough, undulating, tight, organics on fracture surfaces	上	strong HCl reaction, weak to medium strong (R2 to R3), powdery/"chalk	7
-			ND	152.75, 152.85' - Fracture (2), horizontal,	\vdash	like" feel over upper interval, dense	R25: 7 minutes
-	156.5		NR	rough, undulating, open 1/8-1/4" 152.85' - Fracture, horizontal, rough,	1	limestone mottled with gray stains	1
-	. 50.0			undulating, open 1/4"	╨	uver lower interval, elongated cavity 2" long at 150.0', no infill	1
-			1	154.1' - Bedding plane or mechanical break	仜	No Recovery 150.9-151.5'	-
-			1	155.05' - Bedding plane, 7 deg, smooth, planar, open 1/4"	世	-	-
-				156.8' - Bedding plane, horizontal	\vdash	-	-
					广	_	-

APPENDIX 2BB-100 Rev. 7



BORING NUMBER: PROJECT NUMBER: A-09 338884.FL SHEET 9 OF 11

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724113.8 N, 457731.4 E (NAD83)

ELEVATION: 41.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, NQ tools, NW/HW casing

ORIENTATION: Vertical WATER LEVELS: 2.0 ft bgs on 3/13/07 START: 3/13/2007 END: 3/22/2007 LOGGER: T. Stewart LITHOLOGY DISCONTINUITIES COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD SYMBOLIC MINERALOGY, TEXTURE RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 157.8' - Fracture, 70-80 deg, rough, Last core run of 3/21/07 R26-NQ Limestone 151.5-155.5' - Same as 148.6-150.9' 5 ft 10 undulating, black staining, tight 80' of 3" NW in hole 28% except thinly bedded to laminated 20' of 6" casing in hole Driller's Remarks: Expects NR 160 151.5-152.8' and 154.0-155.0' light to be in void space from -118.1 olive gray, (5Y 5/2), moderate to strong HCl reaction, organic approximately 158.0' down (possible karst/cavity) laminations, gray staining of rock at Rock has "chalk like" 152.8', 5-10% cavities up to 3/4' texture 161.5 spherical and infilled with white R26: 2 minutes 08:16 Begin drilling on minerals, trace up to 10% shell NR 3/22/07- water level 1.5' fragments, black wavy laminae (organic) at base of core, gradually below ground surface changes texture twice from coarse to 08:44 Štart R27-NQ; N/A fine grained with depth bottom of hole at 160.7 R27-NQ No Recovery 155.5-156.5' Driller's Remarks: Still no 4.5 ft 73% 7 Limestone circulation >10 156.5-157.9' - yellowish gray, (5Y Driller's Remarks: Run is 8/1), fine grained, strong HCI 0.5' short, he can feel the 165 reaction, weak (R2), tiny spherical voids (micro forams) up to 20-30%, trace of elongated cavities, rimmed loose material from the >10 -123 1 above void that is apparently lodged at top of 0 with secondary mineralization, up to 10% fine grained orange and black 166.0 run and is not allowing for further advancement 3 166.3, 166.4, 166.65' - Bedding plane (3), particles R27-NQ is a 4.5' run. Sand horizontal, rough, undulating, organic infill No Recovery 157.9-162.7' is observed around the Carbonate Silty Sand With Gravel pulled core; hole tagged 4 167.1, 167.5, 167.7, 167.93' - Bedding plane bottom at 166.0' (SM) (4), horizontal, smooth, planar, tight Driller's Remarks: Mixes a 162.7-163.4' - medium gray to medium dark gray, (N5 to N4), wet, nonplastic, strong HCl reaction, R28-NQ thick batch of mud 5 ft 50 >10 R27: 13 minutes 100% Driller's Remarks: Steady 30-40% very fine to fine black 168.98-169.33' - Fracture zone drilling through run, particles, gravel-sized fossil fragments up to 1/2" diameter 0 continued circulation loss (100%), mix 1/4 bag 170 Limestone Fragments -128.1 bentonite to mud tub 170.02' - Bedding plane, horizontal, rough, 163.4-164.0' - angular limestone >10 undulating, organic infill 1/16" R28: 5 minutes fragments 171.0 170.07-170.4' - Fracture zone, organic Limestone laminated rock 164.0-166.0' - medium gray to 2 170.6' - Fracture, vertical, rough, undulating, medium dark gray, (N5 to N4), fine grained, strong HCl reaction, weak (R2), bedded limestone, trace voids 170.78' - Bedding plane, horizontal, rough, 4 undulating, tight up to 1/16"x1/16" 170.93' - Bedding plane or mechanical break, Limestone <10 deg, rough, undulating, tight 166.0-171.0' - light olive gray, (5Y 5/2), strong HCl reaction, strong **R29-NQ** 171.27, 171.9' - Bedding plane or mechanical 5 5 ft 42 break, horizontal, rough, undulating, tight 172.1' - Fracture, 70-80 deg, rough, 98% (R4), voids up to 1/16"x1/16" spherical cover 15-20% of surface, undulating, tight 172.32' - Fracture, 70-80 deg, rough, 5 trace medium gray (N5) inclusions up 175 to 1/2"x1/8" at 166.3', wavy horizontal undulating, tight -133.1 R29: 10 minutes laminations from 166.0-166.6' 3 172.4' - Fracture or mechanical break, 171.0-175.9' - Same as 166.0-171.0' horizontal, rough, undulating, tight 176.0 except without wavy bedding NR 172.55' - Bedding plane, <10 deg, rough, 100% circulation loss, mix No Recovery 175.9-176.0' planar, open 1/8 >10 1/4 bag bentonite to mud 173.08' - Bedding plane, horizontal, rough, tub undulating, open 1/8" 173.35' - Bedding plane, horizontal, rough, 0 SC-6 collected at 177.0undulating, open 1/8" 178 2 R30-NQ



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-09

SHEET 10 OF 11

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724113.8 N, 457731.4 E (NAD83)

ELEVATION: 41.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW/HW casing

WATER	LEVELS : 2.0			13/07 START: 3/13/2007 END: 3/	22/20	07 LOGGER : T. Stewart		
				DISCONTINUITIES		LITHOLOGY	COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SLOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,	
H BE	E RU STH, OVEF	Q D (%)	TUR	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD	
EVEN EVEN	SORE	ROE	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.	
	5 ft	40	>10	173.60, 173.65, 173.8' - Bedding plane (3),	0,	Limestone		
-	84%			<10 deg, rough, undulating, organic infill,	F	 176.0-180.2' - light olive gray, (5Y 		
180			5	open 1/8" 174.12' - Bedding plane, <10 deg, rough,	Ħ	5/2), moderate to strong HCl reaction, weak to medium strong (R2	1	
-138.1				planar, open 1/16-1/8" — 174.22, 174.5, 174.9, 174.97, 175.2' -	愇	— to R3), trace cavities up to 3/8" elongated, tiny voids up to 1/16" over	R30: 9 minutes —	
-	181.0		NR	Bedding plane (5), horizontal, rough,	Ľ	10-15% of surface, trace organics as	1	
-	101.0			undulating, open 1/2" 175.75, 175.8' - Bedding plane (2),	╨	 wavy laminations <1/16" thick from 179.0-180.2' 	1	
-			5	horizontal, rough, planar, open 1/8"	╙	No Recovery 180.2-181.0'	1	
-				177.0' - Fracture or mechanical break, horizontal, rough, undulating, brownish black	囯	 Limestone 181.0-185.9' - yellowish gray, (5Y 	1	
-			4	staining, open 1/4"	口	7/2), moderate to strong HCl	1	
-	R31-NQ			178.2' - Bedding plane or mechanical break, horizontal, rough, planar, top of fractured	世	 reaction, weak to medium strong (R2 to R3), medium to lightly fossiliferous 	1	
-	5 ft 98%	20	3	zone 178.7' - Bedding plane or mechanical break,	Н	(molds, casts), tiny voids up to 1/8"x1/8" over 25-35% of surface,	1	
			5	<10 deg, rough, planar, organic infill 1/16"	\vdash	trace cavities with medium gray (N5)	1	
185			Э	179.0, 179.2' - Bedding plane (2), 8-10 deg, rough, planar, organic infill 1/16"	Ħ	secondary mineral infill, fossils up to 1/4", wavy laminated bedding 1/16"	1	
-143.1			4	179.45, 179.55' - Bedding plane (2), 8-10	岸	thick at 187.3', yellowish gray matrix	R31: 10 minutes	
_	186.0		NR/	deg, rough, planar, open 1/16-1/8" 179.75' - Bedding plane or mechanical break,	片	mottling at 183.0']	
_			>10 >10	5-10 deg, rough, undulating, open 1/4", bedding contact brown, more organic layered	\vdash	No Recovery 185.9-186.0' Limestone]	
_			. 10	unit underneath	₽	186.0-190.3' - dusky yellow to light olive brown, (5Y 6/4 to 5Y 5/6), fine		
-			>10	181.25' - Bedding plane, 5-10 deg, rough, undulating, organic infill 1/16"	厂	grained, moderate to strong HCl		
-				181.65, 181.75' - Bedding plane (2),	口	reaction, weak to medium strong (R2 to R3), voids up to 1/16"x1/8" over		
-	R32-NQ 5 ft	13	>10	horizontal, rough, undulating, tight 181.85' - Fracture or mechanical break,	上	_ 30-50% of surface, poorly		
-	86%			80-90 deg, rough, undulating, tight	士	fossiliferous (molds), 10-15% graphics as short (3/8")	-	
-			>10	181.95' - Fracture or mechanical break, 40-50 deg, rough, undulating, tight	╀	_ discontinuous to laminated at 189.8',		
190 <u>-</u>			7 10	182.2' - Fracture, 75-85 deg, rough, undulating, tight		silt above yellowish gray (5Y 7/2), fossiliferous (molds, casts)	R32: 8 minutes	
-			NR	182.4' - Fracture or mechanical break,	厈	- No Recovery 190.3-191.0'	-	
-	191.0			horizontal, rough, undulating, open 1/2-3/4" 182.75' - Fracture, horizontal, rough,	Ħ	Limestone	Appearance is "chalk like"	
-			>10	undulating, tight to open 1/4"		 191.0-192.3' - yellowish gray, (5Y 	-	
-				182.9' - Fracture or mechanical break, 10-20 deg, rough, planar, tight	H	7/2), very fine grained, strong HCl reaction, weak (R2), voids are micro		
-			>10	183.25' - Fracture or mechanical break, 10-15 deg, rough, planar, open 1/16"	oxdapprox	 forams and micro form molds up to 1/8"-1/4" over 20-25% of surface 		
-	R33-NQ			183.8, 183.9' - Fracture or mechanical break	圧	192.3-192.8' - light olive gray, (5Y	1	
-	5 ft 36%	0		(2), 5-10 deg, rough, undulating, 183.8' open - 1/8", 183.9' open 1/16", black staining	口	 5/6), fine grained, mild to moderate HCl reaction, very weak (R1), sharp 	1	
-	30 /0		NID	184.1' - Bedding plane, horizontal, rough,	世	change from 192.3-192.4'	1	
195			NR	undulating, tight 184.4' - Bedding plane, 5-10 deg, smooth,	┢	- No Recovery 192.8-196.0'		
-153.1				undulating, open 1/8"	F	_	R33: 4 minutes	
-	196.0			184.55' - Bedding plane or mechanical break, 5-10 deg, rough, undulating, tight	Ħ	-	1	
-				184.8, 184.81 - Bedding plane or mechanical break (2), 0-5 deg, smooth, undulating, tight	Ħ	Limestone	1	
-			>10	184.9' - Bedding plane or mechanical break,	世	 196.0-198.85' - yellowish gray, (5Y 7/2), very fine to fine grained, strong 	1	
1 -			. 40	5-10 deg, rough, planar, tight 185.2' - Bedding plane or mechanical break,	HCl reaction, medium strong (R3),			
			>10	20-30 deg, rough, undulating, open 1/4-1/8"	${\mathbb H}$	 trace voids, up to 10% very fine to fine black particles in matrix 	1	
	R34-NQ			185.3' - Bedding plane or mechanical break, 60-70 deg, rough, undulating, tight	$oxed{\bot}$		<u> </u>	
				J. J				
1	1	1			1		1	

APPENDIX 2BB-102 Rev. 7



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-09	SHEET	11	OF	11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724113.8 N, 457731.4 E (NAD83)

ELEVATION: 41.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW/HW casing ORIENTATION : Vertical

	LEVELS : 2.0			/13/07 START : 3/13/2007 END : 3/2/			
			0	DISCONTINUITIES END : 5/2		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	OUTE AND DEDTIL OF CLOSURE
표워E	RUH VER, VER	(%) _Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	CIC	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
FYF A	NGT COO:	αD	ACT R F(PLANARITY, INFILLING MATERIAL AND	MB	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
림Տ립		2		THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROFS, TEST RESULTS, ETC.
	5 ft 80%	15	>10	185.5' - Bedding plane or mechanical break,			
-	0070		_	rough, undulating, open 1/2-3/4" - 185.6' - Bedding plane or mechanical break,	\perp	- Limestone 198.85-200.0' - dusky yellow, (5Y	
200			1	rough, undulating, tight to open 1/16"	\top	6/4), mild to moderate HCl reaction,	SC-7 collected at 198.85- 199.8'
-158.1				186.0' - Bedding plane or mechanical break, — <10 deg, black staining or organic bedding		— weak (R2), 60-70% tiny voids up to 1/8" (spherical), poorly fossiliferous	R34: 8 minutes
-	201.0		NR	planes		(molds), 20% fine to medium grained	Final core run end at 12:19
-	201.0			190.0' - Fracture zone 196.35, 196.45, 196.7' - Bedding plane or		black particles, brownish black staining near bottom	Ending borehole – construction 20' of 6"
-				mechanical break (3), rough, planar, tight		No Recovery 200.0-201.0'	diameter casing, 80' of 3"
-				198.85' - Bedding plane, 5-10 deg, smooth, planar, organics on surface		Bottom of Boring at 201.0 ft bgs on	diameter NW casing
-				199.8' - Fracture or mechanical break,		3/22/2007	203.0' NQ coring assembly Measured total depth at
-				horizontal, rough, undulating, open 1/2" –		- 1	200.0' below ground
-	-			-		-	surface
-				-		-	measured at 177.0' then -
-				-		-	148.0' after abandonment 3/23/07 08:13 Water level
-				-		<u> </u>	at 0.75' below ground —
-						- 1	surface Abandonment completion
-				_		L	on 3/23/07 at 15:50
l -				_		_	47 bags of Portland cement type I/II, 92 bags of
l -				_			Type Gel. 2 bags of Sure
l _							Plug bentonite, one 50lb
l _							bag of 3/8" bentonite chips, one 50lb bag of Quick Gel
]			used for borehole
-				1		[abandonment
-				1		[
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-10	SHEET	1	OF	12	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724149.3 N, 457766.2 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 2-7/8 tri-cone bit

						y, cameau, Avvo rous, 2-7/0			Official Vertical
STANDARD					START : 2/25/2007	END: 3/11/2007	LOGGEF	<u>≀ : C.</u>	LeBlanc, T. Stewart, C. Wallestad
\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \				STANDARD		SOIL DESCRIPTION		U	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				SYMBOLIC LOG	
표보인		RECOVE	RY (ft)	.2011.200213	SOIL NAME, USCS GROUP SYMBOL, COLOR,		일	의 DEPTH OF CASING, DRILLING RATE,	
TH			<u> </u>	011 011 011		CONTENT, RELATIVE DEN Y, SOIL STRUCTURE, MIN		l B	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
929			#TYPE	6"-6"-6" (N)	CONSISTENC	71, SOIL STROCTORE, WIIN	ILHALOGT	Ŋ.	INSTRUMENTATION
42.2				(11)				+ "	
							_		_
							_		
									C. Sump and T. Stewart also logged part of
-							-	1	boring A-10
-							-	1	-
-							-	1	-
-							=	1	_
							_		
-							-	1	1
	. .						-	1	-
5 37.2	5.0				Poorly Graded 9	Sand With Silt (SP-SM)		76.17	Driller's Remark: Hard 5-13.5'
_ 5,.5				3-36-50/2		vellow, (5Y 6/4), moist, ve	ery dense	li li	Diller 3 Hemark. Hard 3-13.3
I _		0.8	SS-1	(86/8")	\ very fine to fine	grained, no HCl reaction,	10% /г	\vdash	
	6.5			,	nonplastic fines		//		
-					Limestone Frag	iments ght gray, (N8), moist, very	fine	1	
-					grained mild HC	onl gray, (N8), moist, very I reaction, some orange:	staining -	1	-
-					9.4	or readility come or anger	-	┨	-
-							-	1	_
							_		
_							-	1	-
							-	1	-
10 32.2	10.0				Silt (ML)			.	
JZ.Z _				8-18-50/5	10.0-11.4' - grav	ish yellow, (5Y 8/4), wet,	verv dense	4	_
		1.4	SS-2	(68/11")	very fine grained	d, nonplastic, very rapid di	ilatancy,		_
	11.4			, ,	moderate to stro	ong HCl reaction, 10-15%	sand	Ш	
_					material, slightly	indurated 1" layers throu	ghout /-	1	-
-							=	┨	-
-							-	1	_
-							_		_
							_		_
]									Driller's Remark: Softened at 13.5-15'
1 7							-	1	1
,,	45.0						-	1	-
15 <u> </u>	15.0	-			Silt With Sand /	And Limestone Fragmen	te (MI)	Ш	_
		l .	l	18-29-35	15.0-16.5' - grav	rish yellow, (5Y 8/4), wet,	fine to	4111	-
_		1.5	SS-3	(64)	coarse grained,	nonplastic, very rapid dila	itancy,		
	16.5			` ′	moderate HCl re	eaction, 20-25% fine to co	arse		
]					sanu-sized, 10%	6 fine gravel-sized carbon	ate material	Γ]
-							-	1	-
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20		-						\vdash	
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PROJECT NUMBER:	BORING NUMBER:			
338884 FI	Δ-10	SHEET	2 OF 1	2

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724149.3 N, 457766.2 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 2-7/8 tri-cone bit

ORIENTATION: Vertical

DHILLIN	GIVIETH	JU AND	EQUIFIVII	EINT : CIVIE 330 S	/N 186073, mud rotary	, cathead, AWJ rods, 2-7/	8 tri-cone bit		ORIENTATION: Vertical
WATER	LEVELS	: 1.0 ft bo	gs on 03/	10/07	START: 2/25/2007	END: 3/11/2007	LOGGEF	R : C.	LeBlanc, T. Stewart, C. Wallestad
				STANDARD		SOIL DESCRIPTION		ر۳	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION				SYMBOLIC LOG	
E A O N			. ,	TEST RESULTS	SOIL NAME,	USCS GROUP SYMBOL,	COLOR,	딕	DEPTH OF CASING, DRILLING RATE,
ATI		RECOVE	ERY (III)		MOISTURE C	CONTENT, RELATIVE DEN	NSITY OR	₩ B	DRILLING FLUID LOSS, TESTS, AND
			#TYPE	6"-6"-6"	CONSISTENCY	Y, SOIL STRUCTURE, MIN	NERALOGY	₹	INSTRUMENTATION
□ あ山 22.2	22.2			(N)	Oile With Oard /	MIX		S IIII	
	20.0			18-29-50/5	Silt With Sand (N	иь) e as 15.0-16.5' except e	xcept one		_
		0.2	SS-4	(79/11")	1/2" gravel-sized	carbonate fragment.	/		
	21.5			(/ 5/)				1]
_							-	1	1
-							-	1	-
-							-	1	-
_							-	1	_
							_		
-							-		_
	05.0						-	1	-
25 <u> </u>	25.0 25.3	0.1	SS-5	50/3	→ Silty Sand (SM)			-	-
		0.1	00-5	(50/3")	25.0-25.1' - dusk	y yellow, (5Y 6/4), wet, v	very dense, /-	1	_
I _				()	\fine to coarse gra	ained, mild to moderate	HCI reaction, /	1	_
					\sand-sized carbo	onate material, 30% fines	S		
							-	1	
-							-	1	-
-							-	1	-
-							-	1	=
_							_		_
1 7							-	1	
30	20.0						-	1	-
12.2	30.0 30.3	0.3	SS-6	50/4	_ Silty Sand (SM)				Sample SS-6 has the appearance of
-		0.0	333	(50/4")	\ 30.0-30.3' - dark	yellowish orange, (10YF	R 6/6), moist, /-	-	extremely weak limestone.
-					\ very dense, fine t	to coarse grained, mode	erate HCI	1	_
					reaction, 25% silf	t-sized grains, carbonate	e material		
-							-	1	_
-							-	1	-
-							-	ł	-
-							-		_
_							-	1	
35	35.0						-	1]
7.2	35:2	0.2	SS-7	50/2		ments		Ħ	
-				(50/2")	35.0-35.2' - mode	erate yellowish brown, (1	10YR 5/4), /-		-
_					fine to coarse gra	ained, mild to moderate arse to 1", fossiliferous	HCI reaction, \int_{-1}^{1}	1	-
_					graver line to coa	arse to 1 , lossililerous			_
							_	1	
							-	1]
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-							-	1	-
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40								1	
								1	



ſ	PROJECT NUMBER:	BORING NUMBER:					
I	338884.FL	Δ-10	SHEET	3	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724149.3 N, 457766.2 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 2-7/8 tri-cone bit

ORIENTATION : Vertical

WATER	LEVELS	: 1.0 ft bg	s on 03/1	10/07	START : 2/25/2007 END : 3/11/2007 LOGO	GER	: C.	LeBlanc, T. Stewart, C. Wallestad
> ^ ^				STANDARD	SOIL DESCRIPTION	_[90	COMMENTS
N (#	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
TH BE		RECOVE			MOISTURE CONTENT. RELATIVE DENSITY OR		BOL	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		SYM	INSTRUMENTATION
2.2	40.0				Sandy Silt (SM)	ヿ	П	
1 -		1.3	SS-8	31-47-45 (92)	40.0-41.3' - moderate yellowish brown, (10YR 5/4), moist to wet, hard, mild to moderate HCl reaction,]		
	41.5			(/	49% sand and gravel, 10-15% fines, carbonate materials			
_					(material)	_		_
-						4		-
_	-					4		-
-								-
-						-		-
45	45.0					\exists		-
-2.8	45.0	0.8	SS-9	40-50/3	Silty Sand (SM)		П	
-	45.8	0.6	33-9	(90/9")	45.0-45.75' - Same as 40.0-41.3' except trace gravel-sized rock fragments	/	111	
_					(3-41-01-01-01-01-01-01-01-01-01-01-01-01-01	_ 1		_
_								_
_						4		_
-	<u> </u>					4		_
-						4		-
						-		-
50 -7.8	50.0 50.4	0.1	SS-10	50/4.5	☐ Limestone Fragments With Silty Sand	7	_	-
-				(50/4.5")	\ \ 50.0-50.1' - pale yellowish brown, (10YR 6/2), mild to moderate HCl reaction, silty sand (SM) cuttings, silty	/-		-
-	-				sand is same as 45.0-45.75', fossiliferous	╛		-
_	-					1		-
]		
_								_
_						4		_
-						4		-
-						4		-
55 <u> </u>	55.0 55.3	0.1	SS-11	50/3			_	
-				50/3 (50/3")	\55.0-55.1' - Same as 50.0-50.1'	╱┤		-
-						-		-
1 -	1					-		-
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1 -]							
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PROJECT NUMBER:	BORING NUMBER:						
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PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724149.3 N, 457766.2 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 2-7/8 tri-cone bit

ORIENTATION : Vertical

				START - 0/05/0007				Unicination vertical	
		START : 2/25/2007	END: 3/11/2007	LOGGE	ત : <u>(;</u> T	LeBlanc, T. Stewart, C. Wallestad COMMENTS			
STANDARD PENETRATION		SOIL DESCRIPTION		JG	COIVIIVIEN I S				
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE INTERVAL (ft) PENETRATION TEST RESULTS		SOIL NAME LISCS GROUP SYMBOL COLOR			SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,		
H BE ACE ATIC		RECOVERY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR			30 I	DRILLING FLUID LOSS, TESTS, AND	
EV.			#TYPE	6"-6"-6"	CONSISTEN	ICY, SOIL STRUCTURE, MIN	IERALOGY	YME	INSTRUMENTÁTION
	00.6	0.1	\SS-12 <i>)</i>	(N) 50/1	□ Limestone Fra			S	
-17.8	60.0	((33-12)	(50/1")	Limestone Fra	agments ht olive gray, (5Y 5/2), mild	to moderate	4	_
I _				(00.1)	HCI reaction		10 1110 1110	1	
					,		_		61.5-62.0' Heavy chatter, drill time increases,
	62.0							<u> </u>	cuttings show weak limestone fragments, - light olive gray, (5Y 5/2), finish soil drilling at
-	62.1	0.0	SS-13	50/1 (50/1")	Limestone Fra	agments ht olive gray, (5Y 5/2), mod	lorata HCI	1	62', switch to rock coring, see rock core log
-				(50/1)	reaction, weak	nt olive gray, (5 + 5/2), mod ∴(R2)	ierale noi	1	1
-					Begin Rock Co	oring at 62.0 ft bgs		1	-
-					See the next sl	heet for the rock core log		1	-
-								1	-
-								-	-
65 <u> </u>							_	-	-
-22.8								1]
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-10 SHEET 5 OF 12

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724149.3 N, 457766.2 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, NQ tools, NW casing

WATER	LEVELS: 1.0	ft bg	s on 0	3/10/07 START: 2/25/2007 END: 3/	1/20	D7 LOGGER : C. LeBlanc, T. Stewa	rt, C. Wallestad
\$ D ≨				DISCONTINUITIES	၅၉	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
DEPTH SURF/ ELEV	CORE LENG RECO	RQD(%)	FRAC PER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
_	62.0		NA	62.0-62.5' - Fracture zone or mechanical break, rough, rock fragments, irregular -	Щ	Silt (ML) 62.0-62.5' - moderate yellowish	O Owner having lawying of
- 5		36	>10	fractures 62.9' - Fracture, rough, undulating	Ħ	brown, (10YR 5/4), moderate to strong HCI reaction, silt with very fine	C. Sump begins logging at 62.0'
	54.110		>10	63.4' - Fracture, rough, undulating 63.4-64.0' - Fracture zone, rough, irregular		- sand, (20-25%) carbonate material Limestone	
	R1-NQ 5 ft 68%		1	fractures 64.0' - Fracture, horizontal, smooth, planar		62.5-63.5' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to medium strong (R2 to R3), voids to	
			1 NR	65.0' - Fracture, horizontal, rough, undulating 65.1' - Fracture, 70 deg, rough, undulating -	片	1/16" over 10-15% of surface - 63.5-64.0' - Same as 62.5-63.5'	Driller's remark: Soft 65.0-66.0'
				65.4' - Fracture, horizontal, rough, undulating		except except weaker and friable 64.0-65.4' - Same as 62.5-63.5'	R1: 3 minutes
	67.0				F	 except weak (R2), except voids 1/4"-3/8" over 1-2% of surface (fossil 	
-			3	67.0, 67.1, 67.9, 68.6, 68.8, 68.9' - Fractures (6), horizontal, rough, undulating to planar -		molds), some infilling No Recovery 65.4-67.0' Limestone	
-			3	_		67.0-68.6' - dusky yellow, (5Y 6/4), 15-25% voids (1/16"-1/8") over	
- 5	R2-NQ	62	ightharpoons	69.0-69.1' - Fracture zone, rock fragments		surface, few larger voids (fossil molds), trace dark gray crystals trace	
	5 ft 94%		2	69.1' - Bedding plane, horizontal, smooth to rough, stepped		clear recrystallized calcite, subhedral to euhedral in voids	SC-1 collected at 69.35- 70.22'
				69.3' - Bedding plane, horizontal, smooth to rough, undulating to stepped -	H	68.6-69.3' - grayish yellow, (5Y 8/4), moderate to strong HCl reaction, extremely weak to very weak (R0 to	
			2	70.2, 70.6' - Mechanical break (2), 10 deg, rough, undulating to planar		R1), finely laminated 69.3-71.7' - yellowish gray to light	R2: 5 minutes
-	72.0		NR	71.4, 71.7' - Fractures (2), horizontal, rough, stepped		olive gray, (5Y 7/2 to 5Y 5/2), moderate HCl reaction, weak to	
-			3	72.3' - Fracture, 10 deg, rough, undulating, - irregular fractures		 medium strong (R2 to R3), 10-15% voids (up to 1/16") over surface, few 	
_			3	72.4-73.6' - Fracture zone, 70-85 deg, rough, undulating, intersecting high angle fracture	H	variably spaced larger voids/cavities (fossil molds up to 3/8"), fine (1/16") clear subhedral to euhedral	
_	R3-NQ		3	set, few surface pyrite coatings 73.9' - Fracture or mechanical break,		carbonate crystals in few void spaces No Recovery 71.7-72.0'	
75	5 ft 94%	52		horizontal, rough, undulating - 74.4' - Fracture, horizontal, rough, stepped, undulating parting, black finely laminated		Limestone 72.0-74.4' - dusky yellow, (5Y 6/4),	_
-32.8 - - - - 77.0			NA	organic layer 74.41' - Fracture, rough, clay infilling,		very fine to fine grained, strong HCl reaction, weak to medium strong (R2	
			2	fractures with light olive gray (5Y 5/2) silty clay infilling on surface	Щ	to R3), voids (1/32"-1/16") variable density across surface ranging from	R3: 8 minutes
	77.0		NR	74.9' - Fracture, rough, dark brown/black coating on surface, organics- pyrite	.,,	15-25% in zones, few larger void/cavities, (fossil molds), very fine,	-
-		15	3	76.3-76.7' - Fractures (2), smooth 77.0-77.5' - Fracture zone	1	black, wavy laminations Silt (ML)	-
- - - 80 -37.8				77.5, 77.55' - Fractures (2), horizontal, rough, irregular fractures		74.4-76.3' - very light gray, (N8), strong HCl reaction, very weak (R1),	
	R4-NQ			78.3-78.6' - Fractures (2), 60 deg, rough, undulating, tight, partially healed fractures, fine black speckled staining		5% limestone clasts up to 3/8", sub rounded to rounded, light olive gray (5Y5/2), laminated zone with light	
	5 ft 94%		>10	78.8-79.3' - Fracture zone, 60-90 deg, rough, undulating, multiple high angle fractures,	Ė	gray consolidated silt fragments up to	_
			3	open to tight, dark gray-black speckled staining		Limestone 76.3-76.7' - Same as 72.0-74.4'	
			2	79.3-79.4' - Fracture zone, rock fragments 80.4, 80.6, 80.8, 81.1' - Fractures (4), rough,		No Recovery 76.7-77.0'	R4: 9 minutes
_	82.0		NR	planar, irregular	Ë		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-10 SHEET 6 OF 12

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724149.3 N, 457766.2 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION : Vertical

Blanc, T. Stewart, C. Wallestad

COMMENTS

WATER	LEVELS: 1.0	ft bgs	s on 00	3/10/07 START : 2/25/2007 END : 3/	11/20	7 LOGGER: C. LeBlanc, T. Stewart, C. Wallestad
≥0 <i>≎</i>	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
85 -42.8	R5-NQ 5 ft 60%	58	2 1 3	81.1-81.3' - Clay seam, poorly to moderately indurated laminated silt (ML) 81.3' - Fracture, horizontal, rough, undulating 82.2' - Fracture, rough, stepped 82.6' - Fracture, rough, stepped, fine sand sized particles on surface 83.7' - Fracture, horizontal, rough, undulating 84.0' - Fracture, 45 deg, rough, undulating to planar, tight, dark black/gray fine grained coating 84.6' - Fracture, horizontal, rough, undulating		Sand (SW) 77.0-77.5' - strong HCI reaction, well graded fine sand sized carbonate derived grains, loose, friable, 10-15% fine clear crystals, (secondary calcite), possible fine silica grains (<5%) Limestone 77.5-81.1' - yellowish gray, (5Y 7/2), fine grained, moderate to strong HCI reaction, medium strong (R3), few 8C-2 collected at 85.06-86.06'
- - -	87.0		NR	84.7' - Fracture, 45 deg, rough, planar, some fine grained pyrite coating		larger voids irregular shaped up to 3/4" in size with dark olive gray staining, Silt (ML)
- - -			1	87.0' - Mechanical break, horizontal, rough, undulating 87.7-88.2' - Fracture zone, discontinuity with weak limestone interbedded 88.8' - Fracture, 10 deg, rough, undulating,		81.1-81.4' - consolidated carbonate silt Limestone 81.4-81.7' - Same as 77.5-81.1' No Recovery 81.7-82.0' Limestone
90 -47.8 - -	R6-NQ 5 ft 82%	60	1 1 NR	iron staining 89.3, 89.5' - Fractures (2), rough, black to dark brown staining, irregular fractures associated with larger voids/solution cavities 89.6' - Fracture, horizontal, contact with silty material 89.8' - Fracture, 30-45 deg, rough, multiple tight healed fractures 90.3' - Mechanical break, horizontal		82.0-85.0' - grayish orange, (10YR 7/4), moderate to strong HCI reaction, weak (R2), color changes with depth to yellowish gray (5Y 7/2), 15-25% voids (1/8") over surface, 1-2% larger voids/cavities (fossil molds) up to 3/8" length, iron staining, few fossil molds infilled with very pale orange (10YR 8/2) soft
 95 -52.8 	R7-NQ 5 ft 80% 97.0	48	4 2 NA >10 NR	91.0' - Fracture, rough, break associated with large cavity 92.0' - Mechanical break, horizontal, planar 92.2' - Fracture, 45 deg, rough, planar 92.21' - Fracture, horizontal, black coating on fracture edge, (pyrite-organics) 92.8, 93.2, 93.8' - Fractures (3), horizontal, rough, stepped, loose, silty sand material on faces 94.5' - Fracture, horizontal, smooth, undulating, parting along fine lamination, dark brown color, friable zone 95.1' - Fracture, 60 deg, planar, loose sand material, fine grained pyrite on surface 95.1-96.0' - Fracture zone, limestone		material No Recovery 85.0-87.0' Limestone 87.0-87.7' - yellowish gray, (5Y 7/2), moderate to strong HCl reaction, medium strong (R3), fossiliferous molds and casts 1/16"-3/16" over 5-20% of surface, larger cavities up to 3/4" (fossil molds) 87.7-88.2' - white to yellowish gray, (N9 to 5Y 8/1), strong HCl reaction, very weak (R1), fossiliferous (molds & casts) 88.2-89.6' - pale yellowish brown, (10YR 6/2), moderate to strong HCl
- - - - 100 -57.8	R8-NQ 5 ft 60%	22	2 2 3 NR	97.1' - Fracture 201e, limestone fragments 97.1' - Fracture or mechanical break, 60 deg, rough, undulating 97.6' - Fracture or mechanical break, horizontal, rough, planar 98.3' - Fracture, 45 deg, rough, undulating, irregular 98.6' - Mechanical break, rough, undulating, near vertical 99.2' - Fracture, 60 deg, planar 99.4' - Fracture, 15 deg, rough, undulating 99.8' - Fracture, 50-60 deg, rough, planar		reaction, 15-20% voids (1/16"-1/8"), 2% larger voids/cavities, laminated black organic infilling at 89.4' 89.6-91.1' - pale yellow gray, (5Y 8/1), strong HCl reaction, weak to medium strong (R2 to R3), silt sized material (inclusions) and thin layers (1"-2") No Recovery 91.1-92.0'
	102.0				Ħ	-



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-10 SHEET 7 OF 12

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724149.3 N, 457766.2 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

ORIENTATION · Vertical

CORING	METHOD A	ND E	QUIPN	IENT : CME 550 S/N 186073, mud rotary, NQ tools, NW	casing		ORIENTATION : Vertical
WATER	LEVELS : 1.0	ft bg	s on 03	3/10/07 START: 2/25/2007 END: 3	11/200	7 LOGGER : C. LeBlanc, T. Stewar	t, C. Wallestad
300	0)			DISCONTINUITIES	U	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - 105 -62.8 -	R9-NQ 5 ft 65% 107.0	38	>10 >10 0 0 NR	102.1, 102.7' - Fractures or mechanical break (2), horizontal, rough, undulating 102.3' - Fracture, 60-70 deg, smooth, thin coating of loose silt sized material on fracture surface 102.7-103.3' - Fracture zone, limestone fragments		Limestone 92.0-93.2' - yellowish gray, (5Y 8/1), strong HCl reaction, weak (R2), black organic/pyrite mottling and castings on fracture/void surfaces, voids (1/16") over 10-15% of surface, fossiliferous (molds/casts) Silt (ML) 93.2-95.2' - moderate HCl reaction, medium strong (R3), carbonate silt material with gravel-sized limestone fragments with 10-15%, voids (1/16-1/8"), large solution cavity (3/4"x3/4") Limestone	
- - - 110 -67.8 -	R10-NQ 5 ft 100%	54	1 2 2	107.1' - Fracture, 45-60 deg 108.5' - Fracture, 60 deg, rough, undulating, <1% fine black trace secondary pyrite crystals on surface 109.4' - Fracture or mechanical break, horizontal – 109.5' - Fracture, 45 deg, rough, stepped, trace very fine black pyrite crystals 110.8' - Fracture or mechanical break, horizontal, rough		95.2-96.0' - yellow gray, (5Y 8/1), strong HCl reaction, weak (R2), pyrite on surfaces No Recovery 96.0-97.0' Limestone 97.0-100.0' - yellowish gray, (5Y 8/1), strong HCl reaction, weak (R2), 10-15% voids (1/16-1/8") over surface, fossil molds/casts, cavities and molds up to 3/8" over 1-2% of surface. No Recovery 100.0-102.0' Limestone 102.0-105.25' - yellowish gray, (5Y	SC-3 collected at 107.3- 108.35' - - - - R10: 4 minutes
- - - - 115 -72.8 -	112.0 R11-NQ 5 ft 96%	86	1 3 1	110.9, 111.0, 111.2, 111.5, 111.6, 111.8, 112.0' - Fractures (7), horizontal, rough, planar to undulating, open, fine "chalky" material on surface 112.0' - Fracture or mechanical break, horizontal, smooth, planar 113.7' - Fracture, horizontal, iron oxide staining 113.71-113.8' - Mechanical break or fracture zone, horizontal, (drill pin) 114.4, 115.2, 115.7, 116.1, 116.3, 116.8' - Fractures or mechanical break (6), horizontal, undulating		8/1), strong HCI reaction, weak (R2), percent voids vary from 5-15%, large fossil molds/cavities up to 3/8" (mollusks) No Recovery 105.25-107.0' Limestone 107.0-114.6' - yellowish gray, (5Y 8/1), fine grained, strong HCI reaction, weak (R2), small voids (1/16"-1/8") over <5% of surface, very few larger (>3/16") cavities/fossil molds on surface chalky appearance and texture 114.6-116.8' - yellowish gray, (5Y 8/1), strong HCI reaction, weak (R2), highly fossiliferous(molds and casts)	
 120 -77.8 -	117.0 R12-NQ 5 ft 100%	70	NR 5 3 3 >10	117.0-117.3' - Fracture zone, loose carbonate fine sand 117.3, 117.5, 117.9' - Fractures (3), horizontal, rough, undulating, fine carbonate sand on surface 118.5' - Fracture, 45 deg, rough, undulating to planar 118.8, 118.7, 119.1, 120.1' - Bedding plane (4), horizontal, smooth to rough, planar 120.1, 120.6, 121.1' - Fractures or mechanical break (3), 0-10 deg, rough, undulating 121.1-122.0' - Fracture zone, irregular fracture surfaces, limestone fragments		up to 30-40%, somewhat friable No Recovery 116.8-117.0' Sand (SP) 117.0-117.3' - strong HCI reaction, well sorted carbonate sand, 5% fine clear subhedral calcite crystals, possible trace silica grains, possibly slough	R12: run time not recorded
					1 1		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-10 SHEET 8 OF 12

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724149.3 N, 457766.2 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION: Vertical

CORING	METHOD A	ND E	QUIPN	IENT : CME 550 S/N 186073, mud rotary, NQ tools, NW	casing		ORIENTATION : Vertical			
WATER	LEVELS: 1.0	ft bg	s on 0	3/10/07 START: 2/25/2007 END: 3/	11/200	7 LOGGER : C. LeBlanc, T. Stewar	t, C. Wallestad			
>	<u>-</u>			DISCONTINUITIES	(J)	LITHOLOGY	COMMENTS			
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.			
	0 3 #		3	122.1, 122.5, 123.25, 123.5, 123.8, 124.1, 124.3, 124.35, 124.55, 124.75, 124.95, 125.1,		Limestone - 117.3-117.9' - pale yellowish gray, (5Y 8/1), coarse grained, very weak	NQ rod stuck at 117.0' after completing R-12, hole abandoned and			
-			3	125.25, 125.4, 125.5, 125.6, 125.7, 125.8, 122.8' - Mechanical break (19), horizontal, smooth, planar		to weak (R1 to R2), fossiliferous mold and casts up to 3/16", friable into coarse sand particles, 10-15%	replacement hole drilled to obtain information below 122'			
- - 125	R13-NG 5 ft 78%	15	6	122.95' - Fracture, 40 deg, smooth, undulating, open, black particles (1/5"-1/3") in matrix on surface	Ħ	argillaceous sand, iron staining on all sand sized inclusions 117.9-122.0' - very pale yellowish	T. Stewart begins logging at 122' NW casing at 120' below			
-82.8			7	_		gray, (5Y 8/1), strong HCl reaction, very weak to weak (R1 to R2), increasing percentage of large fossil	ground surface, water level 1.0' below ground surface R13: 19 minutes			
-	127.0		NR			molds/casts up to 3/8", few cavities infilled with very fine grained silty material				
-			>10	127.8' - Fracture, vertical, smooth,	H	122.0-124.65' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCl reaction, very weak (R1), voids <1/16" over 10-15% of surface, with				
-			5	undulating, tight, black staining 128.1, 128.2,128.4, 128.75' - Mechanical break (4), horizontal, smooth, planar	Ħ	four 3/16"x3/16" trace ellipsoid shaped cavities , 30% fine to medium grained black particles, 15% fine				
130_ -87.8		0	>10	-		grained white particles (fossil fragments), color change to yellowish gray (5Y 8/1) at 128.65'	-			
-			NR		目	124.65-125.9' - Same as 122.0-124.65' except medium grained, moderately fossiliferous,	R14: 24 minutes			
-	132.0				Ħ	medium gray (N5) lense at 125.5' No Recovery 125.9-127.0 Limestone	Driller's Remark: 50% circulation loss near top of R14-NQ			
-			7	132.35' - Fracture, 50 deg, smooth, stepped, tight 132.4, 132.55, 132.65, 132.75, 132.9, 133.1,		127.0-128.95' - yellowish gray, (5Y 7/2), medium grained, strong HCl reaction, weak (R2), 15% fine				
-	R15-NG		>10	133.23, 133.35, 133.55, 133.65, 133.75, 134.55' - Mechanical break (12), horizontal, smooth, planar	H	grained black particles, moderately fossiliferous (fossil fragments, casts), voids over 45% of surface, trace				
135 <u> </u>	5 ft 88%	23	>10	134.85' - Fracture, 5 deg, rough, undulating,		short black laminations <1/16" thick near 128.8' — 128.95-130.2' - yellowish gray, (5Y	-			
-			0	open 2/5" 135.05, 135.15' - Mechanical break (2) 135.53' - Fracture, horizontal, smooth,		7/2), fine grained, strong HCl reaction, weak (R2), trace voids, few fossil casts up to 3/16"x1/8", 1" weak zone at 129.95'	R15: 13 minutes			
-	137.0		NR	undulating, tight to open 1/10" 135.77' - Fracture, 5 deg, rough, undulating, open 3/4", 2/5" thick infilling		No Recovery 130.2-132.0 - Limestone 132.0-135.8' - yellowish gray, (5Y	Driller's Remark: Return of circulation at approximately 135.0' below ground			
-			>10	138.05' - Fracture, vertical, tight, healed		8/1), fine grained, strong HCl reaction, weak (R2), 10-15% voids up to 1/16", trace to many ellipsoidal	surface			
-	R16-NG		>10	138.1-138.3' - Fracture zone 138.7' - Fracture, 70 deg, tight, healed, 1/16" thick infilling		cavities up to 1-1/10", infilled with medium gray color, cavity size increase with depth, up to 40% very				
-97.8 -97.8	5 ft 56%	7	NR	138.95, 139.15' - Fractures (2), 50 deg, rough, undulating, tight 139.55' - Fracture, vertical, tight, vertical, black staining, 1/16" thick infilling		fine to fine grained fossil fragments in matrix, medium grained from 135.15-132.35", laminated from 132.0-132.35' (moderate olive brown - 5Y 4/4) with medium grained particles, organic laminations <1/16"	- R16: 22 minutes			
	142.0				Ħ	at 134.0'				



PROJECT NUMBER: BORING NUMBER: 338884.FL A-10 SHEET 9 OF 12

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724149.3 N, 457766.2 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) $DRILLING \underline{\ CONTRACTOR: Universal\ Engineering\ Sciences,\ Gainesville,\ FL;\ Driller:\ M.\ Boatright;\ Cathead\ Operator:\ M.\ Griffin$

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION: Vertical WATER LEVELS: 1.0 ft bgs on 03/10/07 START: 2/25/2007 END: 3/11/2007 LOGGER: C. LeBlanc, T. Stewart, C. Wallestad DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT DESCRIPTION ROCK TYPE, COLOR. SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 142.0-143.8' - Fracture zone 135.8-136.4' - light olive gray, (5Y 6/1), strong HCl reaction, weak to >10 medium strong (R2 to R3), trace voids up to 1/16", many irregularly shaped cavities up to 2-2/5" long x 1 2/5" wide, infilled with moderate olive 143.8' - Fracture, horizontal, rough, planar, brown (5Y 4/4) medium to coarse R17-NQ SC-4 collected at 144.1open grained material 37 1 5 ft 144.1, 145.0' - Fractures (2), horizontal, 145.05' No Recovery 136.4-137.0' 145 80% rough, planar, tight -102.8 Limestone 137.0-139.8' - light olive gray, (5Y 0 6/1), very fine grained, strong HCI reaction, medium strong (R3), 75% R17: 17 minutes voids up to 1/8"x3/16", cavities over NR 15-20% of surface (near top of run), Last core run on 3/10/07 147.0 infilled with coarse grained material, Resume drilling 07:55 on brownish black laminations <1/16" 0 3/11/07 containing sub rounded clasts up to 3/16" in size at 138.4-138.6', series SC-5 collected at 147.0-148.1, 148.2, 148.3, 148.32' - Bedding plane of 70-90 degree fractures (healed 5 148 1 (4), horizontal, rough, planar, tight to open tight) over 138.6 to 139.8' interval with black mottled appearance R18-NO 148.93' - Bedding plane, horizontal, rough, No Recovery 139.8-142.0' 2 58 5 ft planar, silty infilling 75% Limestone 150 149.4, 150.0, 152.05, 152.1' - Mechanical 142.0-143.8' - yellowish gray, (5Y -107.8 break (4) 0 7/2), medium to coarse grained, strong HCI reaction, very weak to weak (R1 to R2), matrix grain colors R18: 22 minutes NR are white (N9) (33%), yellowish gray (5Y 8/1) (33%), and gray (33%) Driller's Remark: 152 0 143.8-144.1' - Same as 142.0-143.8' Continued loss of except brown and white laminations 2 circulation with trace cavities infilled with white material 144.1-145.05' - Same as 153.3' - Bedding plane, horizontal, smooth, 5 143.8-144.1' except light olive gray undulating, open 1/8"-1/4" (5Y 5/2), 15-20% coarse grained 153.43' - Bedding plane, horizontal, smooth, R19-NQ gray particles undulating, tight >10 39 145.05-146.0' - Same as 143.8-144.1' except fine grained, no 5 ft 86% 153.48, 153.55, 153.63' - Bedding plane (3), 155 horizontal, smooth, planar, tight -112.8 gray particles 153.6' - Fracture, vertical, rough, undulating, No Recovery 146.0-147.0' 6 tight, black particles in matrix Limestone 153.8' - Bedding plane or mechanical break, R19: 14 minutes 147.0-148.37' - dark yellowish horizontal, smooth, planar, tight orange, (10YR 6/6), fine to medium NR 154.05' - Bedding plane or mechanical break, 157.0 grained, moderate HCI reaction, <10 deg, smooth, undulating, open 1/4" weak (R2), 3/16"x1/8" voids over 154.05-155.5' - Fracture zone 4 15% of surface, fossiliferous (trace 157.25, 157.4' - Bedding plane or mechanical molds), bedding plane at 147.9' at 40 break (2), <10 deg, smooth, undulating, open degrees 4 148.37-148.93' - yellowish gray, (5Y 8/1), medium grained, strong HCl 157.45' - Bedding plane or mechanical break, <10 deg, smooth, undulating, open 1/2" R20-NC reaction, extremely weak (R0) 157.8' - Bedding plane or mechanical break, 42 1 148.93-150.74' - dark yellowish orange, (10YR 6/6), fine to coarse 5 ft horizontal, smooth, undulating, open 1/8" 160 92% 158.05' - Bedding plane or mechanical break, -117.8 grained, strong HCl reaction, weak smooth, undulating, open 1/8"-1/4" 158.47, 158.95' - Bedding plane or (R2), trace voids to 1/16" over <5% surface, some infill of white material, mechanical break (2), horizontal, open R20: 19 minutes trace fine to medium grained black 1/8"-1/2" particles NR 162.0 No Recovery 150.74-152.0



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-10 SHEET 10 OF 12

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724149.3 N, 457766.2 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

	LEVELS : 1.0			3/10/07 START : 2/25/2007 END : 3/		D7 LOGGER : C. LeBlanc, T. Stewar	t, C. Wallestad
≥∩≘	(%)			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-			9	159.1' - Bedding plane or mechanical break, horizontal, smooth, planar, open 1/4"-1/2" - 159.3, 159.4' - Mechanical break (2)		Limestone 152.0-156.3' - very pale orange, (10YR 8/2), strong HCl reaction,	-
-			2	160.05-161.3' - Fracture zone or mechanical break, horizontal, smooth, planar - 162.27, 162.3, 162.4, 162.6, 162.7, 162.75,		weak (R2), voids to 1/8" covering 25-30% of surface, moderately fossiliferous, (mold and casts) 5-10%	-
-	R21-NG 5 ft	18	6	162.82, 162.9, 162.98' - Bedding plane or mechanical break (9), smooth, planar, tight to		white inclusions up to 1-1/4" (irregular shape), fine brownish black	-
165_ -122.8 -	88%		>10	open 1/8" 163.9' - Bedding plane, horizontal, smooth, undulating, open 1/8"-1/4", dark staining 163.98' - Bedding plane or mechanical break,		laminations (<1/16") at 153.48-153.63', contains vertical fracture across interval, up to 20% fine black particles	-
_	167.0		NR	<10 deg, rough, undulating, black staining 164.1, 169.25, 164.4, 164.5, 164.85, 164.95' - Bedding plane or mechanical break (6),		No Recovery 156.3-157.0' Limestone 157.0-161.6' - yellowish gray to	R21: 19 minutes
_	101.0		2	horizontal, smooth, planar to undulating, tight to open 1/8"-1/4" 166.0' - Mechanical break		dusky yellow, (5Y 7/2 to 5Y 6/4), fine to medium grained, strong HCI reaction, very weak to weak (R1 to	-
- -			3	166.1' - Bedding plane or mechanical break, horizontal, smooth, planar, tight to open 1/8" 166.25-166.3' - Fracture (2), 80 deg, rough,	Ħ	R2), trace voids up to 1/8" elliptical, poorly fossiliferous (few molds,casts), 3/8"x3/16", bedding	SC-6 collected at 168.4-
170	R22-NG 5 ft 84%	31	3	undulating, tight, reddish brown staining 167.05' - Mechanical break or bedding plane, horizontal, smooth, planar, tight		plane laminations <1/16" from 160.2-161.6' No Recovery 161.6-162.0'	169.3'
170 <u> </u>	0470		4	167.75-167.9' - Fracture zone 168.1' - Bedding plane or mechanical break, horizontal, smooth, planar, open 1/8"-1/4"		Limestone 162.0-166.4' - yellowish gray to moderate olive brown, (5Y 7/2 to 5Y	_
-	470.0		0 NR	168.2' - Bedding plane or mechanical break, <10 deg, rough, undulating, tight to open 1/4"-3/4"		5/4), fine grained, strong HCl reaction, weak to medium strong (R2 to R3), voids up to 1/16" over 40% of	R22: 23 minutes
- -	172.0		3	168.4' - Bedding plane, smooth, undulating, open 1/4" 	H	surface, 163.0-163.09 interval has voids to 3/16" covering 90% of surface, moderately fossiliferous	-
-			6	undulating, open 1/8"-1/4" 169.55-169.7' - Fracture zone 169.8' - Bedding plane, horizontal, smooth,		 from 163.0-163.9' (some molds), 2"x1/4" inclusions up to 5%, from 163.0-163.1', irregular shaped 	-
475	R23-NQ 5 ft	35	4	undulating, 1/8"-1/4" open 170.1' - Bedding plane or mechanical break, <10 deg, smooth, undulating, 1/8"-1/4" open	H	 inclusions, medium gray in color. No Recovery 166.4-167.0' Limestone 	
175 <u> </u>	84%		6	170.3-170.5' - Fracture zone — 170.7-170.8' - Bedding plane (2), <10 deg, tight, dark staining	Ħ	— 167.0-171.2' - moderate olive brown, (5Y 4/4), fine grained, strong HCI reaction, weak to medium strong (R2)	
- -			1 NR	172.05' - Bedding plane, horizontal, smooth, undulating, crystal traces on surface, open 1/4"		to R3), voids up to 1/8" over 15-20% of surface, cavities (1/4"x1") from 168.05-168.04' poorly fossiliferous	R23: 22 minutes
- -	177.0		6	172.15' - Bedding plane, horizontal, smooth, planar, open 1/8"-1/4" 172.3-172.55' - Fracture zone	H	(trace molds), horizontal wavy laminations (<1/16") at 170.5 No Recovery 171.2-172.0'	
_ _			0	173.2' - Bedding plane, horizontal, smooth, undulating, crystals on surface of fracture, open 1/8"		Limestone 172.0-176.2' - yellowish gray to moderate olive brown, (5Y 7/2 to 5Y	
- -	R24-NQ 5 ft	40	2	173.3' - Bedding plane, <10 deg, smooth, undulating, crystals covering 30% of surface, open 1/4"to 1/2"	H	4/4), strong HCl reaction, weak to medium strong (R2 to R3), voids up to 1/8"x3/16" over 10-15% of surface,]
180_ -137.8 -	78%		>10	173.45, 173.75, 173.87, 173.9, 174.0, 174.03,' - Bedding plane (6), horizontal, smooth, planar, crystals covering surface,		cavities up to 1"x1/2" over 5% of surface, poorly fossiliferous (few casts), mottling of slightly darker hue	
_ _			NR	tight to open 1/8"		up to 20% No Recovery 176.2-177.0'	R24: 20 minutes
_	182.0			174.2-174.35' - Fracture zone, 3/4" fragments	H		

APPENDIX 2BB-113 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-10 SHEET 11 OF 12

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724149.3 N, 457766.2 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

WATER	LEVELS : 1.0	ft bgs	s on 0	3/10/07 START : 2/25/2007 END : 3/	11/20	07 LOGGER : C. LeBlanc, T. Stewar	t, C. Wallestad
≥ ∩≎	(9)			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BI	E RU STH, SVEF	(%) _Q	FJ S	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
	SORI	RO	-RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	011			175.45, 175.6, 175.8, 175.85, 175.95, 175.98,		Limestone	
-			4	176.05' - Bedding plane (7), horizontal, smooth, undulating, crystals on surface, tight	╁	- 177.0-177.95' - yellowish gray to	-
-				to open 1/4"	F	moderate olive brown, (5Y 7/2 to 5Y 4/4), fine grained, strong HCl	Driller's Remark: 183.0-
-			4	177.0-177.05' - Fracture zone 177.25, 177.5, 177.55' - Bedding plane (3),	片	 reaction, weak to medium strong (R2 to R3), voids up to 1/8" covering 	184.5' was hard drilling, - had to increase pump
-	R25-NQ			horizontal, smooth, undulating, crystals on		15-20% of surface, wavy dark brown	pressure
185	5 ft 92%	40	6	surface, tight to 1/8" 177.65' - Bedding plane, <10 deg, smooth,	世	 laminations at 177.8' to sharp contact (bedding plane) at 117.95', 25 	1
-142.8				undulating, open 1/4"-1/2"	╙	degree bedding plane	
-			3	177.8' - Bedding plane, horizontal, smooth, planar, tight to open 3/4"	F	 177.95-180.9' - yellowish gray, (5Y 7/2), very fine to medium grained, 	1
-			1	179.0' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/2"-1"	I	strong HCl reaction, weak to medium strong (R2 to R3), voids up to 3/16"	R25: 28 minutes
-	187.0		NR	179.85' - Fracture or mechanical break,	Ш	covering 30-40% of surface, cavities	1
			3	horizontal, rough, undulating, tight to open 1/2"	Ш	(fossil molds) up to 1"x2" covering < 5% of surface, moderate]
l .				180.05-180.15' - Fracture zone, up to 1"	Н	fossiliferous (casts, molds), very fine	
l _			3	fragments 180.2-180.3' - Bedding plane (2), horizontal,	┢	grained, very pale orange (10YR 8/2) wavy beds up to 1"1/2" from	SC-7 rejected due to size requirements, total of six
-				smooth, planar, tight to open 1/8" 180.25' - Fracture or mechanical break,	F	179.65-180.35' and 180.5-180.68' No Recovery 180.9-182.0'	(6) special cores taken
-	R26-NQ 5 ft	31	3	vertical, smooth, undulating, tight	F	_ Limestone	from boring A-10/A-10R
190 -147.8	96%			180.45' - Bedding plane, <10 deg, rough, undulating, open 1/4"-3/4"	H	182.0-186.6' - yellowish gray to moderate olive brown, (5Y 7/2 to 5Y	_
-147.6			2	180.6, 180.8' - Bedding plane (2), <10 deg,	世	4/4), strong HCl reaction, weak to	-
-				rough, undulating, open 1/4-1/2" 182.15, 182.5, 182.6, 182.85,' - Bedding	₽	medium strong (R2 to R3), voids up to 1/16" on 40-60% of surface,	R26: 11 minutes
-			4	plane (4), horizontal, smooth, undulating, tight to open 1/8"	\vdash	cavities (irregular shaped) up to 3/8"x3/16" over 10-20% of surface,	1 -
-	192.0		NR	183.25-183.35' - Fracture zone, rock	厈	 moderately fossiliferous (molds and 	Driller's Remark: Circulation regained
-			>10	fragments up to 1" 183.7, 183.77, 183.9' - Bedding plane (3),	口	casts) No Recovery 186.6-187.0'	-
-				horizontal, smooth, planar, open 1/4"-1/2"	世	- Limestone	-
-			>10	184.10-184.20' - Fracture zone, rock fragments up to 1-1/2" fractures		_ 187.0-188.15' - Same as 182.0-186.6'	-
-	R27-NQ		0	184.4' - Bedding plane, horizontal, smooth, planar, open 1/8"-1/4"	╁	 188.15-191.8' - yellowish gray, (5Y 7/2), fine grained, moderate to strong 	
195	5 ft 44%	12		184.45' - Bedding plane, <10 deg, smooth,	F	HCl reaction, weak to medium strong	1
-152.8	11,70			undulating, open 1/8" — 184.65' - Bedding plane, horizontal, smooth,	Ħ	(R2 to R3), weaker at bottom of interval, medium strong (R3) at base.	
-			NR	planar, open 1/8"-1/4", dark staining	Ħ	voids up to 3/16" covering 5-15% of	1
-				184.9-185.05' - Fracture zone, rock fragments up to 2"	H	 surface, trace cavities 3/4"-1/8" with no infill, poorly fossiliferous, (mostly 	R27: 12 minutes
-	197.0			185.2' - Bedding plane or mechanical break, <10 deg, smooth, undulating, open 1/8"-1/4"		casts, molds), trace organics No Recovery 191.8-192.0'	1
			0	185.6' - Fracture or mechanical break, 20	\vdash	Limestone]
				deg, rough, undulating, tight 185.61' - Fracture or mechanical break, 70	尸	192.0-193.25' - Same as 182.0-186.6']
-				deg, rough, undulating, tight	Д	193.25-194.2' - yellowish gray, (5Y]
_				187.3-187.5' - Fracture zone, rock fragments to 1-1/2"x1-1/5"	厂	7/2), fine grained, strong HCl reaction, medium strong (R3), trace]
-	R28-NQ		NR	187.55, 187.8, 187.9, 188.05' - Bedding plane (4), <10 deg, smooth, undulating, 188.05' has	口	black color laminations, trace very fine to fine black particles	D00: 40
200_	5.5 ft 0%	0	INIX	black stains, open 1/4"	\perp	No Recovery 194.2-197.0'	R28: 10 minutes End of coring at 15:21 on
-157.8				188.8, 188.95' - Fractures or mechanical break (2), 40 deg, rough, undulating, tight	\vdash	Limestone □ 197.0-197.15' - Same as	3/11/07, boring grouted to surface with Portland
-				189.25' - Bedding plane or mechanical break,	F	_ 193.25-194.2'	cement type I/II, type GU -
-				<10 deg, rough, undulating, tight 189.35' - Bedding plane, <10 deg, smooth,	F	No Recovery 197.15-202.5'	on 3/13/07
-				planar, tight	H		-
					1		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-10	SHEET	12	OF	12	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724149.3 N, 457766.2 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION : Vertical

00111110	METHODA	10 0	2011 11	IENT . CIVIE 550 5/N 160075, Mud Totally, NQ 10015, NV	Casii	ng		ORIENTATION : Vertical
WATER	LEVELS: 1.0	ft bg	s on 00	3/10/07 START: 2/25/2007 END: 3	/11/20	007	Z LOGGER : C. LeBlanc, T. Stewar	t, C. Wallestad
>	<u> </u>			DISCONTINUITIES	CD		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	Γ	ROCK TYPE, COLOR,	
BH	N A K	(%	FRACTURES PER FOOT		- 음	Т	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
H A A	A T T N	(%) Q	달입	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	Т	WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
P S S	S S S S	A Q	RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ĮΣ	Т	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
БОШ	0716	IL.	шп		0)	4	0.0.00.00.00	
	202.5			189.95' - Bedding plane, horizontal, smooth,	$oldsymbol{\perp}$	1		
				190.0' - Fracture zone, 60 deg, smooth,	1	Т	Bottom of Boring at 202.5 ft bgs on	
-				undulating, tight	1	F	3/11/2007	-
-				190.3-190.45, 190.6-190.8' - Fracture zone	-	F		-
-				(2), up to 2" rock fragments	1	L		_
				191.1' - Fracture or mechanical break, 60 deg, rough, undulating, open 7/8"-1"	1	Т		
1 -				191.35, 191.45, 191.55' - Bedding plane (3),	1	Г		_
-				horizontal, smooth, undulating, open 1/8"-1/4"	1	Н	_	
-				192.0-193.35' - Fracture zone, well graded	-	ŀ		-
l _				pieces of limestone fragments 1/4"-2"	_	L		_
				subangular shapes and several 3/8"-1/2" discs				
1 7				193.1-193.4' - Fracture zone, pieces 1/4"-2"	1	T		· -
-				sub angular shapes and several 3/8"-1/2"	1	F		-
-				discs	-	F		-
I _				193.95-194.2' - Fracture zone, poorly graded limestone, 1" subangular rock fragments	1	L		_
				ilmestone, i subangular rock tragments	1	Т		
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-11 SHEET 1 OF 15

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.7 N, 457813.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8 tri-cone bit

ORIENTATION : Vertical

					,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	y, cathead, NVV rods, 3-7/8			ORIENTATION : Vertical
WATER	LEVELS	: 1.0 ft bo	gs on 4/22	2/07	START : 4/21/2007	END : 5/9/2007	LOGGE	R : T	Stewart, R. McComb, A. Bonilla
> 0 0 1				STANDARD		SOIL DESCRIPTION		بِ 🏲	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	00" 1111	LICOS ODOLID OVAROSI	001.00	SYMBOLIC LOG	DEDTH OF CACING PRILLING DATE
H H H		RECOVE	ERY (ft)			, USCS GROUP SYMBOL, CONTENT, RELATIVE DEN		J	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTF/			#TYPE	6"-6"-6"		Y, SOIL STRUCTURE, MIN		₩	INSTRUMENTATION
10 E	0.7			(N)	T"			رن ري	
42.5	0.0			2-2-2	Topsoil	black, (N2), moist, roots	s up to 3/8"	/ 	[]
_		1.3	SS-1	(4)	\diameter, organi	CS		事]
_	1.5				Poorly Graded S	Sand With Silt (SP-SM) ellowish brown, (10YR 6/2	2) moist	d'il	5' sections of NW rod, 24" split spoon (SS), 50 lb bags of Quik Gel brand bentonite
_					very loose, very	fine to fine grained, silica	sand,		10:36 1/4 bag bentonite added to full mud
						5% nonplastic fines, trac	e of very fine		vat using 3-7/8" tricone roller bit
					sand-sized black 0.9-1.25' - moder	เ particles rate yellowish brown, (10	YR 5/4),	1	
					moist, very loose	e, very fine to fine grained	d, silica sand,	1	
						fines, trace very fine grain sh orange and very fine o		1	
					particles			1	_
5	5.0							1	1
37.5					Clayey Sand (SC		1 400/		
		1.0	SS-2	6-6-4 (10)	5.0-6.0' - pale blu	ue green, (5BG 7/2), wet ines, silica sand, trace ve	i, ioose, 16% erv fine	1//	1
-	6.5			(10)	sand-sized black	c particles, brownish blac	k staining	ſΥ	
-	0.0				around roots, tra	ice of coarse sand-sized rticles, trace 1/8" rootlets	yellowish	1	1
-					black staining are	ound rootlets	, brownish	1	-
-								1	-
-								1	-
-								+	Driller's Remark: 8.5' below ground surface
-								+	change in drilling
-								+	9.5' stiffened up (harder drilling)
10 32.5	10.0 10.3	0.3	SS-3	50/3	Lean Clay With	Silt (CL-ML)			
-				(50/3")	\ 10.0-10.25' - Sar	me as 5.0-6.0' except ha	rd, no	′┨	-
-					∖organics		/	+	-
-								+	-
-								+	-
-								-	Driller's Remark: 12.5' started losing water
-								-	- Driller's Remark. 12.3 started losing water
-								4	-
-								-	Hard at 14.0' approximately 40.509/
-								-	Hard at 14.0', approximately 40-50% circulation loss, add 1/2 bag bentonite then
15	15.0	0.4	SC 4	50/4	Limentana Franci	monto		\bot	added another 1/8 bag to mud vat
27.5	15.3	0.1	SS-4	50/4 \ (50/4") /	Limestone Frag 15.0-15.3' - grayi	ish to dusky yellow, (5Y 8	8/4 to 5Y	4	_
-					7/4), mild to mod	derate HCI reaction, 20-3	0% voids	1	_
_						nerical to elongated in sh ry fine grained particles,		1	_
_					possible microfo		. 3.00 010	1	
_							_		
1									
]	1
20								1	
							-	T	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-11	SHEET	2	OF	15

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.7 N, 457813.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLIN	DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8 tri-cone bit ORIENTATION : Vertical										
WATER	LEVELS	: 1.0 ft bo	s on 4/22	2/07	START : 4/21/2007 END : 5/9/2007 LOGGER : T. Stewart, R. McComb, A. Bonilla						
				STANDARD	SOIL DESCRIPTION COMMENTS						
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION						
H H H		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND						
PTF EVA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY						
30 L				(N) 50/5							
22.5	20.0	0.3	SS-5	(50/5")	20.0-20.25' - grayish to dusky yellow. (5Y 8/4 to 5Y						
-					6/4), wet, very dense, fine to coarse grained, moderate HCl reaction, 20% nonplastic fines, 15-20%						
-					fine gravel-sized to 3/4", all carbonate						
-											
-					- Drillarda Damadki Hard at 20 Flithan yang anti						
-					Driller's Remark: Hard at 22.5' then very soft drilling from 23.0-25.0'						
-											
-					-						
-					 						
25 <u> </u>	25.0				Cik With Cond (MI)						
17.5				35-34-20	Silt With Sand (ML) 25.0-26.1' - dusky yellow, (5Y 6/4), trace white						
-		1.1	SS-6	(54)	mottling, moist to wet, dense, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 15% very						
-	26.5				│ fine sand-sized, 5-10% fine to medium sand-sized, │ │ │						
-					trace fine sand-sized brilliant green particles, all						
-					\textstyle						
-					-						
-					-						
-					- Drillaria Romania Coff again at 20.01						
-					Driller's Remark: Soft again at 29.0'						
30 <u> </u>	30.0				Silt With Sand (ML)						
12.5				40-30-34	30.0-31.15' - Same as 25.00-26.1' except lenses of -						
-		1.2	SS-7	(64)	very fine grain sized limestone						
-	31.5				-						
-					-						
-					-						
-					-						
-					Driller's Remark: Hard at 33.5'						
-					Driller's Remark: Last foot of run 34.0-35.0'						
-					- Is drilling at 2.5 minutes per inch with 400 psi						
35 7.5	35.9	0.1	\ SS-8 /	50/1	pressure applied Driller's Remark: Approximately 20 minutes						
'.5 -		\/	_00-0_/	(50/1")	├ 35.0-35.05' - light olive gray to moderate olive brown, / to drill 34.0-35.0'						
-					(5Y 5/2 to 5Y 4/4), coarse grained, mild HCl reaction, / Driller's Remark: Will switch over to NQ Very poor recovery						
-					Begin Rock Coring at 35.5 ft bgs						
-					See the next sheet for the rock core log						
-					-						
-					-						
-					-						
-					-						
-					-						
40					+ +						



PROJECT NUMBER: BORING NUMBER: 338884.FL

A-11

SHEET 3 OF 15

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.7 N, 457813.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION: Vertical

CORING	NETHOD A	ND EC	JUIPIV	IENT: CME 550 S/N 186073, mud rotary, NQ tools, NW	casınç		ORIENTATION : Vertical
WATER	LEVELS: 1.0	ft bgs	s on 4	/22/07 START : 4/21/2007 END : 5/9	9/2007	7 LOGGER: T. Stewart, R. McCom	nb, A. Bonilla
				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOCK TABLE COLOR	
E NO	L. A. S.	(%)	FRACTURES PER FOOT	DECORAL MOR	잌	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
A H E	E E E E E E E E E E E E E E E E E E E	Q D (%)	F.S.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOL	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING RATE AND
F S S	R E E	Ø	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	∑ ≻	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
Δощ		œ	ша	THORNEOU, OUT ACE STAINING, AND HOTTINESS	တ		
	35.5		0		Н	Limestone	3" NW set to 35.5' below
1 7			0		ш	 35.5-40.3' - light olive gray to moderate olive brown with yellowish 	ground surface using - casing advancer
-				-	口	gray mottling, (5Y 5/2 to 5Y 4/4 with	Start R1 at 15:56
-			0	36.75, 38.0' - Mechanical break (2)	Н	 5Y 7/2), mild to moderate HCl 	Added 1/4 bag bentonite to -
_					Ш	reaction, very weak (R1), strength	full mud vat
	R1-NQ		١.		Н	decreasing with depth, 35.5 to 37.0'	
-	5 ft 96%	93	1	-	Н	 medium strong (R3), poorly fossiliferous (casts), trace black 	Driller's Remark: Soft at
-	90%			38.35' - Fracture, 50 deg, rough, undulating,	団	particles and short 3/8" discontinuous	38.0'
-			2	tight	Н	- laminations, 1/8" voids over 20-30%	-
				38.8, 39.2' - Fracture (2), 50 deg, rough, undulating, tight	Н	of surface, fossiliferous up to 3/4"	
40			4	undulating, tigrit	ш	long	R1: 5 minutes
2.5	40.5		1		$\vdash\vdash$		-
-	40.5		NR.	40.2' - Fracture, 60 deg, rough, undulating,	世	No Recovery 40.3-40.5'	-
-			>10	tight 40.5-40.75' - Fracture zone	Ш	Limestone	-
			L	.5.5 10.10 11404410 20110	Н	40.5-43.4' - Same as 35.50-40.3' except some void infilling with soft	
1 7					口	gray (N4) fine material	1
-			>10	41.95-42.3' - Fracture zone, tight	ш	, , , , , , , , , , , , , , , , ,	1
-	D2 NO			-	Н	_	l -
_	R2-NQ 5 ft	35	3	42.85' - Fracture, 60-70 deg, rough,	П	_]
	58%	00		undulating, tight	Н		
1 7				42.95' - Mechanical break, horizontal, rough,	Ш	No Recovery 43.4-45.5'	1
-				undulating, tight	Н	<u>-</u> 	1
-			NR	43.0, 43.1' - Fracture (2), horizontal, rough, undulating, tight	Н	_	R2: 3 minutes
45				undulating, tight —	ш		R2. 3 minutes
-2.5	45.5				Н		
				45.5-48.2' - Fracture zone	ш	Limestone	1
-			>10	-	ш	- 45.5-48.5' - light olive gray to	1
-				-	Н	moderate olive brown, (5Y 5/2 to 5Y 4/4), mild to moderate HCl reaction,	-
_			>10	-		- 45.5-45.8' carbonate silts	_
				47.15' - Mechanical break, <1/32" soft silt	Н	46.0-46.7' extremely weak rock (R0),]
1 7	R3-NQ			infill over 25-35% of surface	ш	crumbles under thumb pressure	47.5' Started losing water
-	5 ft 60%	23	>10	47.9-48.2' - Fracture zone, 2-1/2"-3"	$\vdash\vdash$	 47.9-48.2' fractured zone, spherical 1/16" voids up to 35% of surface, 	Driller's Remark: Will set 5' - more 3" NW casing
-	00%			crumbled core fragments	世	poorly fossiliferous (casts up to 3/4"),	more a liviv casing
_				-	Ш	 1/2" elongate trace cavities with no 	-
			NR	_	Н	infill, trace medium grained black]
50			INIC		Щ	particles (organics), similar to	R3: 3 minutes
-7.5	E0 E			-	Ш	35.5-45.5' No Recovery 48.5-50.5'	-
-	50.5			-	Н	Limestone	-
_			1		口	- 50.5-54.55' - light olive gray to	-
				51.05, 51.7, 51.9, 53.9' - Mechanical break or	Н	moderate olive brown, (5Y 5/2 to 5Y]
]				bedding plane (4), horizontal, rough, undulating, tight, except 51.05' is open up to	Ш	4/4), mild to moderate HCl reaction,	1
-			2	1-1/2"		medium strong (R3), extremely weak	1
-	R4-NQ			52.5' - Mechanical break, tight	Н	rock (R0) at 53.9', 1/16" voids (90% are under 1/16", 10% are 1/8"	-
-	5 ft	75	1		Ш	 spheroidal) up to 25-30% of surface, 	-
	81%	_		53.25' - Bedding plane or mechanical break,	Н	moderately fossiliferous (casts up to	
				0-10 deg, rough, undulating, tight		1/2" in size)	1
-			1	3, 3, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,	Ш	_	1
-			<u> </u>	-	$\vdash\vdash$	No Docovery E4 EF EF EI	R4: 5 minutes
55			NR			No Recovery 54.55-55.5'	1 (4. 0 IIIIII (10.03
-12.5	2.5 55.5				Ш		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-11 SHEET 4 OF 15

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.7 N, 457813.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, NO tools, NW casing

ORIENTATION · Vertical

CORING MET	THOD AN	ND EC	QUIPN	IENT: CME 550 S/N 186073, mud rotary, NQ tools, NW	casing		ORIENTATION : Vertical
WATER LEVE	ELS : 1.0	ft bgs	s on 4	/22/07 START : 4/21/2007 END : 5	/9/2007	7 LOGGER : T. Stewart, R. McCor	nb, A. Bonilla
\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	_			DISCONTINUITIES	(2)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft) CORE RUN.	LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-			2	55.5' - Bedding plane or mechanical break, horizontal, rough, planar, tight	Ħ	Limestone - 55.5-60.5' - light olive gray to	Approximately 1.0' below ground surface water level,
			1	56.35, 57.15, 57.6, 58.3, 59.25' - Bedding plane or mechanical break (5), horizontal, rough, undulating, tight to 1" open		moderate olive brown, (5Y 5/2 to 5Y 4/4), mild to moderate HCl reaction, very weak (R1), 1/16" spheroidal voids up to 30% of surface,	core run ended at 8:07, first core run on 4/22/07 T. Stewart/A. Bonilla are the loggers.
-	R5-NQ 5 ft 100%	87	2			moderately fossiliferous (cast up to 3/8"), trace black particles (possibly organics)	-
			1		Ħ	-	R5: 6 minutes
60_ -17.5_ 60.5			0	-		 60.5-65.5' - light olive gray to	_
			1	61.1, 62.0, 63.45' - Mechanical break or bedding plane (3), horizontal, rough,	Ħ	- moderate olive brown, (5Y 5/2 to 5Y 4/4), mild to moderate HCl reaction, very weak (R1), voids (<1/16")	SC-1 collected at 61.1-62'
-	R6-NQ		1	undulating, tight 62.4, 62.7, 63.0, 65.1, 65.4' - Mechanical	坩	- 20-25% of surface, poorly fossiliferous (casts up to 1/16" elongated), trace black particles,	-
-	5 ft 100%	100	1	break (5), tight		10%-15% organics as medium grain particles and laminations under 1/16" thick horizontally aligned, medium	-
-			0		崫	strong rock (R3), stress joints over 61.0-62.0' vertically oriented	R6: 9 minutes
65_ -22.5 65.5			0	-	田		_
-			0		Ħ	Limestone 65.5-70.3' - light olive gray to moderate olive brown, (5Y 5/2 to 5Y	T. Stewart is the logger.
-	D= 110		2	66.7' - Fracture, 40 deg, rough, undulating, tight 67.35' - Mechanical break or bedding plane,		4/4), mild HCl reaction, medium strong (R3), 1/8" voids on 15-20% of surface, some voids filled with hard,	-
-	R7-NQ 5 ft 96%	93	1	horizontal, rough, undulating, open up to 1/2" 68.3' - Fracture, vertical, rough, undulating,	峀	medium gray (N5) mineralization, poorly fossiliferous (casts up to 1/8" elongated)	-
			1	tight 68.65' - Fracture, 55-60 deg, rough, undulating, tight	圕	- -	
70 -27.5			1 NR	69.4' - Mechanical break, horizontal, rough, undulating, tight 70.05' - Fracture, 50-60 deg, rough,	Ħ	 - No Recovery 70.3-70.5'	R7: 10 minutes
			5	undulating, tight 70.6, 70.7, 70.8, 70.85, 71.5' - Mechanical break or bedding plane, horizontal, rough,		Limestone 70.5-74.1' - light olive gray mottled with olive gray, (5Y 5/2 with 5Y 3/2),	-
	D0.115		2	undulating, tight 10 1/8" open 71.2' - Fracture, 50 deg, rough, undulating, tight	峀	mild to moderate HCl reaction, strong (R4), extremely weak rock at top of sample, 1/16" voids on 10-15%	-
	R8-NQ 5 ft 72%	40	2	71.7' - Fracture, 30-40 deg, rough, undulating, carbonate silt infill over 100% surface 1/16" thick	Ħ	of surface, poorly fossiliferous, casts up to 1/2"	
			1	72.1' - Fracture or mechanical break, horizontal, up to 3/8" open 72.8' - Fracture or mechanical break,		_ No Recovery 74.1-75.5'	73.5' Got soft, hard again at 75.0'
75_ -32.5 75.5			NR	horizontal, rough, undulating, open 1/4" 73.1' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/4"	崮		R8: 12 minutes



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-11 SHEET 5 OF 15

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724091.7 N, 457813.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION: Vertical WATER LEVELS: 1.0 ft bgs on 4/22/07 START: 4/21/2007 END: 5/9/2007 LOGGER: T. Stewart, R. McComb, A. Bonilla DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 73.9' - Fracture, 70-80 deg, rough, T. Stewart/A. Bonilla are Limestone undulating, tight
75.5-75.85' - Fracture zone, rock fragments >10 75.5-79.5' - yellowish gray to light the loggers olive gray, (5Y 7/2 to 5Y 5/2), black 3/4", sub-angular, some granular mottling, strong HCI reaction, strong (R4), 1/8" spheroidal voids on mineralization on surface 1 77.1' - Fracture, 15-20 deg, rough, undulating, tight, black stains on 90% of 10-15% of surface, poorly fossiliferous (casts up to 5/16"), trace R9-NQ cavities up to 1" elongate and 62 3 surface 5 ft 77.6, 77.7, 77.9' - Fracture, horizontal, rough, horizontally aligned, no infill in voids or cavities, black 1/16" horizontal 80% undulating, open up to 1/4" SC-2 collected at 78.5-2 78.4-78.5 - Fracture zone, rough, undulating, laminations, vertical stress joints 1/16"-1/32" thick infill of very soft carbonate near 79', fractures with secondary black mineralization infill near 77.2' R9: 15 minutes 80 No Recovery 79.5-80.5' NR -37.5 Driller's Remark: Will set 80.5 3" NW casing from 45.5-Limestone 75.5' below ground surface 2 80.5-85.5' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild 80.85' - Bedding plane or fracture, 0-5 deg, Start R-10 at 11:36, rough, undulating, brownish black stains over observed 50-60% core loss 100% surface, open 1/4" HCl reaction, medium strong (R3), 4 81.35, 81.55, 81.65, 81.8' - Bedding plane or weathered, spheroidal 1/8" voids up mechanical break, horizontal, rough, planar, to 30% of surface, poorly open up to 1/8' fossiliferous (casts up to 1/2"), some R10-NO 2 82.0, 82.95' - Bedding plane or mechanical secondary mineral infill (yellowish 82 5 ft break (2), horizontal, rough, undulating, tight gray 5Y 8/1 in color), trace coarse 100% grained sized black particles to 1/4" open 82.8' - Bedding plane or mechanical break, 0 (organics) horizontal, rough, undulating, organic layers <1/16" thick, apparent weathering R10: 8 minutes 85 83.2' - Mechanical break, tight Add 1/4 bag bentonite to 1 $-42.\overline{5}$ 84.4' - Fracture, 80-90 deg, rough, 85.5 mud vat 85.5-90.5' - light olive gray, (5Y 5/2), moderate HCl reaction, medium strong (R3), spheroidal 1/8" voids up undulating, tight 85.45, 85.6' - Fracture (2), 50-60 deg, rough, 0 undulating to 15-20% of surface, moderately 0 fossiliferous (mostly casts of echinoderma up to 5/8", white whole fossils and fragments up to 3/4" in R11-NO 87.6' - Bedding plane, horizontal, rough, 3 size over bottom 89.5-90.5', 3-7% 85 5 ft undulating, brownish black infill 1/16" thick 100% medium to coarse grained black over 85% of surface fragments (organics) also as 3/8" 87.75' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/16"-1/8" long discontinuous laminations less 0 than 3/8" thick, also spiral and 88.0, 88.15' - Fracture (2), horizontal, rough, conical shaped casts up to 3/16" undulating, 1/8"-1" open 88.95, 89.5' - Mechanical break (2), tight R11: 6 minutes 90 0 SC-3 collected at 89.5--47.5 90.5 90.5 90.5-95.5' - yellowish gray with 14:12 Mix 1/8 bag mud to yellowish gray bedding, (5Y 8/1 with 5Y 7/2), silt-sized black particles, 0 vat 1/16" voids on 20-25% of surface. 91.65' - Bedding plane or mechanical break, highly fossiliferous toward bottom 1/3 of sample (casts and whole fossils) 1 rough, undulating, tight microforams and fossil fragments R12-NO 92.55' - Mechanical break, 3-5 deg, rough, undulating, tight 93.0' - Bedding plane, horizontal, smooth, 87 1 range from medium to coarse 5 ft 100% sand-sized particles, oval shaped planar, tight, possibly organic layer 93.6' - Fracture, 10-20 deg, rough, fossils approximately 1/8", spiral shaped fossils 3 undulating, 1/8" open 93.85, 94.3' - Fracture, 50-60 deg, rough, R12: 15 minutes >10 undulating, tight -52.5 95.5



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-11 SHEET 6 OF 15

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.7 N, 457813.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND FOUIPMENT: CME 550 S/N 186073, mud rotary, NO tools, NW casing

ORIENTATION · Vertical

CORING M	METHOD AN	ND E	QUIPN	IENT: CME 550 S/N 186073, mud rotary, NQ tools, NW	casing		ORIENTATION : Vertical
WATER LE	EVELS : 1.0	ft bg	s on 4	/22/07 START : 4/21/2007 END : 5/9	9/2007	7 LOGGER : T. Stewart, R. McCom	nb, A. Bonilla
200	-			DISCONTINUITIES	(J	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - - - - - - - - - - - - - - - -	R13-NQ 5 ft 100% 00.5 R14-NQ 5 ft 94%	43	3 >10 >10 2 0 1 1 0 0 0 1 1 0 0 0 0 0 0 0 0 0 0	94.45' - Fracture, 80-90 deg, rough, undulating, tight 94.8-95.2' - Fracture zone 95.55, 95.7, 96.75' - Bedding plane or mechanical break, horizontal, rough, undulating 97.5-98.2' - Fracture zone, vertical 98.55' - Fracture, 5-10 deg, rough, undulating, tight 98.65, 98.8' - Mechanical break (2), tight 99.0' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/8" open 102.0, 102.35' - Mechanical break or bedding plane (2), 3-5 deg, rough, undulating, open up to 1/8" 102.6' - Bedding plane or mechanical break, horizontal, rough, undulating		Limestone 95.5-100.5' - yellowish gray (5Y 7/2), strong HCI reaction, very weak rock (R1), highly fossiliferous (casts, molds up to 1/2", microforams), trace organics as coarse particles and 3/4" long/1/16" wide laminations, trace cavities rimmed with secondary mineralization, elongated 3/16"x1/16", 25% medium dark gray (N4) particles in rock matrix 95.5-98.4' friable in places due to fossils, majority of fossil content at 98.4-100.5' voids 5-10% up to 1/16", interval from 96.5-98.5' extremely weak rock (R0) 100.5-105.2' - yellowish gray (5Y 7/2), same sequence as R-13; spiral casts/molded (1/2"-5/8" size) in upper half (100.5-103.0'); less casts/molds in lower half, trace light olive gray (5Y 5/2) mottling at 104.0' in lower half (103.0-105.2'), upper half of R-14 not friable as is R-13	T. Stewart is the logger. R13: 6 minutes Driller's Remark: Will set 3" NW casing (25' more) Last core run on 4/22/07
105 -62.5	05.5		0 NR	- -		_ _ No Recovery 105.2-105.5'	R14: 8 minutes
- - - - - - - - - - - - - - - - - - -	R15-NQ 5 ft 98%	82	>10 2 1 2 0	105.5-106.1' - Fracture zone, fragments up to 2" 106.85' - Fracture, 60-70 deg, rough, undulating, tight 106.95' - Fracture, 20-30 deg, rough, undulating, tight 107.9, 109.05, 109.15' - Mechanical break or bedding plane (3), horizontal, rough, planar to undulating, open to 1/16"		Limestone 105.5-110.4' - yellowish gray, (5Y 7/2), very fine grained, strong HCI reaction, 1/16" spheroidal voids on 20-30% of surface, moderate to highly fossiliferous (casts, molds up to 1-1/2" long), majority of voids over first 2.5', rest of sample is 5-10% voids, trace irregular shaped casts up to 1/2" over first 2.5', no cavities below 107.9'; 15-20% medium grained medium dark gray particles in rock matrix, microforams up to 1/32", oval and spherical shaped molds/casts and very fine to fine	8:05 Start first core run of 4/23/07 Unable to get water level before coring start due to coring barrel being hung over night R15: 10 minutes
- - - - - - 115 -72.5	R16-NQ 5 ft 100%	97	0 2 1 0	112.15, 112.3' - Mechanical break or bedding plane (2), horizontal, rough, undulating, tight 113.0' - Mechanical break, tight 113.25' - Mechanical break or bedding plane, horizontal, rough, planar, open to 1/16"		grained (shell fragments) angular white particles No Recovery 110.4-110.5' Limestone 110.5-115.5' - Same as 105.5-110.4' except 1/16" spheroidal voids on 5-15% of surface, trace cavities up to 5/8" elongated - rimmed with yellowish gray (5Y 8/1) secondary mineralization, some cavities horizontally aligned in a 1/2" bed at 114.0'	R16: 10 minutes



PROJECT NUMBER: BORING NUMBER: 338884.FL A-11 SHEET 7 OF 15

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724091.7 N, 457813.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) $\underline{\mathsf{DRILLING}}\,\underline{\mathsf{CONTRACTOR}}\,:\underline{\mathsf{Un}}\underline{\mathsf{iversal}}\,\underline{\mathsf{Engineering}}\,\underline{\mathsf{Sciences}},\underline{\mathsf{Gainesville}},\underline{\mathsf{FL}};\underline{\mathsf{Driller}}.\,\underline{\mathsf{M}}.\,\underline{\mathsf{Boatright}};\underline{\mathsf{Cathead}}\,\underline{\mathsf{Operator}}.\,\underline{\mathsf{G.}}\,\underline{\mathsf{Davis}}$

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION: Vertical WATER LEVELS: 1.0 ft bgs on 4/22/07 START: 4/21/2007 END: 5/9/2007 LOGGER: T. Stewart, R. McComb, A. Bonilla DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS Limestone 0 115.5-120.5' - yellowish gray, (5Y SC-4 collected at 115.5-7/2), strong HCl reaction, very weak to extremely weak (R1 to R0), very 116.55' 116.55, 116.7' - Bedding plane or mechanical fossiliferous (casts, molds, >10 break, horizontal, rough, undulating, tight to microforams), trace cavities with medium dark gray infill up to 1-1/4", 25-35% medium to coarse grained open 1/4" R17-NQ 116.55-117.3' - Fracture zone 40 >10 5 ft 118.15-118.45' - Fracture zone medium dark gray particles in rock 100% 118.5, 118.65, 118.8, 188.95, 119.2' matrix, gray mottling in matrix at 7 Bedding plane or mechanical break (5), 119.0' horizontal, rough, undulating, tight to open R17: 9 minutes 120 2 119.45' - Fractures (2), horizontal and -77.5 vertical, rough, undulating, perpendicular, 120.5 tiaht No Recovery 120.5-121.0' 9:25 Add 1/4 bag bentonite NR 119.6, 119.8' - Bedding plane or mechanical break (2), 0-5 deg, rough, planar, tight after emptying mud vat and Carbonate Silt With Silica Sand 1 refilling (ML) 121.0-121.2' - grayish yellow, (5Y 7/2), wet, strong HCl reaction, 121.2' - Bedding plane, horizontal, cohesive silt infill on surface, 1/4" thick 1 121.8, 122.8' - Mechanical break (2), tight 15-25% very fine to fine grained, R18-NO clear, subrounded, silica sands, 70 1 5 ft 3-7% very fine to fine grained dark 90% 123.2' - Bedding plane or mechanical break, yellowish orange (10YR 6/6) and light horizontal, rough, undulating, open 3/8" 123.6, 123.63, 123.65, 123.7, 123.75, 123.8, 124.0, 124.02' - Bedding plane or mechanical brown (5YR 5/6) particles 6 Limestone 121.2-125.5' - yellowish gray, (5Y break (8), horizontal, rough, planar, tight, R18: 13 minutes 125 7/2), strong HCl reaction, very 0 dark surfaces, possibly bedding plane of dark $-82.\overline{5}$ fossiliferous (microforams, fossil 125.5 material casts and molds), thinly bedded near 123.5-124.0' with olive gray staining, 1 organic odor from crumbled rock, friable from 121.2' to 123.0', trace 126.4, 127.05' - Bedding plane or mechanical cavities up to 3/4" some with white break (2), horizontal, rough, undulating, tight 2 mineralization as 50% infill (rimmed), to 1/4" open medium dark gray medium to coarse grained on 25-35% of rock matrix 127.5-127.65' - Fracture zone, rock R19-NQ 5 77 fragments 5 ft 125.5-130.5' - yellowish gray, (5Y 7/2), strong HCl reaction, very weak 100% 128.0-128.15' - Fracture zone, angular rock fragments, 1/2"-5/8" (R1), voids (<1/16") over 15-20% (mostly over top 3'), 1/16"x3/16" 128.25, 128.35, 129.0' - Fracture (3), 1 horizontal and vertical, rough, undulating, open up to 3/4", cavity infilled with gray material at 129' elongated trace cavities horizontally R19: 10 minutes aligned, cavities in lower 2' have 130 >10 white secondary mineralization -87.5 129.35' - Bedding plane, 10-15 deg, open 130.5 rimming the outside of the 3/4" void/cavity, medium dark gray 130.0-130.5' - Fracture zone, vertical 6 particles up to 10% of rock matrix, 130.55' - Mechanical break or bedding plane, trace medium gray cavities up to 3/4" horizontal, smooth, undulating, open 1/8" and to trace medium grained black 131.0' - Mechanical break or bedding plane, 4 particles/organics throughout entire horizontal, rough, undulating 131.3, 131.35, 131.4, 131.5, 131.65, 131.7, 131.8' - Bedding plane or mechanical run; R-19 is highly fossiliferous (microforams and casts/molds) R20-NC 1 5 ft 65 break (8), horizontal, rough, undulating, open 98% 132.1, 133.0' - Mechanical break (2), tight 5 132.55' - Bedding plane or mechanical break, horizontal, rough, planar R20: 11 minutes 135 2 133.0' - Mechanical break, tight -92.5 135.5



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-11	SHEET	8	OF	15	

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.7 N, 457813.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

				IEINT : ONE 330 3/N 100073, Midd Totally, NQ tools, NV		-	ORIENTATION: Vertical
WATER	LEVELS : 1.0) ft bg:	s on 4		9/200	·	
≥0≎	(%)			DISCONTINUITIES	FOG	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	2	ROCK TYPE, COLOR,	0175 4115 555711 05 0401110
ᆱᆼ	Ş,H A,R	(%) О	N N		1 🖺	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
F A A	SE F SOV) O	P	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	₩	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	SOR	A Q	-RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
В 07 Ш	014		NR/	122 G! Dodding plane 0 E dog rough	0,	Limestana	
_			1	133.6' - Bedding plane, 0-5 deg, rough, undulating, tight	Ш	Limestone - 130.5-133.65' - yellowish gray, (5Y	
			·	134.1, 134.35, 134.45, 134.5, 134.8' -	ш	7/2), strong HCl reaction, very weak	1
-				Bedding plane (5), horizontal, rough, planar,	Н	to weak (R1 to R2), grades from a	1 1
-			1	open 1/16" -	Н	 very lightly fossiliferous 	1 -
-				134.6' - Bedding plane, 0-5 deg, rough,	Ш	(microforams, molds) to a thinly	1 -
	R21-NG			undulating, open to 1/16" 135.75' - Bedding plane or mechanical break,	Н	bedded and laminated very fine	1
-	5 ft 94%	72	1	horizontal, rough, undulating, open 1/2"	Н	 grained limestone. 130.5-133.65': echinoid and 	SC-5 collected at 138-
-	3470			137.1' - Fracture, 70 deg, rough, undulating,	Ш	microform rich, trace elongated	138.85'
-			1	tight -	Н	- cavities rimmed with white hard	-
				138.0' - Bedding plane or mechanical break,	Н	mineralization 3/8"x1/8", up to 25%	1
140			>10	horizontal, rough, planar, tight	Ш	medium grained medium dark gray	R21: 10 minutes
-97.5				138.85' - Mechanical break —	H	(N4) particles in matrix; very fine	Driller's Remark: 139.5' —
_	140.5		NR	139.2' - Bedding plane or mechanical break, horizontal, rough, planar, top of fractured	ᡛ╣	grained wavy thinly bedded discontinuity at 133.65'	Started losing water rapidly
_			>10	zone, 2" open	Д	133.65-135.4' - yellowish gray to light	
			10	139.5' - Fracture, vertical, rough, undulating	H	olive gray, (5Y 7/2 to 5Y 5/2), thinly	
-				139.65-139.9' - Fracture zone, subrounded	т	bedded to laminated and alternating	1 1
-			2	1/2"- 1-1/8" fragments, black stains over 80%	Ш	beds, wavy thinly bedded	1 -
I _				of surface 139.95' - Fracture, 70-80 deg, rough,	Н	discontinuity at 135.2' (load structures) interval, microforams,]
	R22-NG			undulating, black stains over 25% of surface,	Н	_ medium dark gray (N4) particles as	1
-	5 ft 100%	80	2	tight	Ш	above	SC-6 collected at 143.1-
-	100 /0			140.15-141.25' - Fracture zone, brownish	Н	No Recovery 135.4-135.5'	143.9'
-			1	black staining on fragments, possibly	Н	Limestone	l
				weathered	Ш	135.5-139.2' - yellowish gray to	Driller's Remark: 50-75% circulation loss -
145				142.1' - Bedding plane, 10 deg, smooth, undulating, organic layer, 1/16"	Н	yellowish gray, (5Y 7/2 to 5Y 8/1), yery fine grained, strong HCl	R22: 8 minutes
-102.5			1	142.4-142.5' - Fracture zone, brownish black		reaction, medium dark gray (N4)	
-	145.5			stains over 40% surface	ш	particles on 15-20% of surface, trace	1 -
-			1	143.1' - Bedding plane, horizontal, rough,	H	olive gray (5Y 3/2) laminations and	
				undulating, brownish black stains over 80%		wavy bedded discontinuities at 137.5'	
1 7				surface, 1/16" open 143.9' - Bedding plane, 0-5 deg, rough,	Ш	139.2-140.2' - strong HCl reaction, strong (R4), white with yellowish gray] 1
-			0	stepped, tight	H	(5Y 8/1) cavity infilling, 1-1/2"	1
-				145.2' - Bedding plane or mechanical break,		- irregularly shaped cavities, poorly	1
	R23-NQ 5 ft	100	0	0-9 deg, rough, undulating, 1/4"	Щ	fossiliferous (casts-spiral shaped up	
1 7	5 π 100%	100	١	146.4' - Bedding plane or mechanical break,	Н	to 3/4" length), trace medium grained	1
-	.5570			horizontal, rough, undulating, tight	口	- black particles (organics)	1
-			2	148.0, 148.35, 148.5' - Mechanical break, tight	╀┦	No Recovery 140.2-140.5' Limestone	
				148.9' - Bedding plane, horizontal, 3/8" infill -	H	- 140.5-143.1' - Same as 139.2-140.2'	1
150			_	149.0' - Bedding plane, 0-10 deg, rough,	\Box	except mottled light gray (N7) over	R23: 8 minutes
-107.5	150.5		1	undulating, tight to 1/4" open	\mathbb{H}	40% of run, trace organics as wavy	7
-	130.5			150.0' - Fracture, 60 deg, rough, undulating,	丗	- laminations 3/16", 1/16" spheroidal	1
-			3	tight 150.7' - Fracture, 70 deg, rough, undulating,	\Box	voids infilled 10-15% 143.1-145.5' - yellowish gray, (5Y	-
				tight - Fracture, 70 deg, rough, undulating,	Н	- 7/2), strong HCl reaction, strong]
				141.4, 151.5' - Bedding plane (2), horizontal,	Ш	(R4), bedded, up to 1/8" voids up to	1
-			4	rough, planar, tight	\vdash	25% of surface (may be microforams	1
-	R24-NC	l		151.65' - Bedding plane, horizontal, rough,	╀┤	as casts), trace casts of echinoderm	
-	5 ft	! 38	1	planar, open 3/4", infill of soft fines 152.15, 152.45' - Bedding plane (2),	Ш	fragments, wavy laminations T 145.5-149.0' - yellowish gray, (5Y	
	96%			horizontal and 5 deg, rough, undulating, open	$\vdash\vdash$	7/2), strong HCl reaction, medium	
1 7				1/16"-3/8", silt infill at 152.15	1 + 1	grained texture, 5-10% elongated	1
-			4	152.75' - Fracture, horizontal, rough,	団	cavities (up to 3/4"x1/8") horizontally	
-				undulating, tight to open 1/4"	$\vdash\vdash$	aligned and infilled with hard medium	DOM: 7 minutes
155_			5	153.6-154.95 - Bedding plane (9), horizontal,	┟┼┤	to light gray (N6) mineral, trace voids	R24: 7 minutes
-112.5	155.5			rough, undulating to planar, 1/16"-1/4" open	Ш	1/8"x1/16" rimmed with white mineral	7
	. 50.0				Н		
							1

APPENDIX 2BB-123 Rev. 7



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-11 SHEET 9 OF 15

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.7 N, 457813.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, NO tools, NW casing

ORIENTATION · Vertical

CORING METHOD A	ND E	QUIPN	IENT : CME 550 S/N 186073, mud rotary, NQ tools, NW	casin	g	ORIENTATION : Vertical
WATER LEVELS : 1.0	0 ft bg	s on 4	22/07 START: 4/21/2007 END: 5	9/200	7 LOGGER: T. Stewart, R. McCor	nb, A. Bonilla
			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft) CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
R25-NC 5 ft 64% 160 -117.5 160.5	\text{\frac{\sigma}{\chi}} 0	NR NA 20 0 2 5 4 3 NR 2 3 1 2 2 4 1 3 4	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS 159.9' - Bedding plane, 0-10 deg, rough, planar, contact with silica sand above 160.1' - Bedding plane, 10 deg 161.6, 162.4, 162.57' - Fracture (3), horizontal, rough, undulating, tight 162.75, 162.95, 163.0, 163.35, 164.25, 164.3, 164.5, 164.6, 164.73, 164.92' - Fracture (10), horizontal, smooth, planar, open 163.65' - Fracture, horizontal, rough, stepped, open 164.3-164.5' - Fracture, vertical, stepped, open 165.77' - Fracture, horizontal, rough, undulating, open 166.95, 167.7' - Fracture, horizontal, rough, undulating, open 166.95, 167.7' - Fracture (2), <5 deg, smooth, undulating, tight 168.4, 169.51' - Fracture (2), 10 deg and 10-20 deg, smooth, planar, tight 168.58' - Fracture, horizontal, rough, undulating, open 1/16", silty clayey lining over 80%-90% of surface 169.8' - Fracture, horizontal, rough, undulating, open 1/16", silty clayey lining over 80%-90% of surface 170.95' - Fracture, horizontal, smooth, undulating, tight, <1/16" brown clay lining over surface 170.95' - Fracture, horizontal, smooth, undulating, tight, <1/16" brown clay lining over surface 170.95' - Fracture, horizontal, smooth, planar, open, <1/16" silty coating over 100% of surface 171.17' - Fracture, smooth, planar, open, <1/16" silty coating over 100% of surface 171.5' - Fracture, 40 deg, rough, stepped, tight		AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC. T. Stewart/R. McComb are the loggers. Driller's Remark: Will add 3" NW casing to seal off sand Driller's Remark: 100% circulation loss On the field log the interval that was not recovered (155.5-157.3") appears to be from the top of the core R25: 14 minutes SC-7 collected at 160.5-161.6' 9:49, 5/1/07 Water level 4.5' below ground surface 7:50, 5/8/07 Water level approximately 3' below ground surface Offset approximately 10' to west of A-11 and drill A-11R, lost bit in A-11; tried fishing for bit on 5/6/07 to no avail; offset A-11 on 5/7/07, drilled 4-7/8" borehole to 160', set NW casing at 160.5' R26: 5 minutes
175 -132.5 175.5		3	172.2' - Fracture, 60 deg, rough, undulating, tight, length is from 172.0-172.9'		rock), fractures in 163.7-164.2' — interval, trace organic laminae at 163.2'	R28: 7 minutes
				L		

APPENDIX 2BB-124 Rev. 7



PROJECT NUMBER:

338884.FL BORING NUMBER:

A-11 SHEET 10 OF 15

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.7 N, 457813.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

WATER	LEVELS : 1.0) ft bg:	s on 4/	22/07 START : 4/21/2007 END : 5/9	9/2007	7 LOGGER : T. Stewart, R. McCon	nb, A. Bonilla
₹ ₽₽	(%)			DISCONTINUITIES	၂၀	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-	014		NR)	173.15' - Fracture, horizontal, smooth, undulating, open - 173.7' - Fracture, <5 deg, smooth, stepped,		No Recovery 165.15-165.5' Limestone 165.5-166.1' - moderate olive brown,	
-	R29-NQ		1	tight 174.08, 174.2, 174.35, 164.55' - Fracture (4), horizontal, smooth, planar, tight (open at 174.35)		(5Y 4/4), strong HCl reaction, laminated, voids up to 3/8" to 3/4" covering 50-60% of surface, some cavity infilling with gray limestone	
-	5 ft 94%	51	10	174.7' - Fracture, horizontal, smooth, planar, open, <1/16" thick brown clay over 100% of surface		 (nodules/intraclasts), trace fossil molds and casts 166.1-166.8' - yellowish gray to very 	
180_			>10	175.1' - Fracture, <5 deg, rough, stepped, open 175.6' - Fracture, <5 deg, smooth, stepped, open, dark brown to black stain over —		 light gray, (5Y 7/2 to N8), very fine grained, strong HCl reaction, 1/16" voids on 5-10% of surface, cavities (>5) 3/8"x3/16", fossil casts/molds 	R29: 6 minutes
-137 <u>.</u> 5 - -	180.5		NR 1	95%-100% surface 176.1' - Fracture, horizontal, rough, stepped, open		common 166.8-170.5' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine	
-			3	177.1' - Fracture, horizontal, smooth, planar, tight 177.6, 177.7, 177.82' - Fracture (3), horizontal and <10 deg, smooth, planar, tight		to very fine grained, moderate to strong HCI reaction, becoming stronger with depth (up to R2), voids up to 1/16" on 15-25% of surface	
-	R30-NQ 5 ft 100%	46	2	177.9' - Fracture, 0-40 deg, smooth, stepped, open, dark brown/black stain over 40% 178.1-178.4' - Fracture zone, 0-60 deg,		with some zones of very fine grained limestone with 0% voids, cavities rare, laminated from 167.6-167.8'	
- -			4	rough, undulating, open 178.55' - Fracture, <5 deg, smooth, undulating, open 179.17' - Fracture, horizontal, rough,		 (very weak rock [R1]), some brownish gray to light gray mottling especially from 168.7-169.3' 170.5-175.1' - dusky yellow to 	R30: 9 minutes
185 <u> </u>	185.5		3	stepped, open 179.25-181.2' - Fracture zone, rough to smooth, planar to undulating, open to tight		 yellowish gray, (5Y 6/4 to 5Y 7/2), moderate to strong HCl reaction, voids up to 1/16" over 10-15% of 	- Nov. 9 Illillules
-			4	180.8' - Fracture, <5 deg, rough, stepped, open 181.8, 181.87' - Fracture (2), horizontal, smooth, planar, open		surface, 3/8"x3/16" cavities, trace fossil molds//casts, laminated at 171.0', fine grained with occasional thin beds of very fine grained	
-	R31-NQ 5 ft	62	7	182.0' - Fracture, 0-90 deg, smooth, undulating, tight 182.6' - Fracture, <5 deg, rough, undulating,		limestone with few voids especially near base of interval 175.1-175.4' - dusky yellow, (5Y 6/4),	
- -	99%	02	1	open 182.95' - Fracture, 40 deg, rough, undulating to stepped, tight 183.65, 184.4, 186.4' - Fracture (3),		strong HCl reaction, laminated with black organic laminae, minimum voids and cavities covering 50-60% of surface	
190 <u>-</u> -147.5	190.5		5	horizontal, rough, undulating, open 183.8' - Fracture, 0-<5 deg, smooth, planar to stepped, open		 No Recovery 175.4-175.5' Limestone 175.5-180.2' - variegated dusky 	R31: 8 minutes
-	130.5		NR) 4	184.17' - Fracture, horizontal, smooth, planar, tight 184.93, 185.2' - Fracture, rough, undulating, tight		 yellow to light olive brown, (5Y 6/4 to 5Y 5/6), fine grained, moderate to strong HCl reaction, very weak (R1), light gray mottling (N8), fine grained 	End drilling on 5/8/07 Water level 3.5' below
- - -	D20 NO		3	185.25' - Fracture, 40-50 deg, rough, undulating, tight 185.95, 186.0' - Fracture, horizontal, smooth,		limestone especially from 176.8-177.8', voids (1/16") common in fine grained material up to 15-20%	ground surface on 5/9/07 Begin drilling at 190.5' on 5/9/07 SC-8 collected at 191.15-
-	R32-NQ 5 ft 90%	40	2	open 186-186.4' - Fracture, vertical, rough, undulating, tight 186.4' - Fracture, horizontal, rough,		of surface, some cavities up to 3/8"-3/4"x3/8" deep, voids 1-3% in very fine grained material, some cavity infilling, laminated very weak	192'
- - 195			4 >10	undulating, open 186.6, 186.7' - Fracture, <5 deg, rough, undulating, open		rock from 177.9-180.2' with black carbonaceous material No Recovery 180.2-180.5'	R32: 6 minutes
-152.5	195.5		NR	186.95' - Fracture, <5 deg, rough, stepped, — open	Ħ		_
	195.5		_	undulating, open 186.95' - Fracture, <5 deg, rough, stepped, —			R32: 6 minutes

APPENDIX 2BB-125 Rev. 7



PROJECT NUMBER: BORING NUMBER: 338884.FL A-11 SHEET 11 OF 15

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724091.7 N, 457813.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) $\underline{\mathsf{DRILLING}}\,\underline{\mathsf{CONTRACTOR}}\,:\underline{\mathsf{Un}}\underline{\mathsf{iversal}}\,\underline{\mathsf{Engineering}}\,\underline{\mathsf{Sciences}},\underline{\mathsf{Gainesville}},\underline{\mathsf{FL}};\underline{\mathsf{Driller}}.\,\underline{\mathsf{M}}.\,\underline{\mathsf{Boatright}};\underline{\mathsf{Cathead}}\,\underline{\mathsf{Operator}}.\,\underline{\mathsf{G.}}\,\underline{\mathsf{Davis}}$

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION: Vertical WATER LEVELS: 1.0 ft bgs on 4/22/07 START: 4/21/2007 END: 5/9/2007 LOGGER: T. Stewart, R. McComb, A. Bonilla DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR. SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD <u>0</u> MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 187.05-187.2' - Fracture zone, horizontal, Limestone 2 rough to smooth, planar, open 180.5-180.9' - yellowish gray, (5Y 187.8, 188.0, 188.51' - Mechanical break 7/2), very fine grained, moderate HCI 188.51' - Fracture, <5 deg, rough, undulating reaction, weak to medium strong (R2 2 to stepped, open, black carbonaceous to R3), voids/cavities absent to <1%, Driller's Remark: 197' 50% fossils absent 180.9-181.6' - variegated light olive brown with thin very dark gray/black material over 40% in upper surface loss of circulation 189.55' - Fracture, <5 deg, rough, stepped, R33-NQ 54 3 open 5 ft 189.65, 190.65, 190.8, 190.97' - Fracture (4), carbonaceous/organic laminae, very 100% weak rock (R1), <1/16" voids over 10-15% of surface, cavities absent horizontal, smooth, planar, open >10 189.96' - Fracture, <5 deg, rough, undulating, tight 181.6-183.8' - dusky yellow to 190.05' - Fracture, horizontal, smooth, planar, yellowish gray, (5Y 6/4 to 5Y 7/2), R33: 6 minutes 200 open, black carbonaceous material on 30% moderate HCl reaction, voids 6 157.5 covering 50-60% up to cavity size 200.5 190.15' - Fracture, <5 deg and 30 deg, rough, ranging from 3/4" to 1-3/16"x1/8" to undulating, open , fossil voids and casts common >10 with some clasts/nodules/cavity 191.15' - Fracture, horizontal, smooth, planar, 183.8-185.5' - yellowish gray, (5Y 7/2), fine grained, moderate to strong HCI reaction, weak to medium strong tiaht 191.95, 192.65, 194.05' - Fracture (3), 30 deg >10 and 40 deg, rough, undulating, open 192.3, 192.4' - Fracture (2), <5 deg, rough, R34-NO (R2 to R3), variegated very light gray undulating, open >10 0 5 ft 193.4' - Fracture, 20 deg, rough, undulating, (N8), predominantly very fine grained 60% open with some fine grained thin beds and laminae, voids on 20-30% of surface, 193.55' - Fracture, 70-80 deg, rough, stepped, open voids on 1-2% of surface in very fine NR 194.55-194.85' - Fracture zone, gravel grained materials R34. 4 minutes 185.5-187.8' - yellowish gray with very light gray mottling, (5Y 7/2 with 205 194.85, 195.5' - Fracture (2), horizontal, -162.5 rough, undulating, open and tight 205.5 196.25' - Fracture, 50 deg, rough, undulating, N8), moderate to strong HCI reaction, fine to very fine grained open >10 nodules, voids and cavities up to . 197.3' - Fracture. <5 deg. rough, stepped. 3/8"-3/4"x3/16"-3/8' over 50-60% of tiaht >10 surface, voids in very fine grained intervals on 3-5% of surface, fossil 197.43, 197.65' - Fracture (2), horizontal and <5 deg, smooth, undulating, tight Note: Not sure where voids/casts common, abundant 197.8' - Fracture, horizontal, smooth, planar. missing intervals actually R35-NO cavities 70-80% from 187.2-187.75 occur, assumed missing tiaht 0 5 ft 198.25' - Fracture, <5 deg, smooth, 187.8-188.93' - yellowish gray, (5Y interval from bottom of 30% 7/2), black and dark gray mottled, undulating to planar, open core run, however, texture NR 198.5-199.60' - Fracture zone, 0-90 deg, very fine grained, moderate to strong of limestone very variable rough, undulating to stepped, open HCl reaction, laminated (black indicating that missing 199.68' - Fracture, 40 deg, rough, undulating, carbonaceous /organic laminae), zones are interspersed voids over 5-10% of surface throughout interval 210 -167.5 200.07' - Fracture, smooth, stepped to 188.93-190.45' - Same as R35: 4 minutes 210.5 planar, tight 200.17-200.3' - Fracture zone, <5-90 deg, 185.50-187.8' except thinly bedded very fine to fine grained >10 No Recovery 190.45-190.5' rough, stepped, tight 202.5-203.5' - Fracture zone, 0-90 deg, rough Limestone to smooth, planar to undulating, tight to open 190.5-195.0' - yellowish gray, (5Y 7/2), very fine grained, mild to moderate HCl reaction, chalk-like 3 205.5-206.7' - Fracture zone, 0-<5 deg, rough to smooth, planar to undulating, tight to open grained, voids and cavities up to R36-NO 206.7-207.0' - Fractures, 60-80 deg, rough to 9 5 ft 3/4"x3/16" covering 5-15% of smooth, planar to undulating, tight 10 64% 210.52-210.8' - Fracture zone, various surface, laminated in upper 0.5' fracture angles, rock fragments variegated browns and grays (few 210.8' - Fracture, 0-50 deg, rough, fossils voids/casts), becoming more undulating, open common with depth, becoming NR R36: 4 minutes 211.15-211.4' - Fracture zone, rough to coarse grained with depth 215 smooth, undulating to planar, gravel-sized No Recovery 195.0-195.5' -172.5 215.5 fragments, open



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-11 SHEET 12 OF 15

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.7 N, 457813.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION: Vertical

				TENT . CIVIE 330 3/N 1800/3, HILL TOTALLY, NO 10015, NVV			ORIENTATION : Vertical
WATER	LEVELS : 1.0	ft bg	s on 4		9/2007		
≥∩₽	, (9			DISCONTINUITIES	၂ ပ္	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	OUTE AND DEDTIL OF STREET
ᆱ끯뎓	AUN H,A	(%) Q	NRE TO		┪일 [MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YFA YFA	SGTE	0	CT.	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	l BC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
		a Q	-R/	THICKNESS, SURFACE STAINING, AND TIGHTNESS	l % l	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
				211.65' - Fracture, horizontal, smooth,	H	Limestone	
_			>10	undulating, tight	ш	- 195.5-197.5' - yellowish gray, (5Y	D MacCarab is the January
I _				211.8' - Fracture, horizontal, smooth, planar,	Н	_ 7/2), mild HCl reaction, void and	R. McComb is the logger.
			. 10	tight	ш	cavities up to 3/4" to 1-1/16"x1-3/16"	
			>10	212.3' - Fracture, horizontal, rough, undulating, open	Н	 to 3/4" on 20-30% of surface, voids and cavities less common with depth, 	1
-	R37-NQ		>10	212.5-212.7 and 212.85-212.95' - Fracture	ш	fossiliferous (molds and casts), some	-
-	5 ft	8	/10	zone, <5 deg, rough, undulating, open	ш	- thin carbonaceous laminae	218' circulation 100% loss
-	52%			213.4' - Fracture, <5-70 deg, rough, undulating, open	+	197.5-200.5' - yellowish gray, (5Y 7/2), very fine grained, very weak to	210 circulation 100 /0 1033
_				213.55' - Fracture, <5-90 deg, rough,		- weak (R1 to R2), 1/16" variable voids	_
			NR	undulating, open, black staining on 85-90%	Н	on 0-10% of surface, cavities rare	
220				of surface	Ш	(3/16"x3/16"), trace fossil	R37: 4 minutes
-177.5				215.5-215.75' - Fracture zone, various — fracture orientations, gravel-sized fragments,	Н	— molds/casts, very carbonaceous at 199.75-199.8' with thin occasional	_
-	220.5		\vdash	open	口	black laminae below	-
-			3	215.75' - Fracture, 0-<5 deg, rough, stepped,	₽₽	200.5-200.67' - very similar to	-
_				open 216.15' - Fracture, 0-40 deg, rough,	田	197.5-200.5', "chalky" with dark	
				undulating, open	Н	brown carbonaceous layers 200.67-202.8' - yellowish gray, (5Y	
-				216.15-217.1' - Fracture zone, horizontal,	т	7/2), mild HCl reaction, voids and	1
-	R38-NQ			rough to smooth, planar to undulating, open	Ш	cavities covering 80-90% surface up	-
-	5 ft	0		217.1' - Fracture, <5 deg, rough, undulating,	+	to several inches up to 3/4"-1-3/16",	-
-	15%		NR	open 217.3' - Fracture, 30 deg, rough, undulating,	ш	medium grained fossiliferous molds and casts conglomeratic from	-
				tight	Н	201.7-202.0'	_
				217.6-218.1' - Fracture zone, <5-70 deg,	ш	202.8-203.5' - yellowish gray, (5Y	
225				rough, undulating, open 220.6' - Fracture, <5-30 deg, rough, stepped, _	Н	7/2), very fine grained, mild HCl reaction, with laminae, 1/16" voids	R38: 4 minutes
-182.5	005.5			open	ш	over <1% of surface area	-
-	225.5			220.95, 221.2' - Fracture, <5 deg, rough,	ш	No Recovery 203.5-205.5'	-
-			>10	undulating, open	Ш	_ Limestone	2261 Dessin engrevimetely
_				225.5-228.0' - Fracture zone, 0-90 deg, rough to smooth, undulating, open	Н	205.5-207.0' - yellowish gray, (5Y - 7/2), very fine to fine grained, mild to	226' Regain approximately 20% circulation -
			>10	to smooth, undulating, open	Ш	moderate HCl reaction, voids	2070 0110010111
			/10		ш	variable from <1% to over 50%-60%	
-	R39-NQ		0		т	 of surface, very fine grained rock contains <1-5% voids 	1
-	5 ft	0	<u> </u>		口	No Recovery 207.0-210.5'	-
-	50%				╀╫	- Limestone	-
-					Ш	210.5-211.4' - yellowish gray, (5Y	-
			NR		\mathbb{H}	7/2), mild to no HCl reaction, voids up to 1/16" on 35-40% of surface,	
230						few 3/8"- 3/4"x3/8" cavities, trace	R39: 3 minutes
-187.5	230.5			_	14	fossils as voids/casts, very fine to	
-	230.0		>10	230.5-231.0' - Fracture zone, rock fragments	口	 fine grained, becoming very fine grained at bottom 0.1', little to no 	-
-			- 10		+	voids, no fossils, medium strong (R3)	-
-						- rock	-
					Щ	211.4-212.0' - yellowish gray, (5Y]
1					Ш	7/2), fine grained, no to mild HCl reaction, laminated with black]
1 7	R40-NQ					carbonaceous/organic material, thin]
-	5 ft 10%	0	NR		╁┼┤	vertical fracture extends from	-
-	10%		' '		田	_ 211.4-211.5'	-
-					+	_	-
					H	_	
235					Н		R40: 3 minutes
-192.5	235.5			_	Ш		
	_55.5				\Box		
					1		



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	Δ_11	CHEET	12	OE	15	

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.7 N, 457813.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

				EINT : CIVIL 330 3/11 100073, Hilla Totaly, NQ 10013, NV		<u> </u>	
WATER	LEVELS : 1.0	ft bgs	s on 4		9/200	•	r' 1
>00				DISCONTINUITIES	ڻ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		SI	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
HH HE	F, Y	(%	J. P. P.		1 2	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
ΪΫ́Ϋ́Ϋ́Υ	E F S	(%) Q	CTI	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	IBO	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
		S S	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	₹	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	014				H ,	212.0-212.7' - yellowish gray, (5Y	
I -				-		- 7/2), fine grained, friable, becoming	_
					ш	coarser grained with depth,	
				_	Н	voids/cavities up to	1
-				-		- 3/8"-3/4"x1-3/8"-3/4", voids over	-
-				-	₩	_ 30-40% of surface, very weak rock (R1)	-
I -	R41-NQ 5 ft	0	NR	_	Н	- Limestone	_
	0%		' ' '			212.7-213.7' - very similar to	
_				_	╨	210.5-211.4', fine to very fine	1
-				-	世	grained, fossil molds/casts common,	-
-				-	╁	becoming very fine grained at bottom 0.1' with little to no voids, no fossils,	R41: 2 minutes
240					╨	— approaching medium strong (R3)	R41. 2 minutes
-197.5	240.5					No Recovery 213.7-215.5'	
1	- 1			-	1—	Limestone	1
1 -				-		215.5-217.0' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction,	
I -				-	ш	very fine grained (chalk-like),	-
I .				_	Н	becoming laminated with depth	
						(black to dark gray	
-	R42-NQ			-	111	carbonaceous/organic laminae),	1
-	5 ft	0	NR	-	╁	voids and cavities were common	-
-	0%			-		from 216.6-217.0', voids over 0-1% above grading to 5-10% with depth,	-
l _					ш	cavities few, 3/8"x3/16", with fossil	
					П	molds/casts becoming more	
245				-	1—	common with depth, microfractures	R42: 2 minutes
-202.5					₩	(healed) abundant in upper 0.6' 217.0-218.1' - yellowish gray, (5Y	
-	245.5			-	匚	7/2), mild to moderate HCl reaction,	-
l .				_	Н	voids and cavities common (up to	
						several centimeters), fossiliferous	
-				-	ш	- (molds/casts) and worm burrows	1
-				-	\vdash	(unfilled-open), gastropods, forams No Recovery 218.1-220.5'	No special cores have
I -				<u>-</u>		Limestone	been pulled since SC-8
	R43-NQ 5 ft	0	NR		ш	220.5-221.25' - yellowish gray to very	because RQDs <0.8' (for a
	0%	U	INIX		Н	light gray, (5Y 7/2 to N8), moderate	continuous length)
1 -	• •			-	匚	- HCl reaction, 1/16" voids on 10-15%	1
-				-	₽	of surface, cavities (up to several centimeters), fossiliferous	-
I -				-		- (casts/molds) becoming less]
250_					\Box	common with depth, "chalk-like"	R43: 3 minutes
-207.5	250.5				\vdash	texture	1
I -	_55.5		>10	250.5-250.9' - Fracture zone, gravel-sized	仜	No Recovery 221.25-225.5' Limestone	-
-				rock fragments		225.5-228.0' - yellowish gray, (5Y	-
1 -				-		 7/2), fine grained, mild HCl reaction, 	_
					Ш	extremely weak (R0), becoming	
1				_	\vdash	more friable with depth, rock strength	1
1 -	R44-NQ			-		 decreases with depth, voids/cavities over 30-40% of surface, fossiliferous 	1
-	5 ft	0	ND	-	ш	casts/molds, occasionally laminated	-
1 -	8%		NR	_	\vdash	No Recovery 228.0-230.5']
					匚	-	
1					\vdash		1
				-	仜	-	R44: 5 minutes
255_ -212.5					厂	_	_
-2 12.5	255.5				\vdash		
1					1		l l



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-11 SHEET 14 OF 15

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.7 N, 457813.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION : Vertical

				MENT: CIME 550 S/N 186073, mud rotary, NQ tools, NW	casing		ORIENTATION : Vertical
WATER	LEVELS : 1.0) ft bgs	s on 4		9/200	·	I *
≥□₽	(%			DISCONTINUITIES	ا ي ا	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A B B C C C C C C C C C C C C C C C C C	E F F	(%) Q	F.0	DEPTH, TYPE, ORIENTATION, ROUGHNESS,] j	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FEV.	NG	Oρ	AC_ R F	PLANARITÝ, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
SCI	SHR	S.	유립	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	bitor 3, TEST RESULTS, ETC.
				255.5-256.1' - Fracture zone, gravel-sized	Ш	Limestone	
_			>10	rock fragments 256.1' - Fracture, <5-50 deg, rough, stepped,	\mathbb{H}	 230.5-231.0' - yellowish brown, (5YR 7/2), no to mild HCl reaction, 	-
-			40	open	П	gravel-sized fragments, cavities and	-
-			>10	256.3, 256.5' - Fracture (2), 0-60 deg, rough,	╂╫	 voids on 30-40% of surface, voids up 	-
_	D45 NO			stepped to undulating, open 256.5-256.7' - Fracture, vertical, rough,	\Box	to 3/16"x3/8", fossil voids/casts common	-
_	R45-NQ 5 ft	0		stepped, open	Н	- No Recovery 231.0-250.5'	
	34%			256.7' - Fracture (2), <5-60 deg, rough,	戸	Limestone	l .
			NR	stepped	Н	250.5-250.9' - yellowish gray, (5Y	
_				256.7-257.2' - Fracture zone, open, sand to gravel-size rock fragments	ш	 7/2), mild HCl reaction, fossiliferous (casts/molds), voids (<1/16") 	-
-				graver eize reek nagmente	H	covering 80-90% of surface	R45: 6 minutes
260_ -217.5				_		— No Recovery 250.9-255.5'	-
	260.5			260.5.261.25' Ergoture zone herizentel and		Limestone 255.5-256.1' - yellowish gray, (5Y	-
_			>10	260.5-261.35' - Fracture zone, horizontal and vertical, rough, undulating to stepped, open	Ш	_ 7/2), fine to very fine grained,	-
					Н	moderate to strong HCl reaction,	_
			1	261.5' - Fracture, <5 deg, rough, stepped,		voids on 20-30% of surface, rare voids in very fine grained limestone,	
1				open 261.55' - Fracture, 20 deg, rough, stepped,	\mathbb{H}	some fossil molds and casts	l -
-	R46-NQ			open	Ш	256.1-257.2' - yellowish gray, (5Y	-
-	5 ft	0		261.7' - Fracture, 20 deg, rough, undulating	H	 7/2), moderate to mild HCl reaction, extremely weak (R0), friable 	-
-	26%		NR	to stepped	口	becoming gravel to sand-sized	-
-			INIX		╀┤	_ limestone fragments with depth,	-
_					Ш	voids over 40-50% of surface No Recovery 257.2-260.5'	_
265					П	Limestone	R46: 5 minutes
-222.5	265.5				Н	260.5-261.8' - yellowish gray, (5Y	_
			10	265.5-265.7' - Fracture zone, rock fragments	Ш	7/2), laminated from 260.5-261.0', some bluish gray banding at	-
-				265.7' - Fracture, horizontal, rough,	Ш	261.5-261.6', very weak (R1) to	-
-				undulating, open 265.8' - Fracture, <5 deg, rough, undulating,	Ш	 extremely weak (R0), voids and 	-
_				tight	+	cavities rare in upper laminated section becoming common with	-
-						- depth, some fossil casts/molds	-
	R47-NQ 5 ft	0			Ш	No Recovery 261.8-265.5'	_
	8%		NR			Limestone	
1 1					\vdash	 265.5-265.9' - yellowish gray, (5Y 7/2), fine to very fine grained, mild 	·
						HCl reaction, very weak (R1), voids	l -
					╫	 and few cavities, very fine grained limestone containing few <5% voids, 	R47: 3 minutes
270_ -227.5				_	団	cavities 3/8"x3/16", trace fossil	
	270.5			270.5.271.25' Eractura zana variable	+	voids/casts	-
			>10	270.5-271.25' - Fracture zone, variable fracture orientation	H	No Recovery 265.9-270.5'	-
				271.25' - Fracture, 40 deg, smooth, planar,	Н	Limestone 270.5-271.9' - yellowish gray, (5Y	_
]				open	Ш	7/2), very fine grained, moderate HCI	l -
-			4	271.75' - Fracture, horizontal, smooth,	1	reaction, gravel-sized limestone to	-
-	R48-NQ			undulating to planar, open 272.0' - Fracture, 10 deg, smooth, planar,		 271.25', voids and cavities becoming more common with depth, sparse 	l -
-	5 ft	0	>10	tight	╂┴┤	through upper part of interval	-
-	70%		40	272.18' - Fracture, 40 deg, smooth, stepped,	口	-	-
			10	loose, conical in shape 272.35' - Fracture, horizontal, smooth,	H	_	-
				stepped, tight		_	
275			NR	272.5, 272.62, 272.73, 272.95, 273.03' -	$\vdash \vdash$		R48: 6 minutes
-232.5	275.5			Fracture (5), horizontal, smooth, planar, open —	\Box	_	_
	0.0				\Box		
				•	•		•

APPENDIX 2BB-129 Rev. 7



PROJECT NUMBER:	BORING NUMBER:			
338884.FL	A-11	SHEET	15 OF	15

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.7 N, 457813.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

00111110	WETTIOD 7		2011 11	MENT . CIVIE 350 3/N 186073, Mud Totally, NQ tools, NVV	oaon			ORIENTATION : Vertical
WATER	LEVELS: 1.0	ft bgs	s on 4	/22/07 START : 4/21/2007 END : 5/	9/200	L	OGGER: T. Stewart, R. McCon	nb, A. Bonilla
				DISCONTINUITIES	ניז		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		တ္	DESCRIPTION	SYMBOLIC LOG	DO	OCK TYPE, COLOR,	
HE HO	N. F. F.	(9)	器는	Beeditii Heit	윽		ERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
HENE	E SYE	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	8	WEAT	HERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
PR-R	RN E	Ø	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ		AND ROCK MASS HARACTERISTICS	DROPS, TEST RESULTS, ETC.
Δош	Olk	œ	шФ		S			
				273.18-273.6' - Fracture zone, variable	\vdash	Limestone		
1 7			>10	fracture orientations, limestone gravel	Т		0' - yellowish gray, (5Y rate to strong HCl	1 1
-			0	273.6' - Fracture, horizontal, smooth, undulating, tight	亡		ecoming stronger at	1
-			۲	273.8' - Fracture, <5 deg, rough, stepped	₽		8' (R2) and returning to	-
				273.8-274.0' - Fracture zone, various fracture	Н		rock below 273.8', very	
1 7	R49-NQ			angles, rock fragments			d (chalky), voids covering	1 1
1 -	5 ft	0		275.5-275.95' - Fracture zone, variable	╨		urface, laminated in upper	1 -
-	26%		NR	fracture orientation, rock fragments 275.95' - Fracture, <5 deg, rough, stepped,	╁┰		ice cavities (3/8"x3/8"), molds/casts, gravelly and	
			INIC	open		blue with so		
				276.3' - Fracture, <5 deg, rough, undulating,	Н		ous/organic material	
280				open	\Box	No Recove	ery 274.0-275.5'	R49: 4 minutes
-237.5				276.3-276.8' - Fracture zone, smooth to —	F	- Limestone		⊢
	280.5			rough, planar to undulating, variable fracture orientation, rock fragments	╀		8' - yellowish gray to very	1 -
			>10	280.5' - Fracture, <5 deg, rough, stepped,			5Y 7/2 to N8), fine to very d, mild to strong HCl	
1 7				open	\vdash		th gray thin bed at	1
-				280.5-281.8' - Fracture zone, numerous	╁	276.55', voi	ids and cavities common]
-			3	fractures, some vertical	╨		3/4"x3/16"-3/8", voids and	-
				282.2' - Fracture, <5-40 deg, rough, stepped,	╀		40-50% of surface, rock]
	R50-NQ			open	\vdash		N8 limestone where voids), fossil casts/molds,	
-	5 ft 64%	0	>10	282.75-283.15' - Fracture zone, 10 deg,	ш	strong HCl	reaction for very fine	1
-	0470		1	rough, planar, tight 282.75' - Fracture, <5 deg, rough, undulating,	╁	grained N8		-
_			\vdash	open			ery 276.8-280.5'	
				283.15' - Fracture, <5-90 deg, rough,		Limestone		
285			NR	stepped, open	Н		75' - yellowish gray, (5Y rained, mild to moderate	R50: 3 minutes
-242.5	005.5			283.33' - Fracture, 20 deg, rough, stepped, —	Ľ		n, voids and cavities	
-	285.5			tight	₽		ver 60-70% rock with	Total Depth is 285.5', no
					1		intraclastic limestone rock	special cores since SC-8,
							(darker gray) with cavity	no lengths >0.8'
1 7					1		vities 3/8"-3/4" to 3/16"- ferous (molds and casts)	1
-					1		3.7' - variegated pale blue	-
-					-	to yellowish	n gray, (5PB 7/2 to 5Y	
					1	7/2), fine to	medium grained, mild to	<u> </u>
					1		HCI reaction, becoming	
] [1		with depth, fossil s common in upper 0.3'] 1
-					1		s), voids and cavities	-
-					1	present (up	to several centimeters)	-
				_	1		ery 283.7-285.5'	
					1		Boring at 285.5 ft bgs on	7
1 1					1	5/9/2007		1 1
-					1			1
					4			1 -
1 7					1			1
-					1			-
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				-	_			

Rev. 7



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-12	SHEET	1	OF	10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724065.3 N, 457848.9 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8 tri-cone bit

ORIENTATION · Vertical

DRILLIN	G METH	DD AND	EQUIPM	ENT : CME 550 S	/N 186073, mud rotary, cathead, NW rods, 3-7/8 tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 5.3 ft bo	gs on 05/0	03/07	START : 5/2/2007 END : 5/4/2007 LOGGER : W. Elliott, R. McComb
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
BE-		RECOVE	RY (ft)	TEST NESOLIS	SOIL NAME, USCS GROUP SYMBOL, COLOR,
TH YEAC			#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR ONSISTENCY, SOIL STRUCTURE, MINERALOGY NINERALOGY NINERALOGY
SUI			<i>"</i> ···· <u>_</u>	(N)	\(\sigma \)
42.1	0.0				Poorly Graded Sand (SP)
		1.0	SS-1	1-2-2 (4)	0.0-0.8' - light gray, (N7), moist, very loose, very fine to fine grained, trace nonplastic fines, black (N1)
-	1.5			(+)	organic bed with plant roots at 0.2-0.3', sand is silica Monitoring at LNP site (FSAR Table
-					\ Silty Sand (SM)
-					\loose, very fine to fine grained, approximately 20% \
-					nonplastic fines, gradational contact with overlying material, sand is silica
-					material, sand is silica
-					- 1
-					-
5 37.1	5.0				Silty Sand (SM) Water table about 5' below ground surface
" -		٠	00 -	4-4-4	_ 5.0-5.5' - yellowish gray, (5YR 7/2), wet, loose, very
-		1.3	SS-2	(8)	fine to fine grained, grading more silty with depth, approximately 46% nonplastic fines, sand is silica
-	6.5				Lean Clay (CL)
_					\ 5.5-6.3' - light olive gray with dusky yellow mottling,
_					\(5YR 5/2 with 5YR 6/4), medium stiff, medium \(\)plasticity, no dilatancy, with increasing plasticity and \(\)-
					less sand at 6.0', 10% very fine grained silica sand
					1
					1
10	10.0				1
32.1					Silt (ML)
-		1.1	SS-3	20-29-50	10.0`-11.´1' - grayish orange, (10YR 7/4), wet to moist, hard, nonplastic, rapid dilatancy, moderate to strong
-	11.5			(79)	HCl reaction, 10-15% very fine grained sand, all
-	11.5				\carbonate \/ -
-					
-					- 1
-					-
-					-
-					
-					
15 <u> </u>	15.0 15.3	0.0	SC 4	50/2 F	No December 15 0 15 21
	13.3	0.0	SS-4	50/3.5 (50/3.5") /	No Recovery 15.0-15.3'
_				(<u> </u>
]
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-					1
20					<u> </u>
20					++
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PROJECT NUMBER:	BORING NUMBER:

338884.FL A-12

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724065.3 N, 457848.9 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8 tri-cone bit

ORIENTATION: Vertical

SHEET 2 OF 10

WATER LEVELS: 5.3 ft bgs on 05/03/07 START: 5/2/2007 END: 5/4/2007 LOGGER: W. Elliott, R. McComb										
WATER	LEVELS	: 5.3 Tt bg	gs on 05/0	J3/07 S	START : 5/2/2007	END : 5/4/2007	LOGGER	{ : vv.		
30≈				STANDARD		SOIL DESCRIPTION		g	COMMENTS	
NAN H	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COIL NAM	AE LICCO ODOLID CVMDOL	COLOR	O LC	DEDTIL OF CACING DOULING DATE	
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE	ERY (ft)		MOISTURE	ME, USCS GROUP SYMBOL E CONTENT, RELATIVE DE	, COLON, NSITY OR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND	
PT. EVA			#TYPE	6"-6"-6"		NCY, SOIL STRUCTURE, MI		MB	INSTRUMENTATION	
밀S급				(N)				S		
22.1	20.0				Silty Sand Wit	th Limestone (SM)				
		1.0	SS-5	24-21-22	fine to coarse	ayish orange, (10ÝR 7/4), grained, moderate HCl rea	wel, derise, - action 24%	111	_	
-	21.5			(43)	\ nonplastic fine	es, 30% fine to coarse grav	el sized (up	1.1.1.	-	
-	21.5					nts are very porous and for	ssiliferous, all / -	ł	-	
-					carbonate			ł	-	
_							-	Į I	_	
_							_		_	
							-	1	_	
-							-	1	-	
							-	1	-	
25 <u> </u>	25.0			40 =====	Silty Sand (SI	M)		7111	_	
'''		0.7	SS-6	12-50/4.5 (62/10.5")	25.0-25.7' - Sa	ame as 20.0-21.0' except 2	25-30% -		_	
I _	25.9			(02/10.5)	\nonplastic fine	es, 25% fine gravel sized	[-	1	_	
					`					
							-	1	_	
_							-	1	-	
-							-	┨	-	
-							-	┨	-	
_							-	1		
l _							_		Driller's Remark: Soft at 28.5'	
30	30.0						-	1	-	
12.1	00.0				Silty Sand Wit	th Gravel (SM)		111	_	
-		1.0	SS-7	20-11-15	30.0-31.0' - Sa	ame as 20.0-21.0' except o	lark yellowish -	111	-	
-		1.0	33-7	(26)	orange, mediu	ım dense			-	
_	31.5						-	1	_	
							_		_	
_							-	1	Driller's Remark: Harder at 32.5'	
_							-	1	-	
-							-	1	-	
-							-		-	
_							-		Dellarda Dansardu Osittala (NO. 105)	
35	35.0	100	00.0	50/1	No Bossies	25 0 25 1'	7	lacksquare	Driller's Remark: Switch to NQ at 35'	
7.1	35.1	/	SS-8 /	(50/1")	No Recovery	oring at 35.0 ft bas	/			
]				(55/1)	See the next s	oring at 35.0 ft bgs sheet for the rock core log	-		7	
-							-	1	-	
-							-	1	-	
-							-	1	-	
-							-		_	
_							-	1		
]							-		7	
-							-	1	7	
							-	1	-	
40								\vdash		



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-12

SHEET 3 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724065.3 N, 457848.9 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

00111110	WILTHOU / (I	ND L	ZOII IV	IENT: CME 550 S/N 186073, mud rotary, NQ tools, HW	casiii	<u> </u>	ORIENTATION : Vertical
WATER	LEVELS : 5.3	ft bas	s on 0	5/03/07 START : 5/2/2007 END : 5/4	1/2007	LOGGER : W. Elliott, R. McComb	
WALLE		, it ag		DISCONTINUITIES		LITHOLOGY	COMMENTS
≥□₽	CORE RUN, LENGTH, AND RECOVERY (%)			DISCONTINUITIES	ဗ္ဂ	LITIOLOGI	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	-ÿZ,>		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	OUZE AND DEDTIL OF GAGING
出병은	Ş ⁺ ∺	%	로 C		1 ≌ 1	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
±ĕ€	#ES	(%) Q	FS	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
989		Ø	ER A	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Z ∑	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	072	œ	Ы	THICKNESS, SORI ACE STAINING, AND HOTTINESS	S	CHARACTERISTICS	
7.1	35.0				ш	Limestone	HW casing set at 35'
-			2	35.4' - Fracture, <5 deg, rough, stepped,	Н	- 35.0-39.9' - moderate yellowish	-
l -				open _	Н	brown, (10YR 5/4), fine grained, mild	_
				35.6' - Fracture, 0-40 deg, rough, stepped,	ш	HCl reaction, very weak (R1),	
I -			3	tight -		becoming extremely weak (R0) and	1 1
-				36.05' - Fracture, 40-70 deg, rough, stepped,	ш	friable at 38.9-39.3', fossiliferous	-
	R1-NQ			approximately 0.3-0.4' long, open to tight	Н	molds and casts) with voids covering 50-60%, cavities >5 up to	
_	5 ft 98%	50	0	36.2' - Fracture, 40-70 deg, rough, stepped,	Н	3/8"-3/4"x3/16", mottled, less voids	1 1
-	90%			approximately 0.3-0.4' long, open to tight	ш	through extremely weak rock zone	-
l _			1	36.8' - Fracture, 30 deg, rough, undulating, tight	Ш	-	
			'	38.2' - Fracture, 70 deg, rough, undulating,	ш		
-				tight	Н	_	R1: 6 minutes
-			3	39.05, 39.25, 39.5' - Fractures (3), <5-90	Н	_	
40	40.0			deg, rough, stepped, tight to open			
2.1			NR.		Ш	No Recovery 39.9-40.0'	ı –
-			0	-	ш	_ Limestone	1 -
1					Н	40.0-43.2' - Same as 35.0-39.9'	
-				⁻	ш	except with interbeds of very weak to	1 1
-			2	-	ш	extremely weak (R1 to R0) rock at	1 -
l _				41.65' - Fracture, 60 deg, rough, stepped,	Ы	40.5-41.3'	
	R2-NQ			open	Н		
-	5 ft	8	>10	41.9' - Fracture, 40-60 deg, rough, stepped,	ш	_	1
-	64%			open 42.3-42.9' - Fracture zone, <5-90 deg, rough,	Ш	_	
l _				stepped to undulating, open	Н	No Recovery 43.2-45.0'	Driller's Remark: Very soft
				stepped to dilidulating, open	Ш	•	drilling at 43.5'
-			NR	-		-	R2: 3 minutes
-				-	ш	_	-
45	45.0				Ш		
-2.9				45.0-45.3' - Fracture zone, <5-90 deg, rough,		Limestone	
-			>2	stepped, open	ш	45.0-48.4' - moderate yellowish	1 1
-				45.65' - Fracture, horizontal, rough,	Н	brown, (10YR 5/4), fine grained, mild	1 -
				undulating, tight	ш	HCI reaction, very weak (R1),	
-			1	46.3' - Fracture, horizontal, rough, undulating, open	ш	 fossiliferous (casts/molds), voids typically up to 1/16" over 40-50%, 	1 1
-	R3-NQ			open -	Н	cavities (>5) up to	1 -
l _	5 ft	47	3	_	Н	- 1-3/16"-1-9/16"x3/8" (fossil casts),	
1	68%	.,		47.7' - Fracture, 10 deg, rough, planar, tight	Ш	cavities more common from	
1 -			3	47.8' - Fracture, 60 deg, rough, planar, tight		45.0-46.0'	1 1
-			ا ا	47.9' - Fracture, <5 deg, rough, undulating,	ш	No Recovery 48.4-50.0'	-
1				open	$\vdash\vdash$		
1 -			NR	48.0' - Fracture, 40 deg, rough, planar, open	Щ		R3: 3 minutes
I				48.2' - Fracture, <5 deg, rough, undulating,	Ш	-	1
50	50.0			open	$\vdash\vdash$	- ,. ,	_
-7.9			40	48.25' - Fracture, 80-90 deg, rough,	Н	Limestone	
1 -			10	undulating, tight	Ш	- 50.0-54.2' - Same as 45.0-48.4' except becoming mottled with] 1
-				undulating to stepped, open to tight	H	brownish gray patches of irregularly	-
-			1	-	Н	- distributed finer grained limestone	_
1			'		Н	a.c. ibatea infor granica infloatorio	
1 -	R4-NQ			51.9' - Fracture, 20-30 deg, rough,	口	-	1 1
-	5 ft	68	2	undulating, tight	ш	_] -
I _	84%			52.1' - Fracture, rough, undulating, tight	Н	_	SC-1 collected at 52.75-
				52.7' - Fracture, 30 deg, rough, stepped to undulating, tight, very soft on either side of	Щ		53.75'
1 -			1	fracture	Ш	-]
-				53.7' - Fracture, 40 deg, rough, stepped,	$\vdash\vdash$	_	D4: 4 minutes
				open	Н	No Recovery 54.2-55.0'	R4: 4 minutes
55	55.0		NR	·	Ш	-	1
					ш		
1							
							1



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-12	SHEET	4	OF	10

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724065.3 N, 457848.9 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing

WATER	LEVELS : 5.3	3 ft bas	s on 0	5/03/07 START : 5/2/2007 END : 5/	4/2007	7 LOGGER: W. Elliott, R. McComb	
				DISCONTINUITIES	П	LITHOLOGY	COMMENTS
AND (#	74N 0% 0%		ES	DESCRIPTION] [ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-12.9 -			10	55.0-55.6' - Fracture zone, 0-90 deg, rough, undulating to stepped, open to tight	Ħ	Limestone - 55.0-59.8' - Same as 50.0-54.2'	-
-	55.110		10	56.0-56.5' - Fracture zone, 0-90 deg, rough, undulating to stepped, open, very soft brown "clayey" infilling at 56.4-56.5'		except with very fine grained yellowish gray limestone at 55.7-55.9' (irregular), generally weak (R2) and free of voids and cavities compared with adjacent rock, very weak (R1)	- - -
-	R5-NQ 5 ft 96%	64	2	57.45' - Fracture, 50 deg, rough, stepped, tight, black organics over 10-15% of surface	Ħ	 with thin friable zone of extremely weak rock (R0), adjacent to some 	_
_			1	57.65' - Fracture, 10 deg, rough, stepped, open, black organics over 5% surface	Ħ	fracture traces	-
-	00.0		2	59.3' - Fracture, horizontal, rough, undulating,	Ħ	- -	R5: 6 minutes
-17.9	60.0		NR.	tight	Ħ	No Recovery 59.8-60.0' Limestone	_
-			0	fine grained sandy carbonate covering 100% of surfaces	Ħ	60.0-61.5' - Same as 55.0-59.8'	- -
-	Do No		1	61.55' - Fracture, 0-50 deg, rough, stepped, open	Ħ	- 61.5-62.3' - moderate yellowish - brown, (10YR 5/4), mild to no HCl	- -
-	R6-NQ 5 ft 96%	20	10	62.0-62.9' - Fracture zone, 0-90 deg, rough, stepped, open to tight, soft clay at 62.1' and 62.3' lining fracture trace		reaction, extremely weak to very weak (R0 to R1), cavities <1-3%, fossils (casts/molds) absent, thinly	SC-2 collected at 63.1- 64.1'
-			0	02.5 lifting fracture trace	\boxplus	laminated, mottled. 62.3-64.0' - moderate yellowish	-
-			0		\exists	 brown, (10YR 5/4), fine to very fine grained, weak to medium strong (R2 to R3), voids up to 1/16" over 5-10%, 	R6: 7 minutes
-22.9	65.0		NR_	_	H	— few cavities up to 3/16"x3/16", trace fossil molds/casts.	_
_			1	65.75' - Fracture, smooth, planar, tight,	囯	64.0-64.8' - Same as 62.3-64.0' - except very weak (R1), thinly	-
-			10	horizontal 66.2-67.1' - Fracture zone, 80 deg, smooth, undulating, dominated by fracture trace	H	laminated at 64.2' (possible organics), trace fine grained stronger rock	-
-	R7-NQ 5 ft 100%	50	10	inclined approximately 80 deg from 66.2-68.1', with horizontal fracture at 66.2'	Ħ	No Recovery 64.8-65.0' Limestone	- -
-	100 70		3	67.3-68.1' - Fracture zone, 80-90 deg, rough, undulating, tight to open 68.55' - Fracture, horizontal, rough,		65.0-69.35' - moderate yellowish brown, (10YR 5/4), fine to very fine grained, moderate HCl reaction, very weak to weak (R1 to R2), voids	- -
70	70.0		3	undulating, open 68.6' - Fracture, 50 deg, rough, stepped, open	H	(generally 1/16" or less) over 10-30%, more dense at 65.0-66.0' and 68.5-69.35', cavities more	R7: 5 minutes
-27.9			2	69.35' - Fracture, 40 deg, rough, undulating, tight 69.65' - Fracture, horizontal, rough, stepped,		abundant in same two intervals up to 3/4"-1-3/16"x3/8", some mottling,	-
-			1	open 69.8-70.0' - Fracture, 0-90 deg, rough, stepped, open		 possible void with cavity infilling at 68.5-69.35', very weak (R1) zone at approximately 66.0' 	- -
-	R8-NQ 5 ft	78	2	70.2' - Fracture, 0-90 deg, smooth, stepped, open 70.65' - Fracture, 70 deg, rough, undulating,	Ħ	69.35-70.0' - moderate yellowish brown, (10YR 5/4), very fine grained, moderate HCl reaction, weak (R2),	-
-	98%		1	tight 71.85' - Fracture, 10 deg, smooth, undulating,	Ħ	thinly laminated, with trace very fine grain limestone rock nodules up to 1/8" voids become more common	Driller's Remark: 80% loss of circulation water at 75'
-			2	tight 72.15' - Fracture, 40 deg, rough, stepped, open	뒴	with depth from <1% up to 10-15%	R8: 13 minutes
75	75.0				\blacksquare		
I							

APPENDIX 2BB-134 Rev. 7



R12-NO

5 ft 74

99%

95

95.0

3

2

2

92.4' - Fracture, 40 deg, rough, undulating,

92.95' - Fracture, <5 deg, rough, undulating,

93.5' - Fracture, 80 deg, smooth, stepped,

92.4-92.95' - Fracture, vertical, rough,

undulating, tight

PROJECT NUMBER: BORING NUMBER: 338884.FL A-12 SHEET 5 OF 10

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724065.3 N, 457848.9 E (NAD83)

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing

ELEVATION: 42.1 ft (NAVD88) $\underline{\mathsf{DRILLING}}\,\underline{\mathsf{CONTRACTOR}}\,:\underline{\mathsf{Un}}\underline{\mathsf{iversal}}\,\underline{\mathsf{Engineering}}\,\underline{\mathsf{Sciences}},\underline{\mathsf{Gainesville}},\underline{\mathsf{FL}};\underline{\mathsf{Driller}}.\,\underline{\mathsf{M}}.\,\underline{\mathsf{Boatright}};\underline{\mathsf{Cathead}}\,\underline{\mathsf{Operator}}.\,\underline{\mathsf{G.}}\,\underline{\mathsf{Davis}}$

WATER LEVELS: 5.3 ft bgs on 05/03/07 START: 5/2/2007 END: 5/4/2007 LOGGER: W. Elliott, R. McComb DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT DESCRIPTION ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -32.9 NR 72.2' - Fracture, 80-90 deg, rough, 70.0-72.6' - moderate yellowish Driller's Remark: Soft undulating, extends to 72.45', open brown, (10YR 5/4), very fine grained, drilling from 75-77 NR 73.95' - Fracture, 0-90 deg, smooth, stepped, weak (R2) with some medium strong tight (R3) zones, voids up to 1/16" over 74.1' - Fracture, <5 deg, rough, stepped, 15-20% of core surface, decreasing with depth, rock becoming thinly laminated and weaker with depth, NA open 74.7' - Fracture, horizontal, rough, stepped, R9-NQ SC-3 collected at 77.1punctuated with light gray/yellowish 26 1 open, clay (brown) over 90% of surface 5 ft 78.4 70% gray very fine grained, (sandy) 77.1' - Fracture, <5 deg, smooth, undulating, irregular-shaped nodules/clasts, 2 open voids generally lacking in lighter Driller's Remark: Advanced gray, very fine grained nodules/clasts 78.45' - Fracture, 0-30 deg, rough, NW casing to 80', regained undulating, open, gravel filled 72.6-74.9' - Same as 70.0-72.6' circulation 78.7' - Fracture, horizontal, rough, undulating, except with thick (6"") beds of 1 R9: 8 minutes yellowish gray, very fine grained open, gravel filled 80 80.0 Driller's Remark: Very hard 79.65' - Fracture, 20 deg, rough, undulating, limestone, weak to medium strong -37 9 from 80' to approximately tight, black organic film over 100% of surface (R2 to R3), thinly laminated with 3 80.1' - Fracture, horizontal, rough, undulating, organics, in matrix of void/cavity open, dark gray staining over 30% 80.2' - Fracture, horizontal, rough, undulating, characterized limestone No Recovery 74.9-76.5' 3 Driller's Remark: Hard open, dark gray staining over 30% Silt (ML) again at 84' 80.43' - Fracture, horizontal, rough, 76.5-77.1' - moderate yellowish R10-NO undulating, open, dark gray staining over 2 brown, (10YR 5/4), wet, soft, rapid 5 ft 72% 48 100% dilatancy, mild HCl reaction 81.05' - Fracture, horizontal, rough, Limestone 1 undulating to stepped, open, brown clay lining 77.1-78.4' - pale yellowish brown to <1/16" thick over 100% of surface dark yellowish brown, (10YR 5/4 to 81.35, 81.5' - Fractures (2), smooth, planar, 10YR 4/2), very fine grained, strong R10: 10 minutes NR black organic stains over 15-20% HCl reaction, medium strong to weak 82.35' - Fracture, horizontal, rough, stepped, (R3 to R2), voids up to 1/16" over 85 85.0 open, brown clay lining (silty and sandy), up -42.9 10-15% decreasing with depth, to 1/16" thick cavities typically 3/8 to 3/4"x1/16" 0 82.65, 83.6' - Fractures (2), <5 deg, rough, (fossil casts/molds), becoming lighter undulating, tight, clayey in color and containing less voids 2 with denth 78.4-79.5' - fine to very fine grained, 86.7, 86.8' - Fractures (2), <5 deg, rough, moderate HCl reaction, very weak to R11-NO smooth, undulating weak (R1 to R2), voids up to 1/16", cavities 1-3/16"-1-9/16"x3/8", clay laminae at 78.3-78.4' (brown, soft) 2 76 5 ft 100% 87.9' - Fracture, <5 deg, smooth, undulating, film of black organic stains over 100% of 79.5-80.0' - very light gray to bluish 2 surface, open white, (N8 to 5B 9/1), very light gray 87.95' - Fracture, 60-70 deg, rough, stepped, mottling, very fine grained, medium R11: 7 minutes strong (R3), voids (up to 1/16" or open 2 88.25, 88.4' - Fractures (2), <5 deg, rough, less) over 3-5%, several cavities up 90.0 stepped, open to 3/16"x3/16", several vertical to -47.9 89.42, 89.7' - Fractures (2), horizontal, rough, subhorizontal hairline fractures 0 80.0-81.5' - Same as 79.5-80.0' undulating, open except becoming darker (brownish) with depth, cavities common at 80.4' 91.15' - Fracture, horizontal, smooth, 1 undulating, tight 81.5-83.6' - moderate yellowish brown, (10YR 5/4), fine to very fine

R12: 10 minutes

grained, moderate HCl reaction, very

weak (R1), voids up to 1/16" over

30-40% surface, cavities up to

rock from 82.35-82.65'

No Recovery 83.6-85.0'

1-3/16"-1-9/16"x2", fossiliferous

(molds/casts), extremely weak (R0)



PROJECT NUMBER: BORING NUMBER: A-12

ROCK CORE LOG

SHEET 6 OF 10

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724065.3 N, 457848.9 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing

\M∆T⊏D	LEVELS : 5.3	ff ha	on O	5/03/07 START : 5/2/2007 END : 5/	1/200	7 LOGGER: W. Elliott, R. McComb	<u> </u>
		o it bgs	S UIT U	5/03/07 START : 5/2/2007 END : 5/ DISCONTINUITIES	П	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	- FOG	ROCK TYPE, COLOR,	
BAS	RUN H.A	(%) _Q	FRACTURES PER FOOT		SYMBOLIC	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
PTH	NGT CO	о О	ACT R F(DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	MBC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	SSI	A.		THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-52.9			NR/	93.65' - Fracture, <5 deg, smooth, undulating	Н	Limestone	
-			1	to stepped, tight 94.05' - Fracture, horizontal, smooth,	ш	 85.0-88.35' - Same as 81.5-83.6' except black organic laminae at 88.0' 	1
-				undulating, tight, black organic coating	Н	and traces of black organic laminae	SC-4 collected at 98.15- 99.05'
-			2	94.55' - Fracture, 80 deg, smooth, undulating, tight	П	 from 87.0-88.0' 88.35-89.45' - variegated very pale 	99.05
-	R13-NQ			95.7' - Fracture, horizontal, smooth, planar,		orange and very pale blue, (10YR 8/2	1
-	5 ft 98%	72	0	open 96.2' - Fracture, vertical, smooth, undulating,	Н	 and 5B 8/2), strong HCl reaction, very weak (R1), possibly cavity fill 	1
-	90%			tight	Ш	with brownish limestone; fossil	-
-			1	96.75' - Fracture, <5 deg, rough, stepped,	Ш	- casts/molds, voids over 15-20%, few	-
-				open 98.15' - Fracture, 60 deg, rough, undulating,	Н	cavities 3/8"x3/16", three 2"x3/16" black coated cavities (possible worm	R13: 6 minutes
l			1	tight	H	– burrows)	-
100 <u> </u>	100.0		NR)	99.05' - Fracture, 60 deg, rough, undulating,	븬	89.45-90.0' - Same as 85.0-88.35' except fossiliferous, molds/casts and	-
-57.9			>10	100.0-102.0' - Fracture zone, undulating,	ш	_ original material	-
-				stepped, horizontal to inclined, open to tight	Ш	90.0-91.15' - moderate yellow brown, (10YR 5/4), fine to very fine grained,	-
l -			>10		Н	strong HCl reaction, very weak (R1),	_
l _				_	Ħ	voids up to 1/16" over 40-50%, cavities generally 3/16"x1/16", fossil	
l _	R14-NQ 5 ft	54	1		H	cavilles generally 3/16 x 1/16, lossil casts/molds with whitish fossil layer	
l _	100%	54	'	102.8' - Fracture, <5 deg, rough, undulating,	Н	at 90.8', thin discontinuous black	
	1)	tight, clayey	Ш	organic laminae 91.15-94.95' - yellowish gray, (5Y]
-			0		Ш	7/2), very fine grained, moderate to	1
-					Н	strong HCl reaction, very weak (R1), voids 1/16" or less over 1-5% (up to	R14: 5 minutes
105	105.0		1		Н	10-15% at 92.0-92.5'), thinly	End at 13:05 on 5/3/07
-62.9				104.9' - Fracture, <5 deg, rough, undulating,	ш	laminated at 93.8' No Recovery 94.95-95.0'	depth to water 5'3" — Start on 5/4/07 depth to
-			2	tight, clayey .	₩	Limestone	water 5'3"
-				105.9' - Fracture, 70 deg, rough, planar, open	Ш	95.0-95.7' - Same as 91.15-94.95' 95.7-95.9' - organic zone, thinly	1
-			10	105.9-107.9' - Fracture zone, 0-90 deg, rough, undulating to stepped, open,	Ш	laminated, black peat, soft, platy	-
-	R15-NQ			dominated by vertical fracture that	Н	95.9-99.9' - yellowish gray, (5Y 7/2),	-
-	5 ft	40	>10	propagates to 108.9' 105.95' - Fracture, 0-90 deg, rough,	Ħ	fine grained, strong HCl reaction, very weak (R1), voids over 40-50%,	-
-	100%			undulating, open	世	cavities up to 3/4"-1-3/16"x3/8"-3/4"	-
-			2	108.15' - Fracture, horizontal, rough, stepped, open	\mathbb{H}	with thin (1/16"x3/8") black worm tubes, some cavity fill at 97.8-98.0',	-
-				108.4' - Fracture, horizontal, rough,	団	 fossiliferous (casts/molds) 	R15: 7 minutes
-			>10	undulating, open 109.25' - Fracture, 0-90 deg, rough, stepped,	Ш	No Recovery 99.9-100.0' Limestone	-
110_ -67.9	110.0			tight —	\mathbb{H}	— 100.0-105.0' - Same as 95.9-99.9'	-
-07.9				109.35-110.0' - Fracture zone, 0-90 deg,	H	105.0-110.0' - yellowish gray, (5Y 7/2), fine to very fine grained, strong	
-				rough, stepped, undulating, varying orientations from vertical to horizontal	Ш	HCl reaction, very weak (R1), voids	_
-			NR		H	covering 10-15% in upper half of core, becoming less common with	_
-					口	depth; cavities more common in]
l -	R16-NQ 5 ft	45			Н	upper half also, typically 3/8"x3/16"	_
_	45%	70		112.75-115.0' - Fracture, horizontal, there are	H	becoming absent with depth, some molds/casts in upper half, absent	Driller's Remark: Upper
Ι [0	vertical fracture planes when rock has	岸	below.	2.75' was lost (soft-no
				separated in thin (1/16") slices	Н	No Recovery 110.0-112.75'	recovery)
I -					Ш		R16: 7 minutes
115	115.0		0		Ш		1
					П		



PROJECT NUMBER: BORING NUMBER: 338884.FL

A-12

SHEET 7 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724065.3 N, 457848.9 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 5.3	ft bgs	s on 0	5/03/07 START : 5/2/2007 END : 5/-	4/200	7 LOGGER: W. Elliott, R. McComb)
> O =	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH BE	E RU STH, OVEF	(%) Q	FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
ELEV SURFI	SORE	ROL	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	3×ME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-72.9	014			115.0' - Fracture, 0-40 deg, rough, stepped,	l "	Limestone	
-			3	tight -	╁	- 112.75-115.0' - yellowish gray, (5Y	-
-				115.6' - Fracture, 0-20 deg, rough, stepped, tight	Ħ	7/2), very fine grained, strong HCl reaction, very weak (R1), voids <1%,	1
-			2	115.7' - Fracture, horizontal, rough, planar to stepped, open	岸	 4-5 cavities at approximately 114.2' generally 3/8"x3/8", fossils absent 	1
-	R17-NQ			116.02' - Fracture, horizontal, smooth, planar,		115.0-119.35' - Same as	1
-	5 ft 100%	60	>10	tight	L	- 112.75-115.0' except fossiliferous zone at 118.5', casts/molds possibly	1
-				tight	╙	original material	Fossiliferous zone at 118.7'
-			0	117.0-117.45' - Fracture zone, 0-90 deg, rough, stepped to undulating, tight to open	Н	_	1
_			- 10	117.72' - Fracture, horizontal, smooth, planar, tight	Ш	440.05.400.01.0	R17: 9 minutes
120	120.0		>10	119.3-120.0' - Fracture zone, various	世	119.35-120.0' - Same as 115.0-119.35' except except coarser	1
-77.9			1	orientations, up to gravel sized limestone fragments	上	grained (gravelly to sandy), voids and cavities more common than]
			'	120.15' - Fracture, 10 deg, rough, undulating,	\vdash	115.0-119.35']
l -			0	open -	H	120.0-121.3' - yellowish gray, (5Y - 7/2), fine grained, strong HCl]
_				_	F	reaction, very weak (R1), voids up to]
l _	R18-NQ 5 ft	95	0	_	F	1/16" covering approximately 15-20%, few cavities 3/8"x3/8", some	
_	97%			_	H	mottling and some nodules of very fine grained limestone with no	
_			0		L	voids/cavities	-
-				-	₽	121.3-122.7' - Same as 120.0-121.3' except voids and cavities more	SC-5 collected at 123.27- 124.3'
			0	-	Н	common, covering 60-70% of	R18: 6 minutes
125_ -82.9	125.0		NR	_	₽	surface, fossils (casts/molds) common	-
-			1	125.45' - Fracture, horizontal, smooth, planar,	口	_ 122.7-124.85' - Same as 120.0-121.3'	-
-				tight -	仜	No Recovery 124.85-125.0'	-
-			0	-	世	Limestone 125.0-128.5' - Same as	1
-	R19-NQ			-	╁	122.7-124.85' except fine to very fine	-
-	5 ft 100%	70	0	-	╁	 grained, voids over 1-3%, cavities rare, some cavity infilling/nodules, 	1
-				128.0-129.0' - Fracture zone, <5-90 deg,	F	sharp undulatory contact between different color limestone at 125.5'	1
-			>10	rough, undulating to stepped, open to tight	H	(possible stylolite)	1
			10	129.0' - Fracture, 60 deg, rough, undulating, open, gravel-filled	F	128.5-129.0' - Same as 125.0-128.5' except some thin laminae, voids	R19: 7 minutes
	130.0		10	129.5-129.9' - Fracture zone, 60-90 deg,	Ħ	becoming more common, transitional with 129.0-130.0']
-87. 9 -			1	multiple fractures 130.1' - Fracture, horizontal, smooth, planar,	H	_ 129.0-130.0' - yellowish gray, (5Y]
_				open	片	7/2), fine grained, strong HCl reaction, very weak (R1), somewhat	
_			0	-	₽	friable, cavities cover 70-80%, fossil	
-	DOO NO				仠	molds/casts, cavity infillings/nodules - 130.0-130.6' - yellowish gray, (5Y	-
-	R20-NQ 5 ft	88	0		厂	7/2), fine to very fine grained, strong HCl reaction, very weak (R1), voids	-
-	96%			-	仜	over 1-3% of surface, cavities	-
-			2	133.15, 133.85' - Fractures (2), horizontal, smooth, planar, tight	士	1/16"x1/16", thinly laminated, fossils (molds/casts) rare and interlaminated	-
-					\vdash	between very fine grained limestone	R20: 7 minutes
105	425.0		3	-	\vdash	-	-
135	135.0	-			F		



PROJECT NUMBER: BORING NUMBER: 338884.FL A-12 SHEET 8 OF 10

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724065.3 N, 457848.9 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) $\underline{\mathsf{DRILLING}}\,\underline{\mathsf{CONTRACTOR}}\,:\underline{\mathsf{Un}}\underline{\mathsf{iversal}}\,\underline{\mathsf{Engineering}}\,\underline{\mathsf{Sciences}},\underline{\mathsf{Gainesville}},\underline{\mathsf{FL}};\underline{\mathsf{Driller}}.\,\underline{\mathsf{M}}.\,\underline{\mathsf{Boatright}};\underline{\mathsf{Cathead}}\,\underline{\mathsf{Operator}}.\,\underline{\mathsf{G.}}\,\underline{\mathsf{Davis}}$

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical WATER LEVELS: 5.3 ft bgs on 05/03/07 START: 5/2/2007 END: 5/4/2007 LOGGER: W. Elliott, R. McComb DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -92.9 NR 134.47, 134.62' - Fractures (2), horizontal, 130.6-132.65' - yellowish gray, (5Y 1 smooth, planar, open 7/2), fine grained, strong HCI 134.72' - Fracture, horizontal, rough to reaction, very weak (R1), voids and cavities common covering 50-60% of smooth, stepped, open 2 135.25' - Fracture, 10 deg, smooth, planar, surface, some fossil molds/casts, some cavity infilling/nodules, some tiaht very fine grained thin laminae 136.5' - Fracture, <5 deg, rough, stepped, R21-NQ 132.65-134.8' - Same as 86 0 open 5 ft 130.0-130.6' except thinly laminated, very weak (R1), yellowish brown and 136.8' - Fracture, <5 deg, rough, undulating, 98% open light olive gray mottling associated 0 with laminae, becoming darker with depth, some cavities and voids up to R21: 8 minutes 139.2' - Fracture, <5 deg, rough, undulating, 2 approximately 5-10% coverage open No Recovery 134.8-135.0' 140 140.0 NR 139.3' - Fracture, <5 deg, rough, undulating, Limestone -97 9 Driller's Remark: 80% loss open, gravel between fracture planes 135.0-135.25' - light olive gray, (5Y 0 of circulation at 140' 7/2), very fine grained, strong HCI reaction, very weak to weak (R1 to R2), thinly laminated, voids <1% 1 (27, 2011) raminated, voids < 1% (1/16" or less), 1 cavity 1-9/16"x9/32" (approximately 3/8" deep) 135.25-137.7' - yellowish gray grading to moderate yellowish brown, 141.7' - Fracture, <5 deg, rough, undulating, SC-6 collected at 142.88-R22-NO open, dark brown organic stains 5 5 ft 76 144 13 142.03' - Fracture, horizontal, rough, 87% undulating, open with black organic coating (5Y 7/2 to 10YR 5/4), fine grained, over 100% very weak (R1), thinly laminated from 0 142.15' - Fracture, horizontal, rough, 135.25-135.5' and from 137.3-137.7 undulating, open, dark brown coating over (sharp contact with underlying rock), 1 R22: 10 minutes voids up to 1/16" over 15-20%, few 142.4' - Fracture, horizontal, rough, NR cavities generally 3/16"x3/16", trace undulating, open with black organic coating 145 145 0 fossil molds/casts -102.9 over 100% 137.7-139.2' - Same as 142.5' - Fracture, <5 deg, rough to smooth, undulating, open, no coatings 142.85' - Fracture, 10 deg, smooth, 3 135.25-137.7' except yellowish gray, (5Y 7/2), voids <3-5%, few cavities generally 3/8"x3/16", fossil hash accumulation at 139.0-139.2', some undulating, tight 1 144.12' - Fracture, horizontal, rough, mottling, possible cavity stepped, tight R23-NO infilling/nodules 0 145.1' - Fracture, horizontal, rough, 97 5 ft 139.2-139.9' - yellowish gray, (5Y 7/2), very fine grained, very weak 100% undulating, open 145.8' - Fracture, 50-60 deg, rough, planar, (R1), cleaves very easily due to large open 1 cavities (worm burrows), voids over 145.9' - Fracture, 50-60 deg, rough, planar, 1-3% (<1/16") cavities up to 2"-2-3/8"x3/8"-3/4" (extending open R23: 6 minutes 146.4' - Fracture, horizontal, rough, 0 completely through core), fossil undulating, open 150 150.0 molds/casts (gastropods) 148.7' - Fracture, <5 deg, rough to smooth, 107.9 No Recovery 139.9-140.0' undulating 150.55' - Fracture, horizontal, smooth, planar, 0 Limestone 140.0-142.5' - Same as 139.2-139.9' tiaht except becoming grayish yellow at 150.58' - Fracture, horizontal, smooth, planar, 3 140.0' and grading to yellowish tight gray/light olive gray (5Y 7/2 to 5Y 150.83' - Fracture, horizontal, rough, R24-NQ 5/2) with depth, sharp boundary stepped, open 70 0 5 ft between grayish-yellow and yellowish 95% grey at 140.6', cavities becoming more frequent/dense with small voids 0 (1/16") covering 10-15% of limestone, perhaps becoming R24: 6 minutes somewhat coarser grained in depth 1 155 155.0



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-12 SHEET 9 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724065.3 N, 457848.9 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 5.3	ft bgs	s on 0	5/03/07 START : 5/2/2007 END : 5/	4/20	07	LOGGER: W. Elliott, R. McComb	
				DISCONTINUITIES	Т	Т	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG		ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
	CORE LENG RECO	RQD		PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMB		AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-112.9 -			(NR) 2	154.67' - Fracture, <5 deg, rough, undulating, open 155.25' - Fracture, horizontal, rough to		F	142.5-144.35' - yellowish gray mottled with dusky yellow, (5Y 7/2 and 5Y 6/4), fine to very fine grained,	
-			1	smooth, undulating, open 155.85' - Fracture, horizontal, rough, planar,		‡	distinct boundaries between fine and very fine grained, voids more common in fine grained material	SC-7 collected at 156.68- 157.65' -
-	R25-N0		1	tight 156.7' - Fracture, horizontal, rough, planar, tight	Ħ	+	covering 20-30%, 1-3% voids in very fine grained material occuring in	-
-	100%		4	157.65' - Fracture, <5 deg, rough, undulating, open 158.45-158.65' - Fracture zone, 70 deg,		irregular-shaped nodules, thinly laminated near top of interval, trace fossil molds/casts	-	
-			1	rough, undulating to stepped, open to tight	Ħ	-	No Recovery 144.35-145.0' Limestone 145.0-148.7' - yellowish gray to	R25: 6 minutes
160_ -117.9	160.0			159.87' - Fracture, horizontal, rough,	F	+	dusky yellow and light olive brown, (5Y 7/2 to 5Y 6/4 and 5Y 5/2), fine grained, strong HCl reaction, weak	
_					-		(R2), voids (<1/16") over 95-100% surface, becoming fossiliferous with depth, casts/molds with some	-
-					1	-	cavities near base of interval 148.7-149.7' - dusky yellow to	-
-						-	moderate olive brown, (5Y 6/4 to 5Y 5/6), moderate to mild HCl reaction, very weak (R1), thinly laminated at	-
-					-		148.9' and with very fine grained beds at 149.0' (yellowish gray) 149.7-150.0' - Same as 148.7-149.7'	-
-				_	1	E	except very fine grained, few voids 150.0-151.0' - yellowish gray mottled with dusky yellow, (5Y 7/2 and 5Y	_
-					1		6/4), very fine grained, strong HCI reaction, weak (R2), voids <1/16" over 1-3%, few cavities	_
-					$\frac{1}{2}$	-	3/4"-1-3/16"x3/8" 151.0-151.85' - Same as	-
_]	-	150.0-151.0' except becoming thinly laminated with light olive brown (5Y 5/6) bands, voids over 10-15%	-
-					1	-	surface area 151.85-152.5' - light olive brown, yellowish gray and light gray, (5Y 5/6,	_
-					1	F	5Y 5/2 and N5), fine to very fine grained, very weak (R1), thinly laminated, voids and cavities	-
-				_		F	covering 40-50% surface (more so in fine grained, darker colored material), some fossil hash	_
-					-	-	152.5-154.75' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, very weak (R1), coarse]
-					-	-	grained at 154.5-154.75', voids covering 10-15% with cavities up to 3/8"x2" over 10%, grades to fossil	
-					1	-	hash below 153.8' with fossils (molds/casts) common below 154.5' where rock becomes friable	
-					1	F	No Recovery 154.75-155.0']
					+	+		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-12	SHEET	10	OF	10	

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724065.3 N, 457848.9 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing

				in it is the same same in the interest of the			-	ONLIVIATION: Vertical
WATER	LEVELS: 5.3	ft bgs	on 0	5/03/07 START : 5/2/2007	END : 5/4	/200	LOGGER : W. Elliott, R. McComb	
				DISCONTINUITIES		ניו	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION		SYMBOLIC LOG	DOCK TYPE COLOR	
N H H N N N N N N N N N N N N N N N N N	N A Y	(9)	JRE JT	DECORAL HOR		<u>o</u>	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
ATI	E E E	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROL	JGHNESS,	ž	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
프류ヴ	N.S. S.	ο	SAC ER I	PLANARITY, INFILLING MATERIA	AL AND	¥	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
	8.50	~	F F	THICKNESS, SURFACE STAINING, ANI	DIIGHTNESS	S	CHARACTERISTICS	2.10. 0, 120. 1120210, 2.0.
							Limestone	
-					-	1	- 155.0-155.25' - light olive gray	-
1 4					_		mottled with yellowish gray, (5Y 5/2	_
							and 5Y 7/2), strong HCl reaction,	
1 7					-	1	very weak (R1), thinly laminated with	
-					_		organic material, voids over 20-30%, soft and friable from 155.0-155.1'	-
					_		- 155.25-155.9' - light olive brown, (5Y	_
							5/6), very fine to fine grained, strong	
-					-	1	HCl reaction, very weak (R1), voids	_
-					-		(<1/16") covering 60-70% surface,	-
					_		trace fossil molds/casts	_
							155.9-156.65' - yellowish gray, (5Y	
1 1					_		7/2), fine to very fine grained, moderate to strong HCl reaction,	
-							very light gray (N8) interbeds, thinly	
					_		laminated, especially from	_
							156.5-156.65', voids (<1/16")	
1 1					-		covering 50-60%, voids <10% in gray	
-					-		very fine grained limestone	-
1 _					_		156.65-160.0' - yellowish gray, (5Y	_
							7/2), fine grained, strong HCl reaction, very weak (R1), becoming	
1 7					-	1	more coarse grained and more	_
-					-		fossiliferous (molds/casts) with	-
_					_		depth, voids increase from 1-2%	_
							coverage to 60-70% with depth,	
1 7					_	1	possible void/cavity infilling from 158.0-160.0' (possible	_
1 -					-	l	nodules/intraclasts)	-
-							Bottom of Boring at 160.0 ft bgs on	
							_ 5/4/2007	
1 7					_	1	- <i>3. 11</i> <u></u>	
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PROJECT NUMBER:	BORING NUMBER:					
338884 FI	Δ-13	CHEET	1	ΩE	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722927.1 N, 457933.5 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 252345; CME 75 S/N 252437, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical

DRILLIN	GMETH	OD AND	EQUIPM	ENT: CME 55 S/I	I 252345; CME 75 S/N 252437, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 2.0 ft bo	gs on 5/6/	07 S	TART : 5/6/2007
STANDARD PENETRATION					SOIL DESCRIPTION COMMENTS
A A N	SAMPLE	INTERVA	L (ft)	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,
ASE THE THE THE THE THE THE THE THE THE TH		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
40.6	0.0			(N)	Poorly Graded Sand With Organics (SP) Borehole located in staked wetlands area
-	0.0		00.4	0-1-2	0-0.5' - moist, very loose, very fine to fine grained, - drill rig and equipment staged on swamp
-		1.1	SS-1	(3)	30-40% organics and roots, sand is silica mats, surface conditions are dry Poorly Graded Sand (SP)
-	1.5				\ 0.5-1.1' - light gray, (N7), moist, very loose, very fine -
-					to fine grained, trace nonplastic fines, organics decreasing with depth, sand is silica Water table 2.0' below ground surface
-					water table 2.0 below ground surface
-					4 1
_					
-					
-					.
5 35.6	5.0				City Could (ON)
35.6				1-1-2	Silty Sand (SM) 5.0-6.25' - grayish brown, (5YR 3/2), wet, very loose,
-		1.3	SS-2	(3)	very fine to fine grained, 20-25% nonplastic fines,
-	6.5				fines appear to be organic material, slight sulfur odor, trace medium to coarse sand-sized grains, iron
_					cemented silica sand concretions
_					_
_					.
l _					<u> </u>
l _					<u> </u>
l _					<u> </u>
10	10.0				
30.6				0.07	Clayey Sand (SC) \[\begin{align*} \text{ SS-3A 10.0-10.2'} \\ \daggerightarrow \text{ SS-3B 10.2-11.1'} \\ \d
_		1.1	SS-3	2-3-7 (10)	medium grained, carbonate material, white limestone / Links
_	11.5			(- /	fragments incorporated (slough)
_					Drilling's Remark: Approximately 10% loss of circulation (limestone zones)
_					coarse grained, strong HCl reaction, 10-15% nonplastic fines, material appears to be predominantly
					fossil fragments
Ι -]
] [
15	15.0]
25.6				6.1.5	Well Graded Sand With Silt (SW-SM) ↑ 15.0-15.4' - Same as 10.2-11.1' except pale yellowish / ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑ ↑
		1.0	SS-4	0-1-2 (3)	\ 15.0-15.4' - Same as 10.2-11.1' except pale yellowish / SS-4 15.4-16.0' SS-4 1
-	16.5			(3)	Silty Sand (SM)
					15.4-16.0' - very light gray, (N8), wet, very loose, very fine to fine grained, sand is predominantly silica, 20%
-					fine to medium grained carbonate sand, 20-25%
-					nonplastic fines, scattered pockets of very pale green (10G 8/2) medium plasticity clay, moderate HCI
					reaction in carbonate materials
-					Driller' Remark: Drilling rate slowing down at
					- 18.5'
20					11
1			1		1 1



PROJECT NUMBER:	BORING NUMBER:			
338884 FI	Δ-13	SHEET	2 OF 11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722927.1 N, 457933.5 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT : CME 55 S/N 252345; CME 75 S/N 252437, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION : Vertical

DRILLIN	DRILLING METHOD AND EQUIPMENT: CME 55 S/N 252345; CME 75 S/N 252437, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical									
WATER	LEVELS	: 2.0 ft bo	gs on 5/6/	/07	START : 5/6/2007					
30≎				STANDARD PENETRATION	SOIL DESCRIPTION COMMENTS					
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION					
ACE		RECOVE	ERY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND					
FER			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY					
20.6	20.0	0.2	SS-5	(N) 50/2.5	Sandy Silt With Limestone (ML)					
-	0.2			(50/2.5")	│ \ 20.0-20.2' - very pale orange, (10YR 8/2), moist, hard,					
-					\nonplastic, very rapid dilatancy, moderate to strong \HCl reaction, 35% fine to coarse sand-sized, 10% fine \					
-					gravel-sized, all carbonate materials -					
-					- 1					
-					- 1					
-					- 1					
-					- 1					
-										
-					-					
25 <u> </u>	25.0			00 50/0 5	Silty Sand (SM) Stop drilling for 5/6/07 due to					
- 10.0	25.8	0.8	SS-6	39-50/3.5 (89/9.5")	25.ó-25.8' - palé yellowish orange, (10YR 8/2), moist - thunderstorm/lightning hazard					
-	20.0			,	to wet, very dense, fine to coarse grained, mild to moderate HCl reaction, 25-30% nonplastic fines, trace					
-					fine gravel-sized, all carbonate					
-					Resume drilling 5/7/07, water level					
-					approximately 2.0' below ground surface					
-					-					
-					Install surface casing (4") to approximately					
-					- 28.5'					
-					-					
30 10.6	30.0 30.3	0.3	SS-7	50/3.5	Silty Sand (SM)					
-	00.0		33-7	(50/3.5")	30.0-30.3' - Same as 25.0-25.8'					
-										
-					- 1					
-					-					
-					-					
-					- 1					
-					- 1					
-					-					
-					- 1					
35 5.6	35.0				Silty Sand (SM)					
- 0.0			00.0	37-47-19	■ 35.0-36.2' - pale gravish grange grading to pale					
-		1.2	SS-8	(66)	yellowish brown, (10YR 8/2 to 10YR 6/2), moist, very dense, fine to coarse grained, mild HCl reaction,					
-	36.5				\ 45-50% low plastic fines, 10-15% fine gravel-sized, all / -					
-					\(\text{\carbonate} \) \(\text{\left} \) \(\text					
-					- Much softer material, no loss of circulation					
-										
-										
-										
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40					 					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-13	SHEET	3	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722927.1 N, 457933.5 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 252345; CME 75 S/N 252437, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 2.0 ft bo	gs on 5/6/	07 S	START : 5/6/2007 END : 5/23/2007 LOGGER			: C. Sump, P. De Sa'rego				
				STANDARD	SOIL DESCRIPTION			COMMENTS				
N (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COIL NAME LICOS OPOLID OVARDOL COLOD	1	O LO	DEDTIL OF CACING DOUGLING DATE				
H BE ACE ATIO		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	١	30LI	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND				
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	١	SYMBOLIC LOG	INSTRUMENTATION				
0.6	40.0	0.7	SS-9	26-50/2 (76/8")	Silty Gravel With Sand (GM)	一						
_	40.7			(70/0)	40.0-40.7' - light olive gray, (5Y 5/2), moist to wet, very dense, moderate HCI reaction, predominately	ď	<u> </u>	_				
_					fine gravel to 1", 30-35% fine to coarse sand-sized, 20-25% low plastic fines, all carbonate, pyrite coating	4		_				
-					on some large fragments	4		-				
-						+		-				
-						+		-				
-						1		-				
-						1		-				
45	45.0		00.10	F0/4 0F		1						
-4.4	45.1	0.0	(SS-10)	50/1.25 (50/1.25")	No Recovery 45.0-45.1' Begin Rock Coring at 45.0 ft bgs	\prod		_				
_					See the next sheet for the rock core log	4		_				
-						4		-				
-						+		-				
-						+		-				
-						1		-				
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-13 SHEET 4 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722927.1 N, 457933.5 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT: CME 55 S/N 252345; CME 75 S/N 252437, mud rotary, NQ tools, HW casing ORIENTATION: Vertical

CORING	NIE I NOD AI	ND EC	JUIPIV	1ENT : CME 55 S/N 252345; CME 75 S/N 252437, mud	rotary,	NQ tools, HVV Casing	ORIENTATION : Vertical	
WATER	LEVELS : 2.0	ft bg	s on 5	/6/07 START : 5/6/2007 END : 5	/23/200	D7 LOGGER : C. Sump, P. De Sa're	go	
	<u> </u>			DISCONTINUITIES	(J	LITHOLOGY	COMMENTS	
BELOW CE AND TION (ft)	DEPTH BELOW SURFACE AND ELEVATION (ft) CORE RUN, LENGTH, AND RECOVERY (%)		URES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND	
DEPTH SURFA ELEVA			FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS		WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC	
-4.4	45.0		1	45.3' - Fracture or mechanical break, 50 deg,	\blacksquare	Limestone - 45.0-45.9' - pale yellowish brown,	Switch to rock coring (45.0')	
-				rough, undulating to mostly planar 45.9-47.9' - Fracture zone, friable,	+	_ (10YR 6/2), moderate HCl reaction, medium strong (R3), 10-20%	-	
-			0	disaggregated material, numerous "breaks" handling material (unconsolidated)	坩	- coverage of 1/6" to 1/8" small voids on surface, larger lenticular shaped		
-	R1-NQ 5 ft 58%	0	0			cavities (up to 1/2" long 1/6"-3/16" high), exhibit preferred horizontal orientation	-	
-					1	45.9-47.9' - Same as 45.0-45.9' - except very weak (R1) and	-	
-			NR		掛	disaggregated, easily broken by hand into silty sand material No Recovery 47.9-50.0'	R1: 4 minutes	
50 -9.4	50.0			50.0-53.3' - unconsolidated silty, sandy,		Silty Sand With Limestone	_	
-				gravel material	-	Fragments (SM) 50.0-53.3' - moderate yellowish	-	
-			NA		-	brown, (10YR 5/4), moderate HCl reaction, 20-25% fines, 35-40%	-	
-	R2-NQ 5 ft	13			_	sand, 35-40% gravel-sized fragments of friable limestone with fragments 1/4"- >1" size		
-	88%				-111	- -	_	
-			2	53.3-54.4' - Fracture zone, rough, irregular, non planar	井	 Limestone 53.3-54.4' - pale yellowish brown, (10YR 6/2), moderate HCl reaction, 	R2: 7 minutes	
- 55	55.0		1 NR	54.1' - Fracture, 10 deg, rough, planar, tight		medium strong (R3), 10-20% coverage of 1/16"-1/8" voids on	RZ. / Hillitutes	
-14.4			1	55.4' - Fracture or mechanical break, rough,	田	surface, few larger cavities/fossil molds (<1%) up to 3/4" No Recovery 54.4-55.0'		
-			3	undulating, nonplanar 56.4, 56.8' - Fractures (2), 15 deg, rough,	坩	Limestone 55.0-56.8' - yellowish brown, (10YR		
-	R3-NQ	47		planar 57.0' - Bedding plane, 10 deg, rough, planar		5/4), very fine grained, mild to moderate HCl reaction, weak (R2),	Horizontal partings – associated with black	
-	5 ft 96%			to stepped 57.7' - Mechanical break, rough, nonplanar	井	20-25% coverage of 1/16"-1/8" small voids on surface, very fine dark black laminations (<1/16") 1/2"-1" spacing	laminations (soft) laminae are sinuous and exhibit	
-			3	57.95, 58.3' - Bedding plane (2), 5 deg, smooth, planar, (organic layer) 58.6' - Bedding plane, 5 deg, smooth, 0.5"	田	_ 56.8-59.8' - Same as 55.0-56.8' except weak (R2), finer grained (silt	more pinch and swell patterns and are often slightly inclined to core	
-			2	thick zone 58.8' - Bedding plane, smooth, planar	用	 sized particles), reduced small void density (<10%) and pronounced fine black laminations (lignite, organics) 	diameter R3: 6 minutes	
-19.4 	60.0		NR 2	59.1' - Fracture or mechanical break, horizontal, rough, undulating 59.4' - Fracture, 10 deg, rough, planar to	拑	throughout interval and concentrated in zones up to 1/2" thick		
-				undulating 60.5, 60.7, 61.4, 61.7' - Fractures or		No Recovery 59.8-60.0' Limestone 60.0-63.8' - Same as 56.8-59.8'	-	
-	Barre		3	mechanical break (4), horizontal, rough, undulating to planar	用	 60.0-63.8 - Same as 56.8-59.8 except weak to medium strong (R2 to R3), decreasing density of fine black 		
-	R4-NQ 5 ft 76%	40	3	62.1, 62.3, 62.5' - Fractures (3), <10 deg, rough, undulating to semi planar	田	_ layering, variable density of small voids (5-15% surface area), weak	-	
-			2	63.4' - Fracture, rough, undulating	囯	 unconsolidated zone at 63.5' of silt and sand with gravel 		
-			NR	63.5' - Fracture, 45 deg, rough, undulating	丗	- No Recovery 63.8-65.0'	R4: 6 minutes	
65	65.0				用			
			_				1	

APPENDIX 2BB-144 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-13 SHEET 5 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722927.1 N, 457933.5 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345; CME 75 S/N 252437, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	VATER LEVELS : 2.0 ft bgs on 5/6/07								
≥0≥	(9)			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,		
H BE ATIC	TH.	(%) O	T.O.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Ğ	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND		
EN.	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	¥₩	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.		
-24.4	074	<u>~</u>	шФ	THIORNEGO, GON AGE STAINING, AND HOTTINEGO	S				
-24.4			NA	65.4, 65.5, 65.6, 65.7' - Mechanical break (4),	4111	Silty Sand (SM) - 65.0-65.8' - moderate yellowish	-		
-				horizontal, rough, undulating to planar, fine	-	brown, (10YR 5/4), with gravel-sized / limestone fragments 1/2"-2" size	1 -		
-			4	sand/silt material on fracture surface	╁┼	(disaggregated by drilling)	-		
-	D= 110				F	Limestone	_		
-	R5-NQ 5 ft	10			岸	65.8-66.8' - moderate yellowish brown, (10YR 5/4), very fine grained,	_		
_	36%				╨	strong HCl reaction, weak to medium	_		
_			NR		oxdot	strong (R2 to R3), 15-20% coverage of 1/16" to 1/8" small voids on	_		
_					工	surface, 1-2% coverage of larger			
_					上	cavities/fossil molds up to 1/4" diameter, fine silt infilling in many	R5: 10 minutes		
70	70.0			_	\perp	voids/molds			
-29.4			0		戸	No Recovery 66.8-70.0' Limestone			
_					片	70.0-74.9' - moderate yellowish			
l _			2	71.1, 71.2' - Fracture or mechanical break	╨	brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, medium	SC-1 collected at 71.3-		
_				(2), horizontal, rough, undulating	$oxed{\square}$	strong (R3), fossiliferous, with 4"-6"	72.5'		
l _	R6-NQ 5 ft	67	1		厂	thick poorly fossiliferous, fine grained intervals, low to medium density, up			
	98%	01	'	72.5-73.5' - Fracture or mechanical break, vertical, rough, undulating	Ь	to 17-20% coverage of small			
			2		\vdash	(1/16"-1/8") voids and larger (up to 3/4") cavities/fossil molds, lenticular			
				73.4' - Fracture, 45 deg, rough, planar	Ħ	inclusions of soft black organic			
			0	74.1' - Fracture or mechanical break,	世	material up to 1-1/2"x1/4" thick at 73.2-73.8', few fine (1/16"-3/16")	R6: 8 minutes		
75	75.0			horizontal, rough, undulating	╨	organic inclusions			
-34.4	·		(NR)	75.2' - Fracture or mechanical break,	\blacksquare	No Recovery 74.9-75.0 Limestone	_		
-			1	horizontal, rough, undulating		75.0-80.0' - Same as 70.0-74.9'	1		
-			_	76.2' - Fracture, 5 deg, rough, planar	Т	except mild HCl reaction, weak (R2), 5-15% coverage of small (1/16"-1/8")			
-			5	76.3, 76.4' - Fractures (2), 30-45 deg, rough,	┰	voids, loose sand-sized limestone	1		
-	R7-NQ		_	undulating and planar 76.8, 76.95' - Fractures (2), horizontal, rough,	Ħ	particles on fracture surfaces	_		
-	5 ft 100%	50	1	undulating	世	Ī	1		
-				77.7' - Fracture, 60 deg, rough, non planar (radial)	╨	Ī	1		
-			2	78.0' - Fracture, 45 deg, rough, planar	丌	<u> </u>	1		
-				78.3' - Mechanical break, horizontal, rough	世	Ţ	R7: 7 minutes		
80	80.0		1	79.5' - Mechanical break, 0-15 deg, rough,	士	Ť			
-39.4	- 5.0			undulating –	╁	80.0-84.0' - Same as 75.0-80.0'			
-			>10	80.4-80.7' - unconsolidated zone	广	 except mild HCl reaction, weak to medium strong (R2 to R3), with 	1		
-					世	friable, extremely weak (R0), partially			
-			1	81.4, 82.0' - Fractures (2), horizontal, rough,	₽	- unconsolidated zones at 80.4-80.7', 81.4-81.6', and 82.0-82.5'			
-	R8-NQ			undulating and planar, (either end of unconsolidated material)	圧				
-	5 ft 80%	23	>10	82.0-84.0' - Fracture zone	世	†			
-	0070				\pm	ţ			
-			>10		干	†			
-					岸	No Recovery 84.0-85.0'	R8: 6 minutes		
05	05.0		NR		廿	†	-		
85	85.0				╁				
L					\perp				



PROJECT NUMBER:	BORING NUMBER:				-	
338884.FL	A-13	SHEET	6	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722927.1 N, 457933.5 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345; CME 75 S/N 252437, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

			2011 11	IENT: CME 55 S/N 252345; CME 75 S/N 252437, mud r	otary,	Tra tools, Tive sacing	ORIENTATION: Vertical
WATER	LEVELS: 2.0	ft bgs	s on 5/	6/07 START : 5/6/2007 END : 5/3	23/200	D7 LOGGER : C. Sump, P. De Sa're	go
\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	CC LE RE	ď	FF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	51.61.6, 1201.12002.16, 21.6.
-44.4 - - - - -	R9-NQ 5 ft 98%	47	1 >10 >10	85.6' - Fracture, 45 deg, rough, planar 86.0-88.0' - Fracture zone, 0-30 deg, limestone fragments 1/4" to 2", larger fragments exhibit semi planar surfaces		Limestone 85.0-89.9' - moderate yellowish brown, (10YR 5/4), moderate HCl reaction, medium strong (R3), fossiliferous (molds/casts), surface coverage of voids 20%, with very weak to weak (R1 to R2) zones of limestone disaggregated into carbonate sands or silt from 86.0-86.6' and 87.2-88.1'	1/2" thick "greasy" organic layer at 85.2 - - - - -
-			3	88.2, 88.8, 89.3, 89.5' - Fractures or mechanical break (4), horizontal, rough, undulating - 89.4' - Fracture, 45 deg, rough, planar		- - -	R9: 7 minutes
90 <u></u> -49.4	90.0		NR)			No Recovery 89.9-90.0'	Small flazer structure on
-			>10	90.3' - Fracture, 70 deg, rough, planar 90.7' - Fracture, horizontal, rough, undulating to planar, black organics on surface (or fine		Limestone 90.0-94.2' - Same as 85.0-89.9' except highly fossiliferous zone with	fragment material, - bioturbation _
-	R10-NQ		>10	laminae controlling break) 90.7-91.2' - Fracture zone		greater density of small voids from 90.8-91.1' (fragments <1"), finer grained with decreased density of small voids, weak to medium strong	SC-2 collected at 91.75- 92.5'
	5 ft 84%	58	1	-	Ш	(R2 to R3) below 91.1'	<u> </u>
_			2	93.0' - Fracture, horizontal, rough, undulating, open 93.5' - Fracture, 25 deg, rough, undulating,	Ħ	-	-
- - 95	95.0		0 NR	1/16" open 93.9' - Mechanical break, horizontal		No Recovery 94.2-95.0'	R10: 12 minutes
-54. 4 -			2	95.2' - Fracture, 5 deg, planar 95.7' - Fracture, 60 deg, rough, planar		Limestone 95.0-98.0' - yellowish gray, (5Y 4/2), variable density of small voids	SC-3 collected at 95.6-
- -	R11-NQ		1	96.8' - Mechanical break, rough, undulating		(1/16"-1/8") across interval ranging from sparse up to >20% in discrete zones, typically 5%, few larger cavities/fossil molds 1/4" or larger,	96.8'
- - -	5 ft 96%	62	>10	97.3, 97.35' - Fractures (2), 60 deg, rough, planar 97.9' - Fracture, horizontal, rough, nonplanar, brownish black coating on surface (soft)		 dark brown/black (organic) inclusions (1/16"-1/8") and as thin (1/16") fine stringers 98.0-98.7' - fine grained, strong to 	
-			>10	98.0-98.7' - Fracture zone, rock fragments, conchoidal fracture faces, undulating, near vertical break, few 45-60 deg fractures on		very strong (R4 to R5), dense 98.7-99.8' - Same as 95.0-98.0' except mild to moderate HCl	R11: 11 minutes
100 -59.4 _	100.0		NR >10	fragments 98.9, 99.2, 99.8' - Fractures (3), horizontal, rough, undulating	Ħ	reaction, weak to medium strong (R2 to R3) No Recovery 99.8-100.0'	
-			1	100.0-101.0' - Fracture zone, vertical, rough, planar to undulating, 3/4"-1" angular rock fragments with large (4"-5") long partial core	H	Limestone 100.0-104.5' - Same as 95.0-98.0' except medium strong (R3),	
- -	R12-NQ 5 ft	33	>10	pieces 101.3' - Fracture, 70 deg, rough, planar 102.0-102.7' - Fracture zone, limestone fragments		increasing density of small voids and larger (up to 1/2") cavities/fossil molds (10-20%), irregular zones of dark gray (N6) (redox boundary), few	
- -	90%		>10	102.8' - Fracture, 45 deg, rough, undulating 103.3' - Fracture or mechanical break, horizontal, rough, undulating		fector boundary), few fossil molds/casts infilled with soft clayey carbonate material	-
-			>10	103.3-104.5' - Fracture zone, horizontal,	丗	-	R12: 6 minutes
105	105.0		NR	rough, planar to undulating, partings with 1-2" spacing	囯	No Recovery 104.5-105.0'	-

APPENDIX 2BB-146 Rev. 7



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-13 SHEET 7 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722927.1 N, 457933.5 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT: CME 55 S/N 252345; CME 75 S/N 252437, mud rotary, NQ tools, HW casing ORIENTATION: Vertical

CORING	I WE I HOD AI	ND EC	JUILIV	MENT: CME 55 S/N 252345; CME 75 S/N 252437, mud r	otary,	TVQ (0015, 1 TVV Casing	ORIENTATION : Vertical
WATER	LEVELS : 2.0	ft bgs	s on 5	/6/07 START : 5/6/2007 END : 5/3	23/200	D7 LOGGER : C. Sump, P. De Sa're	ego
≥∩ ∷	(9)			DISCONTINUITIES	ڻ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H H H	P.E.R.	Q D (%)	50	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	1 ട്ര	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FF/A	NG CO	Q	AC R	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
SS	SER	A.	E H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	λs	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-64.4			40	105.2-105.8' - Fracture zone, limestone	\Box	Limestone	
-			>10	fragments (1/2"-1-1/2")	Н	 105.0-107.5' - grayish orange to light olive gray, (10YR 7/4 to 5Y 5/2), mild 	-
-					П	to moderate HCl reaction, weak (R2),	_
-			>10		Ш	- <5% coverage of small (1/16"-1/8")	-
-	R13-NQ			106.7' - Fracture, 45 deg, rough, undulating	ш	voids on surface, moderately friable	_
_	5 ft	40	0	106.8-107.1' - Fracture zone, weak friable material, 1/2"-2" fragments, dark brown/black	ш		_
_	82%			staining (possibly pyrite) on few	Н	107.5-109.1' - yellowish gray to light - olive gray, (5Y 7/2 to 5Y 5/2), mild	
				fragment/fracture surfaces		HCl reaction, medium strong (R3),	
			>10	108.7-109.1' - Fracture zone, rough,	Ш	small voids (1/16"-1/8") and larger	
_				undulating	ш	 cavities/fossils/molds (up to 1/2" max dimension) 5-10% coverage on 	R13: 10 minutes
110	440.0		NR	-	H	surface, few fossil casts, partial fine	
110 <u> </u>	110.0		-		丗	recrystallization	-
-			2	110.1' - Fracture or mechanical break, horizontal, rough, planar	Н	No Recovery 109.1-110.0' Limestone	-
-				110.7' - Fracture, rough, undulating	Ш	- 110.0-113.9' - Same as 107.5-109.1'	_
_			2	111.3' - Fracture, rough, undulating, fine	Н	except medium strong to strong (R3	
			-	limestone fragments	Ħ	to R4), fewer cavities/fossil molds > >1/4"	
	R14-NQ			111.6' - Fracture, rough, undulating to	Н	- / 1/4	
-	5 ft 78%	57	2	partially stepped 112.0' - Fracture, 70 deg, rough, undulating,	ш	-	
-	7070			with thin spalls, black staining/coating on	╁┼	_	-
-			1	surface (pyrite) somewhat radiased surface	H	_	-
-				112.6, 113.7' - Fractures (2), 45 deg, rough, planar	Н	No Recovery 113.9-115.0'	R14: 9 minutes
_			NR	-	ш	-	R 14: 9 minutes
	115.0			_	Н		
-74.4			>10	115.0-116.0' - Fracture zone, 1"-3" rock fragments, larger fragments exhibit 30 deg	Н	Limestone - 115.0-119.5' - intermingled zones of	
			-10	orientation, planar surfaces	Ш	pale yellowish orange and light olive	
				116.1, 116.2' - Fractures or mechanical break	Ш	gray, (10YR 8/6 and 5Y 5/2),	
-			3	(2), horizontal, rough, undulating	ш	 moderate HCl reaction, medium strong (R3), 5-10% coverage of 	
-	R15-NQ			116.5' - Fracture, 75 deg, rough, undulating to planar	Н	small (1/6"-1/8") voids on surface,	-
-	5 ft	37	1	117.0' - Mechanical break, horizontal, rough,	口	 partial recrystallization 	_
-	90%			undulating .	₽	-	-
-			1	118.0' - Fracture, 45 deg, rough, planar	Ш	<u> </u>	
_			<u> </u>	118.5' - Fracture or mechanical break, 15 deg, rough, planar	\mathbb{H}	_	
			1	119.1' - Fracture or mechanical break, rough,	H		R15: 10 minutes
120	120.0		NR	undulating	Н	No Recovery 119.5-120.0'	1
-79.4				_	Ш	Limestone	
-			1	- 120.6' - Fracture, 15 deg, rough, planar	Ы	- 120.0-124.0' - Same as 115.0-119.5'	-
-			<u> </u>	120.0 - Fracture, 15 deg, rough, planar	口	except mild HCl reaction, strong (R4), larger cavities (1/4"-1/2")	-
-			4	121.1-121.3' - Fracture zone	버	 present in discrete zones of variable 	-
-				121.3' - Mechanical break, rough, undulating	Ш	spacing, most prominent in	-
_	R16-NQ 5 ft	55	>10	122.1' - Mechanical break, horizontal, rough,	Ш	fragmented zones (123.0-123.4'), – blackish brown staining on some	
	80%	00	Ĺ	undulating	H	fracture/fragment surfaces, minor	
				122.9-123.3' - Fracture zone, limestone fragments (1/2"-1-1/2"), dark brown staining	Ш	recrystallization, color becoming	1
			1	on surfaces	Ш	 darker with depth light olive gray (5Y 5/2) to medium olive brown (5Y 4/4) 	1
-				123.3, 124.0' - Fractures or mechanical break	団	No Recovery 124.0-125.0'	R16: 11 minutes
-	4050		NR	(2), horizontal, rough, undulating and planar	+	-	-
125	125.0				Ħ		
					\Box		ı



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-13 SHEET 8 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722927.1 N, 457933.5 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345; CME 75 S/N 252437, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

DISCONTINUTIES	DISCONTINUITIES DISCRIPTION TYPE ORIGINATION, ROUGHNESS, AMARTY, NIFILLING MATERIAL AND SURFACE STAINING, AND TIGHTNESS SURFA	DISCONTINUTIES DISC					IENT : CIVIE 33 3/IN 232343, CIVIE 73 3/IN 232437, ITIUU I		-	ORIENTATION : Vertical
DESCRIPTION PROCESS PLANARITY, INFILLING MAIREMAL AND PRUMPINESS SPANARITY, INFILLING MAIREMAL AND PRUMPINESS PLANARITY, INFILLING MAIREMAL AND PRUMPINESS PRUMPINESS PLANARITY, INFILLING MAIREMAL AND PRUMPINESS	DESCRIPTION Type, GRIENTATION, ROUGHNESS, WARTY, NPILLING MATERIAL, AND B., SURFACE STAINING, AND TIGHTNESS (APRILID LOSS, CORNING RATE AND S., SURFACE STAINING, AND TIGHTNESS) S. SURFACE STAINING, AND TIGHTNESS (APRILID LOSS, CORNING RATE AND DENTH OF CASING FLUID LOSS, CORNING RATE AND DENTH OF CASING FLUID LOSS, CORNING RATE AND SECURITY (CHARLES). 123.55' - Mechanical break (2), I, rough, undulating, and the control of the control o	Section Sect	WATER	LEVELS : 2.0	ft bgs	s on 5		23/200		
## 125.35, 123.55' - Mechanical break (2), horizontal, rough, undulating, healed fracture, tight 125.01-28.9' - yellowish orange to pale yellowish brown. (10YR 86 to 10YR 66.2), mild (10 reaction, medium strong to strong (R3 to R4), 10-20% coverage of 1716'-178' small voids on surface, larger oval shaped (10ss) morizontal, planar 126.0' - Fracture corrections of 127.3-127.7' - Fracture zone, irregular limestone fragments, undulating surfaces 128.6' - Fracture zone, cough, undulating surfaces on most fragments, who roizontal, planar, thin (174') bedding plane partings 130.0-132.1' - Fracture zone, rough, undulating surfaces on most fragments, who roizontal, planar, thin (174') bedding plane partings 130.0-130.5', 1/2'-1-1/2' fragments with 2'-4'-1/2' hide partings 130.5-135.2' - Bedding plane partings 135.5' - Tacture for possible vertical fracture, fine black staining on few fragments to 138.5' - Tacture, for possible vertical fracture, fine black staining on few fragments to 138.5' - Tacture, for possible vertical fracture, fine black staining on few fragments to 140.5' pale yellowish orange (10YR 7/4 to 19YR 8/6), mild HCl reaction, finely laminated of the partings (14'5' 12') exhibit variable density scross in the parting of voids, sparse large (cavillies) (14'-12') exhibit variable density scross in the parting of voids, sparse large (2010 from the partings) (14'-12') exhib	Limestone 123.55 - Mechanical break (2), al, rough, undulating, inclure, vertical, rough, undulating, acture, itight 1, planar 125.9' - Bedding plane (2), l, planar 1, planar 1, planar 1, reacture, horizontal, mouth 1, planar 1, reacture zone, irregular 1, reacture zone, irregular 1, rough, undulating 2, 1'- Fracture zone, irregular 1, rough, undulating 3, undulating 3, undulating 4, rough, undulating 3, undulating 4, rough, undulating 3, undulating 4, rough, undulating 4, rough, undulating 5, 2'- Fracture zone, irregular 1, rough, undulating 4, rough, undulating 5, 2'- Bedding plane, horizontal, multiple 1/4'-1/2" house are supported to the support of the s	Recovery 128-1-1350 135.0-135.2" - Bedding plane, horizontal, sugh, undulating surfaces on most fragments with 2-4" full dlameter core pieces between zones 135.0-135.2" - Bedding plane, horizontal, sugh, planar 136.7 - Fracture or mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, sugh, planar 136.7	200	(9)			DISCONTINUITIES	၂ ၂	LITHOLOGY	COMMENTS
A	Limestone 123.55 - Mechanical break (2), al, rough, undulating, acture, ight l, planar lacture, ight l, planar lacture, ight l, planar lacture in the control of the contr	125.35, 123.55 Mechanical break (2), horizontal, rough, undulating 125.0-128.9 yellowish orange to pale yellowish brown, (10YR &6 to 10YR &7), and HC I reaction. Path 125.0-128.9 yellowish orange to pale yellowish brown, (10YR &6 to 10YR &7), and HC I reaction. Path 125.0-128.9 yellowish brown, (10YR &6 to 10YR &7), and HC I reaction. Path 125.0-128.9 yellowish prompt to pale yellowish brown, (10YR &6 to 10YR &7), and HC I reaction. Path 125.0-128.9 yellowish prompt to pale yellowish brown, (10YR &6 to 10YR &7), and HC I reaction. Path 125.0-128.9 yellowish prompt to pale yellowish brown, (10YR &6 to 10YR &7), and the HC I reaction. Path 125.0-128.9 yellowish prompt to pale yellowish brown, (10YR &6 to 10YR &7), and the HC I reaction. Path 125.0-128.9 yellowish prompt to pale yellowish brown, (10YR &6 to 10YR &7), and the HC I reaction. Path 125.0-128.9 yellowish prompt to pale yellowish brown, (10YR &6 to 10YR &7), and the HC I reaction. Path 125.0-128.9 yellowish prompt to pale yellowish prompt to pale yellowish brown, (10YR &6 to 10YR &7), and the HC I reaction. Path 125.0-128.9 yellowish prompt to pale yellowish prompt to pale yellowish prompt to pale yellowish prompt to yellowish prompt to pale yellowish prompt to yellowish prompt to yellow yello	JONE S	, ND (%)		S	DESCRIPTION] 2 [ROCK TYPE COLOR	
## 125.35, 123.55' - Mechanical break (2), horizontal, rough, undulating, healed fracture, tight 125.01-28.9' - yellowish orange to pale yellowish brown. (10YR 86 to 10YR 66.2), mild (10 reaction, medium strong to strong (R3 to R4), 10-20% coverage of 1716'-178' small voids on surface, larger oval shaped (10ss) morizontal, planar 126.0' - Fracture corrections of 127.3-127.7' - Fracture zone, irregular limestone fragments, undulating surfaces 128.6' - Fracture zone, cough, undulating surfaces on most fragments, who roizontal, planar, thin (174') bedding plane partings 130.0-132.1' - Fracture zone, rough, undulating surfaces on most fragments, who roizontal, planar, thin (174') bedding plane partings 130.0-130.5', 1/2'-1-1/2' fragments with 2'-4'-1/2' hide partings 130.5-135.2' - Bedding plane partings 135.5' - Tacture for possible vertical fracture, fine black staining on few fragments to 138.5' - Tacture, for possible vertical fracture, fine black staining on few fragments to 138.5' - Tacture, for possible vertical fracture, fine black staining on few fragments to 140.5' pale yellowish orange (10YR 7/4 to 19YR 8/6), mild HCl reaction, finely laminated of the partings (14'5' 12') exhibit variable density scross in the parting of voids, sparse large (cavillies) (14'-12') exhibit variable density scross in the parting of voids, sparse large (2010 from the partings) (14'-12') exhib	Limestone 123.55 - Mechanical break (2), al, rough, undulating, inclure, vertical, rough, undulating, acture, itight 1, planar 125.9' - Bedding plane (2), l, planar 1, planar 1, planar 1, reacture, horizontal, mouth 1, planar 1, reacture zone, irregular 1, reacture zone, irregular 1, rough, undulating 2, 1'- Fracture zone, irregular 1, rough, undulating 3, undulating 3, undulating 4, rough, undulating 3, undulating 4, rough, undulating 3, undulating 4, rough, undulating 4, rough, undulating 5, 2'- Fracture zone, irregular 1, rough, undulating 4, rough, undulating 5, 2'- Bedding plane, horizontal, multiple 1/4'-1/2" house are supported to the support of the s	Recovery 128-1-1350 135.0-135.2" - Bedding plane, horizontal, sugh, undulating surfaces on most fragments with 2-4" full dlameter core pieces between zones 135.0-135.2" - Bedding plane, horizontal, sugh, planar 136.7 - Fracture or mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, sugh, planar 136.7	표원인	EP, A	(%	滿		┫	MINERALOGY, TEXTURE,	
84.4	Limestone 123.55 - Mechanical break (2), al, rough, undulating, inclure, vertical, rough, undulating, acture, itight 1, planar 125.9' - Bedding plane (2), l, planar 1, planar 1, planar 1, reacture, horizontal, mouth 1, planar 1, reacture zone, irregular 1, reacture zone, irregular 1, rough, undulating 2, 1' - Fracture zone, irregular 1, rough, undulating 2, 1' - Fracture zone, irregular 1, rough, undulating 3, undulating 3, undulating 4, rough, undulating 3, undulating 4, rough, undulating 4, rough, undulating 5, 2' - Fracture zone, irregular 1, rough, undulating 4, rough, undulating 5, rough, undulating 5, rough, undulating 6, rough, undulating 7, rough, undulating 7, rough, undulating 8, rough, undulating 9, rough, undulating 1, rough, undulating 2, - Fracture zone, irregular 2, - Fracture zone, irregular 3, rough, undulating 3, - Fracture zone, irregular 4, rough, undulating 4, rough, undulati	## 125.55. 123.55 - Mechanical break (2), horizontal, rough, undulating 125.0-128.9 - yellowish orange to pale yellowish brown, (10YR & 6t on pale yellowish pale to pale yellowish prown indicates possible partial ercystalization of pale yellowish pale to pale yellowish prown (10YR & 6t on pale yellowish prown) (10YR & 6t on	ĦĂ¥.	GT NO	0	FS	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	B		SMOOTHNESS, CAVING ROD
## 125.35, 123.55' - Mechanical break (2), horizontal, rough, undulating, healed fracture, tight 125.01-28.9' - yellowish orange to pale yellowish brown. (10YR 86 to 10YR 66.2), mild (10 reaction, medium strong to strong (R3 to R4), 10-20% coverage of 1716'-178' small voids on surface, larger oval shaped (10ss) morizontal, planar 126.0' - Fracture corrections of 127.3-127.7' - Fracture zone, irregular limestone fragments, undulating surfaces 128.6' - Fracture zone, cough, undulating surfaces on most fragments, who roizontal, planar, thin (174') bedding plane partings 130.0-132.1' - Fracture zone, rough, undulating surfaces on most fragments, who roizontal, planar, thin (174') bedding plane partings 130.0-130.5', 1/2'-1-1/2' fragments with 2'-4'-1/2' hide partings 130.5-135.2' - Bedding plane partings 135.5' - Tacture for possible vertical fracture, fine black staining on few fragments to 138.5' - Tacture, for possible vertical fracture, fine black staining on few fragments to 138.5' - Tacture, for possible vertical fracture, fine black staining on few fragments to 140.5' pale yellowish orange (10YR 7/4 to 19YR 8/6), mild HCl reaction, finely laminated of the partings (14'5' 12') exhibit variable density scross in the parting of voids, sparse large (cavillies) (14'-12') exhibit variable density scross in the parting of voids, sparse large (2010 from the partings) (14'-12') exhib	Limestone 123.55 - Mechanical break (2), al, rough, undulating, inclure, vertical, rough, undulating, acture, ight 1, planar 1, planar 1, planar 1, planar 1, planar 1, planar 1, precture zone, irregular 1, reacture zone, irregular 1, rough, undulating 2, 1'- Fracture zone, irregular 1, rough, undulating 2, 1'- Fracture zone, irregular 1, rough, undulating 3, irregular 1, rough, undulating 4, irregular 1, rough, undulating 3, irregular 1, rough, undulating 4, irregular 1, rough, undulating 3, irregular 1, rough, undulating 4, irregular 1, rough, undulating 4, irregular 1, rough, undulating 3, irregular 1, rough, undulating 4, irregular 4,	Recovery 128-1-1350 135.0-135.2" - Bedding plane, horizontal, sugh, undulating surfaces on most fragments with 2-4" full dlameter core pieces between zones 135.0-135.2" - Bedding plane, horizontal, sugh, planar 136.7 - Fracture or mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, horizontal, sugh, planar 136.7 - Fracture core mechanical break, sugh, planar 136.7	P.S.E.	E E S	Ø	RA		l ≥		DROPS, TEST RESULTS, ETC.
4 125.35, 123.55". Mechanical break (2), horizontal, rough, undulating, 125.7". Fracture, vertical, rough, undulating, 125.7". Fracture, vertical, rough, undulating, 125.7". Fracture, vertical, rough, undulating, 126.0". Fracture, loght 125.57, 125.9". Bedding plane (2), horizontal, planar 126.0". Fracture or mechanical break, norizontal, planar 126.0". Fracture or mechanical break, 127.3". Fracture or mechanical break, 128.0". Fracture or mechanical break, 138.0". Mechanical break	123.55 - Mechanical break (2), al, rough, undulating, racture, vertical, rough, undulating, racture, evertical, rough, undulating, acture, light 125.9° - Bedding plane (2), al, planar racture, horizontal, smooth 50 graphs and 125 graphs (6) graphs (7) - Fracture zone, irregular e fragments, undulating surfaces racture or mechanical break, al, rough, undulating all graphs (14°-1/8°) words and superior (14°-1/8°) words and surface, larger oval shaped (fossil molds) cavities (14°-1/2") occur variably throughout depth but 45% surface area, very fine grained dense interbeds as 125.75-125.9° and 126.0-126.3° yellowish gray (50° 77/2), laminated, with 45% small wit	4 d. 125.35, 123.55* Mechanical break (2), horizontal, rough, undulating, 125.7* Fracture, vertical, rough, undula		0715	Œ	шп		o		
horizontal, rough, undulating, 125.75, 125.97. Bedding plane, horizontal, rough, undulating, healed fracture, tight, 125.75, 125.97. Bedding plane, horizontal, rough, undulating, undulating, undulating, undulating, undulating, undulating, 126.07. Bedding plane, horizontal, smooth 127.3-127.7°. Fracture zone, irregular limestone fragments, undulating surfaces 128.0°. Fracture zone, irregular limestone fragments, including surfaces on most fragments, few horizontal, planar fracture, finch 144°-122° horizontal, rough, undulating surfaces on most fragments, few horizontal, planar, thin (144°) bedding plane partings 130.0-130.5°, 127-1-127 fragments with 2°-4° full diameter core pieces between 200.5° full support 130.0-130.5° grayish orange to yellowish gray, (10°R 7/4 to 5° 772), moderate F1G reaction, medium strong (R3), thin (34°) zones of dark gray fine familiations, thin (225) bedding plane partings 130.5° 135.0° surface and surfaces in the first part of the first pa	pale yellowish brown, (10YR 8/6 to 10YR 6/2), mild HCI reaction, medium strong to strong (R3 to R4), 10-20% coverage of 11/6"-18" small voids on surface, larger oval shaped (fossil molds) cavities (14"-12") occur variably throughout depth but 45% surface area, very fine grained dense interbeds at 125.75-125.9 and 126.0-1263 (7) ellowish gray (5Y 7/2), laminated, with 45% small voids on surface, larger oval shaped (fossil molds) cavities (14"-1/2") occur variably throughout depth but 45% surface area, very fine grained dense interbeds at 125.75-125.9 and 126.0-1263 (7) ellowish gray (5Y 7/2), laminated, with 45% small viols on surface, party (5Y 7/2), laminated, with 45% small viols on surface, party (5Y 7/2), laminated, with 45% small viols on surface, small viols on surface, party (5Y 7/2), laminated, with 45% small viols on surface, party (5Y 7/2), laminated, with 45% small viols, read of are gray (5Y 7/2), laminated, with 45% small viols on surface, party (5Y 7/2), laminated, with 45% small viols on surface, party (5Y 7/2), laminated, with 45% small viols on surface, party (5Y 7/2), laminated, with 45% small viols on surface, party (5Y 7/2), laminated, with 45% small viols on surface, party (5Y 7/2), laminated, with 45% small viols on surface, party (5Y 7/2), laminated, with 45% small viols on surface, party (5Y 7/2), laminated, with 45% small viols on surface, party (5Y 7/2), laminated, with 45% small viols on surface, party (5Y 7/2), laminated, with 45% small viols on surface, party (5Y 7/2), laminated, with 45% small viols on surface, party (5Y 7/2), laminated, with 45% small viols on surface, party (5Y 7/2), laminated, with 45% small viols on surface, party (5Y 7/2), laminated, with 45% small viols on surface, party (5Y 7/2), laminated, with 45% small viols on surface, party (5Y 7/2), laminated, with 45% small viols on surface, party (5Y 7/2), laminated, with 45% small viols on surface, party (5Y 7/2), laminated, with 45% small viols on surface, party (5Y 7/2), laminated, with 45% small viols on surface,	horizontal, rough, undulating, 152.7 - Fracture, vertical, rough, undulating, 152.6 - 174.2 - 174.2 -	-84.4			1	405.05.400.55l. Maskariasl.kmask.(0)	Н		
1 1 25.7°- Fracture, vertical, rough, undulating, healed fracture, tight 1 25.7°s, 125.9°- Bedding plane (2), horizontal, planar 1 25.7°s, 125.9°- Bedding plane (2), horizontal, planar 1 26.0°- Fracture, horizontal, smooth 1 27.3°1-27°. Fracture zone, irregular limestone fragments, undulating surfaces 1 28.6°- Fracture zone, rough, undulating surfaces 2 128.6°- Fracture zone zone so the horizontal, planar, thin (1/4") bedding plane partings 3130.0-130.5°- grayish orange to yellowish gray, (10/4" 16.5°) bedding plane partings 3130.5°- 313.5°- 31	Tracture, vertical, rough, undulating, acture, light 10.7% 6/2), mild HCI reaction, medium strong to strong (R3 to R4), 10-20% coverage of 1/16"-1/8" small voids on surface, larger oval shaped (rossil molds) cavities (1/4"-1/2") occur variably throughout depth but 98 surface area, very fine grained dense interbeds at 125.75-125.9" and 126.0-126.3" vellowish gray (5Y 7/2), laminated, with <5% small (1/4"-1/8") voids 1/4"-1/8" voids 1/4	1 1 25.7 - Fracture, vertical, rough, undulating, healed fracture, tight of the process of the p	1 7			4		Ш		
1	acture, tight 125.9" - Bedding plane (2), al, planar racture protizental, rough, gedding plane, horizontal, smooth 7.7" - Fracture zone, irregular fragments, undulating surfaces racture or mechanical break, al, pough, undulating al, planar thir (14") bedding plane 130.0-130.5", 172"-1-1/2" fragments "full diameter core pieces between 130.0-130.5", 172"-1-1/2" fragments 130.0-130.5", 172"-1-1/	healed fracture, tight 1	-					╁┼		
Name	al, planar racture, horizontal, rough, gg sedding plane, horizontal, smooth 7.7 - Fracture zone, irregular e ragments, undulating surfaces fracture or mechanical break, 1, rough, undulating 2.1 - Fracture zone, rough, gg surfaces on most fragments, few al, planar, thin (1/4") bedding plane 130.0-130.5 - grayish orange to yellowish gray, (10YR 7/4 to 5Y 7/2), moderate HCl reaction, medium strong (R3), thin (3/4") zones of dark gray fine laminations, him (>25) bedding plane partings 130.5-132.1 - grayish yellow, (5Y 8/4), weak (R2), 15-20% coverage of 1/6"-1/8" small voids, larger (1/4"-3/4") cavities/fossil molds, friable No Recovery 132.1-135.0' Limestone 130.0-130.5' grayish orange to yellowish gray, (10YR 7/4 to 5Y 7/2), moderate HCl reaction, medium strong (R3), thin (3/4") zones of dark gray fine laminations, him (>25) bedding plane partings 130.5-132.1 - grayish yellow, (5Y 8/4), weak (R2), 15-20% coverage of 1/6"-1/8" small voids, larger (1/4"-3/4") cavities/fossil molds, friable No Recovery 132.1-135.0' Limestone 130.0-130.5' -grayish orange to yellowish gray, (10YR 7/4 to 5Y 7/2), moderate HCl reaction, medium strong (R3), thin (1/4") below ground surface, soft drilling, possible void drilling, possible void drilling, possible void drilling, possible void strainle lack staining on few fractures (pyrite) 135.2-138.7' - grayish orange 130.0-130.5' - grayish orange 130.0-130.5' - grayish orange 130.0-130.5' - grayish orange 130.0-130.5' - grayish vellow, (5Y 8/4), weak (R2), 15-20% coverage of 1/6"-1/8" small voids larger (1/4"-3/4") cavities/fossil molds friable No Recovery 132.1-135.0' R18: 4 minutes Fine black staining on few fracture or mechanical break, 10/14"-1/2") <5% (fossil molds) No Recovery 133.7-140.0' Limestone 130.0-130.5' 130.5-132.1' -grayish yellow, (5Y 8/4), weak (R2), 15-20% coverage of 1/6"-1/8" small voids (1/16"-1/8") yellowish orange, (10YR 7/4 to 10YR 8/6), mild HCl reaction, medium strong (R3), small voids (1/16"-1/8") yellowish orange, (10YR 7/4 to 10YR 135.2-138.7' -grayish o	horizontal, planar 126 - Fracture, horizontal, rough, undulating undulating surfaces, possible vertical fracture, fine black staining on few fractures (govite) 130	-			1		╀┼┼		-
Table Tabl	Fracture, horizontal, rough, go cocru variably throughout depth but 5% surface area, very fine grained dense interbeds at 125, 75-125 of and 126,0-126,3' yellowish gray (GY 7/2), laminated, with <5% small (1/4"-1/2"), laminated, with <5% small (1/4"-1/2"), small (1/4") pedragon of the standard of the	Test					125.75, 125.9' - Bedding plane (2),	Ш		_
nudulating 126.2* Bedding plane, horizontal, smooth 127.3-127.7* Fracture zone, irregular ilmestone fragments, undulating surfaces 128.6* Fracture or mechanical break, horizontal, rough, undulating surfaces 128.6* Fracture or mechanical break, horizontal, planar, thin (1/4") bedding plane partings 130.0-130.5* [127-14-12" finick partings 130.130.0* R18-NO 10	sedding plane, horizontal, smooth 7.7 - Fracture zone, irregular e fragments, undulating surfaces Fracture or mechanical break, 1, rough, undulating 1.7 - Irracture zone, riregular e fragments, undulating surfaces Fracture or mechanical break, 1, rough, undulating 2.1 - Fracture zone, rough, gs surfaces on most fragments, few al, planar, thin (1/4") bedding plane 130.0-130.5 - grayish orange to yellowish gray, (10YR 7/4 to 5Y 7/2), moderate HCl reaction, medium strong (R3), thin (3/4") zones of dark gray fine laminations, thin (>25) bedding plane partings 130.5-132.1 - grayish yellow, (5Y 8/4), weak (R2), 15-20% coverage of 1/6"-1/8" small voids, larger (1/4"-3/4") cavities/fossil molds, friable No Recovery 132.1-135.0' Limestone 135.0-135.2 - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild HCl reaction, finely laminated, bedding plane partings (1/4") 135.2-138.7 - grayish orange to yellowish gray, (10YR 7/4 to 5Y 7/2), moderate HCl reaction, medium strong (R3), small voids, larger (1/4"-3/4") cavities/fossil molds, friable No Recovery 132.1-135.0' Limestone 135.0-135.2 - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild HCl reaction, finely laminated, bedding plane partings (1/4") 135.2-138.7 - grayish orange to yellowish gray (10YR 7/4 to 5Y 7/2), moderate HCl reaction, fracture or mechanical break, friable No Recovery 132.1-135.0' R18: 4 minutes Fine black staining on few fractures (pyrite) SC-4 collected at 135.7- 136.6' Fracture zone, irregular, gray fine laminations, thin (<25) bedding plane partings (1/4") 135.2-138.7 - grayish orange to yellowish orange, (10YR 7/4 to 10YR 8/4), weak (R2), partings/breaks concentrate along zones with higher percentage of voids, sparse large cavities (1/4"-1/2") <5% (fossil molds) No Recovery 133.7-140.0' Limestone 140.0-140.5 - pale yellowish orange, (10YR 8/6), very weak to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and larger cavities/fossil molds (up to 1/4"), some infilling of cavities with soft white carbonate material	undulating 126.2 - Bedding plane, horizontal, smooth 127.3-127.7 - Fracture zone, irregular ill misestone fragments, undulating surfaces 126.6 - Fracture or mechanical break, NR NR NR NR NR 130 130.0 -89.4 >10 130 130.0 130 130.0 130 130.0 130 130.0 130 130.0 130 130 130 130 13						Н		
126.2 - Bedding plane, horizontal, smooth 127.3-127.7 - Fracture zone, irregular limestone fragments, undulating surfaces 128.6' - Fracture or mechanical break, horizontal, rough, undulating surfaces on most fragments, few horizontal, planer, thin (14") bedding plane partings 130.0-130.5' - 130.0-130.5' - grayish or ange to yellowish gray, (10YR 7/4 to 5Y 7/2), moderate HCI reaction, medium strong (R3), thin (3/4") yealing plane partings 130.0-130.5', 1/2"-1-1/2" fragments with 2"-4" full diameter core pieces between zones 135 135.0 135 135.0 135 135.0 135 135.0 135 135.0 135 135.0 135 135.0 135 135.0 135 135.0 136 137 2 - Bedding plane, horizontal, smoth horizontal, smoth, multiple 1/4"-1/2" thick partings 130.5-132.1' - grayish yellow, (5Y 8/4), weak (R2), 15-20% coverage of 1/6"-1/8" small voids, larger (1/4"-3/4") cavilies/fossil molds, friable No Recovery 132.1-135.0' 135 135.0 135 135.0 135 135.0 135 135.0 135 135.0 135 135.0 135 135.0 136 135.0 137 137 Fracture or mechanical break, horizontal, smoth, multiple 1/4"-1/2" thick partings 130.5-132.1' - grayish yellow, (5Y 8/4), weak (R2), 15-20% coverage of 1/6"-1/8" small voids, larger (1/4"-3/4") cavilies/fossil molds, friable No Recovery 132.1-135.0' 135 135.0 135 135.0 135 135.0 135 135.0 135 135.0 135 135.0 135 135.0 135 135.0 135 135.0 135 135.0 135 135.0 135 135.0 135 135 135.0 135 135 135 135 135 135 135 135 135 135	Sedding plane, horizontal, smooth 7.7 - Fracture zone, irregular e fragments, undulating surfaces racture or mechanical break, al, rough, undulating 2.1' - Fracture zone, rough, gs surfaces on most fragments, few al, planar, thin (114") bedding plane 130.0-130.5', 1/2"-1-1/2" fragments "full diameter core pieces between Tough, plane, horizontal, multiple 1/4"-1/2" hick partings racture or mechanical break, al, rough, undulating 3.2' - Fracture zone, rough, grouph, planar reacture, horizontal, rough, planar dechanical break, 60 deg, rough, Tracture, 40 deg, smooth, planar reacture, 40 deg, smooth, planar reacture, vertical, rough, undulating, gs. 4" reacture or bedding plane, horizontal, multiple 1/4"-1/2") - 5% (fossil molds) No Recovery 132.1-135.0' Limestone 135.0-135.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild HCl reaction, finely laminated, bedding plane partings 135.0-135.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild HCl reaction, finely laminated, bedding plane partings 135.0-135.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild HCl reaction, finely laminated, bedding plane partings 135.0-135.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild HCl reaction, finely laminated, bedding plane partings 130.0-130.5' grayish vellow, (5Y 8/4), yesid yesid yesid gray 10% (714"-1/2") yesid yesid 10% (714"-1/2") yesid yesid 10% (714"-1/2") yesid 10% (714"-1/2"	1 126.2 - Bedding place, horizontal, smooth limestone fragments, undulating surfaces 126.6 - Fracture zone, irregular limestone fragments, undulating surfaces 126.6 - Fracture zone, irregular limestone fragments, undulating surfaces 126.6 - Fracture zone, irregular limestone fragments, undulating surfaces 200 most fragments, few undulating surfaces on most fragments, few undulating surfaces, post of surfaces, few undulating surfaces, possible vertical fracture, fine black staining on few fragments surfaces, few undulating surfaces, possible vertical fracture, fine black staining on few fragments surfaces, few undulating surfaces, possible vertical fracture, fine black staining on few fragments surfaces, few undulating surfaces, possible vertical fracture, fine black staining on few fragments surfaces, few undulating surfaces, possible vertical frough, undulating surfaces, possible vertic	1 7		43	>10		╫		
1 1 27.3-127.7" - Fracture zone, irregular limestone fragments, fundulating surfaces 2126.6" - Fracture or mechanical break, horizontal, rough, undulating surfaces on most fragments, few horizontal, planar, thin (147) bedding plane partings 130.0-130.5", 127-112" fragments with 2"-4" full diameter core pieces between zones 130.0-132.1" - grayish yellow, (5Y 8/4), weak (R2), 15-20% coverage of 16*-18* small voids, larger (1/4"-3/4") cavities/fossil molds, friable No Recovery 132.1-135.0" 135	dense interbeds at 126.75-125.9' and 2126.79-125.9' and 126.0-126.3' yellowish gray (SY 7/2), laminated, with <5% small (1/16"-1/8") voids (1/16"-	1 1 27.3-127.7 - Fracture zone, irregular ilmestone fragments, undulating surfaces il 26.6 - Fracture or mechanical break, horizontal, rough, undulating surfaces on most fragments, few horizontal, lagran, thin (147) bedding plane partings 130.0-132.1 - Fracture zone, rough, undulating surfaces on most fragments, few horizontal, lagran, thin (147) bedding plane partings 130.0-130.5 1;72-1-112* fragments with 2*4* full diameter core pieces between with 2*4* fu	-	70%				╆		-
Imestone fragments, undulating surfaces 128.6 - Fracture or mechanical break, horizontal, rough, undulating surfaces on most fragments, few horizontal, planar filt (1/4) bedding plane partings 130.0-130.5', 1/2"-1-1/2" fragments with 2"-4" full diameter core pieces between zones 135.0-135.2' - Bedding plane, horizontal, smooth, multiple 14"-1/2" thick partings 130.5-132.1' - grayish vellow, (5Y all conditions) 135.0-135.2' - Bedding plane, horizontal, smooth, multiple 14"-1/2" thick partings 135.5' - Fracture, horizontal, rough, planar 136.7' - Mechanical break, horizontal, rough, planar 136.7' - Mechanical break, horizontal break, 60 deg, rough, planar 136.7' - Mechanical break, 60 deg, rough, planar 136.7' - Mechanical break, horizontal break, horizontal, supplication break, horizontal break, horizontal, supplication break, horizontal, supplicati	al, rough, undulating 2.1' - Fracture zone, rough, g surfaces on most fragments, few al, lorugh, undulating 2.1' - Fracture zone, rough, g surfaces on most fragments, few al, planar, thin (1/4") bedding plane 130.0-130.5', 1/2"-1-1/2" fragments "full diameter core pieces between "full diameter core pieces betwee	limestone fragments, undulating surfaces 128.6 - Fracture or mechanical break, horizontal, rough, undulating surfaces on most fragments, few horizontal, planar, thin (1/4") bedding plane partings 130.0 - 130.5 - 132 - 11/2" fragments with 2"-4" full diameter core pieces between zones NR 135.0 135.0	_			1		\vdash		_
NR horizontal, rough, undulating 130.0 130.0 130.0 130.0-132.1' - Fracture zone, rough, undulating surfaces on most fragments, few horizontal, planar, thin (1/4") bedding plane partings (130.0-130.5', 1/2"-1-1/2" fragments with 2"-4" full diameter core pieces between zones R18-NQ	al, rough, undulating 2.1' - Fracture zone, rough, gaurfaces on most fragments, few al, planar, thin (1/4") bedding plane 130.0-130.5', 1/2"-1-1/2" fragments "full diameter core pieces between diameters full (3/4") zons of dark gray fine laminations, thin (<25) bedding plane partings "full diameter core full diameter full diamet	130 130.0 -89.4						Н		
130.0-132.1' - Fracture zone, rough, undulating surfaces on most fragments, few horizontal, planar, thin (1/4") bedding plane partings 130.0-130.5', 12"-1-172" fragments strong (R3), thin (3/4") zones of dark gray fine laminations, thin (c25) bedding plane partings (130.0-130.5' 12"-1-174" fragments strong (R3), thin (3/4") zones of dark gray fine laminations, thin (c25) bedding plane partings (130.5-132.1' - grayish yellow, (5Y 8/4), weak (R2), 15-20% coverage of 1/6"-1/8" small voids, larger (1/6"-1/8") small voids (1/6"-1/6")	No Recovery 128.9-130.0* Limestone 130.0-130.5*, 1/22*-1-1/2* fragments "full diameter core pieces between "full diameter core full diameter (18°, 19°, 19°, 19°, 19°, 19°, 19°, 19°, 19	130 0 130.0	1 7					Ш		R17: 9 minutes
130.0-132.1' - Fracture zone, rough, undulating surfaces on most fragments, few horizontal, planar, thin (1/4') bedding plane partings 130.0-130.5', 1/2"-1-1/2" fragments with 2"-4" full diameter core pieces between zones R18-NO	2.1' - Fracture zone, rough, glandar, thin (1/4") bedding plane and plane is few gray fine laminations, thin (25) bedding plane partings (1/4"-1/2" thick partings racture or mechanical break, all rough, undulating guardes, possible vertical fine black staining on few fragments whechanical break, 60 deg, rough, modulating staining or few fracture or mechanical break, lough, undulating 2.2" - Fracture zone, irregular, graytine plane with consumer than the chanical break, 40.0 -140.5" - pale yellowish orange, (10/YR 7/4 to 10/YR 8/6), very weak to weak (R1 to R2). 15-7% coverage of 10/8" 1/8" small voids, larger (1/4"-1/2" thick partings fracture or mechanical break, all rough, planar recture zone, irregular, graytine orange, (10/YR 7/4 to 10/YR 8/6), mild HCl reaction, medium strong (R3), small voids (1/16"-1/8") strong (R3), small voids (1/16"-1/8") strong (R3), small voids (1/16"-1/8") small voids and larger cavities/fossil molds (up to 1/4"), some infilling of cavities with soft white carbonate material	130 0.132.1's Fracture zone, rough, undulating surfaces on most fragments, few horizontal, planar, thin (1/4") bedding plane partings 130 0.130.5' 132'-1/12" fragments with 2"4" full diameter core pieces between zones 135 136.0 135 136.0 136 0.135.2' - Bedding plane, horizontal, smooth, multiple 14"4"-1/2" thick partings 136.4' - Fracture or mechanical break, horizontal, rough, planar 136.7' - Mechanical break, rough, undulating, planar 136.2' - Mechanical break, rough, undulating 138.2' - Mechanical break, following the process of the planar 141.1' - Fracture or mechanical break, erical, rough, undulating 144.1' - Fracture, 40 deg, smooth, planar 141.1' - Fracture or mechanical break, certical, rough, undulating, healed, light 14.2' - Fracture, 40 deg, smooth, planar 141.1' - Fracture, 40 deg, smooth, planar 141.	l			NR	horizontal, rough, undulating	╂┼┼		-
ndulating surfaces on most fragments, few horizontal, planar, thin (1/4") bedding plane partings 130.0-130.5', 1/2"-1-1/2" fragments with 2"-4" full diameter core pieces between zones NR 135 135.0 135 135.0 135 135.0 135 135.0 136 136 27 137 27 137 27 138 2" - Fracture, horizontal, rough, planar 136.7' - Fracture, horizontal, rough, planar 136.8' - Mechanical break, rough, undulating surfaces, possible vertical fracture, fine black staining on few fragments 138.2' - Mechanical break, planar 138.2' - Mechanical break, folded and response to the control of the co	13.0.0-130.5' - grayish orange to yellowish gray, (10YR 7/4 to 5Y 7/2), moderate HCl reaction, medium strong (R3), thin (3/4") zones of dark gray fine laminations, thin (3/4") zones of	135 135.0		130.0			420.0.422.41 Freeture ==== ===============================	╂┼┼╂		
horizontal, planar, thin (1/4") bedding plane partings 130.0-130.5'; 1/2"-1-1/2" fragments with 2"-4" full diameter core pieces between zones NR 135	yellowish gray, (10YR 7/4 to 5Y 7/2), moderate HCl reaction, medium strong (R3), thin (3/4") zones of dark gray fine laminations, thin (<25) bedding plane partings (10% +1.2" thick partings fracture or mechanical break, elso the staining on few fracture zone, irregular, gray surfaces, possible vertical fine black staining on few fragments whechanical break, 60 deg, rough, pararefracture or mechanical break, 60 deg, rough, pararefracture, 40 deg, smooth, planarefracture, 40 deg, smooth, planarefracture or mechanical break, cough, undulating (1/4"-1/2") -5% (fossil molds) No Recovery 132.1-135.0' Limestone view for surface, soft dark gray fine laminations, thin (<25) bedding plane partings (1/4") cavities/fossil molds, friable voice of (1/6"-1/8") cavities/fossil molds, friable voice of (1/4"-1/2") cavities/fossil molds, friable voice of (1/6"-1/8") cavities/fossil molds, friable voice of	horizontal, planar, thin (14") bedding plane partings 130,0-130.5, 12"-1-1/2" framents with 2"-4" full diameter core pieces between zones NR 135	-09.4			>10		Д		
partings 130.0-130.5; 1/2"-1-1/2" fragments with 2"-4" full diameter core pieces between 2 strong (R3), thin (3/4") zones of dark gray fine laminations, thin (<25) bedding plane partings 130.5-132.1" grayish yellow, (5Y 8/4), weak (R2), 15-20% coverage of 1/6"-1/8" small voids, larger (1/4"-3/4") cavities/fossil molds, friable No Recovery 132.1-135.0' 135.0-135.2' - Bedding plane, horizontal, smooth, multiple 1/4"-1/2" thick partings 135.4" - Fracture or mechanical break, horizontal, rough, planar 135.7" - Fracture, horizontal, rough, planar 135.7" - Fracture, spossible vertical fracture, fine black staining on few fragments 138.2' - Mechanical break, 60 deg, rough, planar 140.140.0 99.4 140.140.0 150.135.2' - Fracture, 40 deg, smooth, planar 140.0-140.5" - pale yellowish orange, (10YR 8/6), very weak to weak (R1 to 10YR 8/6).	moderate HCI reaction, medium strong (R3), thin (3/4") zones of dark gray fine laminations, thin (<25) bedding plane partings 130.5-132.1", grayish yellow, (5Y 8/4), weak (R2), 15-20% coverage of 1/6"-1/8" small voids, larger (1/4"-3/4") cavities/fossil molds, friable No Recovery 132.1-135.0' Limestone 135.0-135.2" - yellowish gray to light olive gray, (5Y 7/2) to 5Y 5/2), mild HCI reaction, finely laminated, bedding plane partings (1/4") 135.2-138.7" - grayish orange to yellowish orange, (10YR 7/4 to 10YR 8/6), mild HCI reaction, medium strong (R3), small voids (1/6"-1/8") exhibit variable density across interval (<5% up to 20+%) partings/breaks concentrate along zones with higher percentage of voids, sparse large cavities (1/4"-1/2") <5% (fossil molds) No Recovery 138.7-140.0' Limestone 135.0-135.2" - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild HCI reaction, finely laminated, bedding plane partings (1/4") 135.2-138.7" - grayish orange to yellowish orange, (10YR 7/4 to 10YR 8/6), mild HCI reaction, medium strong (R3), small voids (1/6"-1/8") exhibit variable density across interval (<5% up to 20+%) partings/breaks concentrate along zones with higher percentage of voids, sparse large cavities (1/4"-1/2") <5% (fossil molds) No Recovery 138.7-140.0' Limestone 140.0-140.5" - pale yellowish orange, (10YR 7/4 to 10YR 8/6), very weak to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and larger cavities/fossil molds (up to 1/4"), some infilling of cavities with soft white carbonate material	Partings 130.0-130.5; 1/2"-1-1/2" fragments with 2"-4" full diameter core pieces between zones "diameter core pieces between zones" "diameter core pieces between zones and zones" "diameter core pieces between zones and zones zones and zones zones and zones and zones zones zones zones and zones and zones				710		Н		
R18-NQ 5 ft 42% NR NR NR Since the series of	strong (R3), thin (34") zones of dark gray fine laminations, thin (<25) bedding plane partings 130.5-132.1' - grayish yellow, (57 844), weak (R2), 15-20% coverage of 1/6"-1/8" small voids, larger (1/4"-3/4") cavities/fossil molds, friable No Recovery 132.1-135.0' Limestone 135.0-135.2' - yellowish gray to light olive gray, (57 7/2 to 57 5/2), mild HCl reaction, finely laminated, bedding plane partings (1/4") 135.2-138.7' - grayish orange to yellowish orange, (107K 7/4 to 107K 8/6), mild HCl reaction, medium strong (R3), small voids (1/16"-1/8") exhibit variable density across interval (<5% up to 20+%) partings/ones with higher percentage of voids, sparse large cavities fossil molds) No Recovery 138.7-140.0' Fracture, 40 deg, smooth, planar fracture, vertical, rough, undulating, 15.2" Fracture zone, irregular, sough, undulating 15.2" overage of 1/16"-1/8" small voids and larger cavities/fossil molds (1/16"-1/8") small voids and partings/break to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and larger cavities/fossil molds (1/16"-1/8") small voids and partings/break to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and partings/break to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and partings/break to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and partings/break to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and partings/break to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and partings/break to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and partings/break to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and partings/break to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and partings/break to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and partings/break to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and partings/break to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and partings/break to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and partings/break to	Start Star	1 7					╁┼╁	moderate HCl reaction, medium	
R18-NQ 5 ft 42%	bedding plane partings 130.5-132.1' - grayish yellow, (5Y 8/4), weak (R2), 15-20% coverage of 1/6"-1/8" small voids, larger (1/4"-3/4") cavities/fossil molds, friable No Recovery 132.1-135.0' Limestone 135.0-135.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild HCl reaction, finely laminated, bedding plane partings 15.2' - Bedding plane, horizontal, multiple 1/4"-1/2" thick partings Fracture or mechanical break, al, rough, planar Mechanical break, rough, undulating 8.2' - Fracture zone, irregular, g surfaces, possible vertical fine black staining on few fragments Mechanical break, 60 deg, rough, Fracture, 40 deg, smooth, planar Fracture, 40 deg, smooth, planar Fracture or mechanical break, rough, undulating 2.2' - Fracture zone, limestone s <1" Fracture or mechanical break, rough, undulating 2.2' - Fracture zone, limestone s <1" Fracture or bedding plane, horizontal, fracture, vertical, rough, undulating, ight Driller's Remark: 100% loss of circulation at 132.0' below ground surface, soft drilling, possible void R18: 4 minutes Fine black staining on few fractures (pyrite) SC-4 collected at 135.7- 136.6' R18: 4 minutes Fine black staining on few fractures (pyrite) SC-4 collected at 135.7- 136.6' Fracture and the properties of the prope	R18-NG S ft 135.0 NR NR	-			>10		╓		-
135. 135.0 NR NR 135.0-135.2' - Bedding plane, horizontal, smooth, multiple 1/4"-1/2" thick partings 135.4' - Fracture or mechanical break, horizontal, rough, planar 136.7' - Fracture, horizontal, rough, planar 136.9-138.2' - Fracture zone, irregular, undulating surfaces, possible vertical fracture, fine black staining on few fragments 138.2' - Mechanical break, 60 deg, rough, planar 140.0 NR NR 140.0 -99.4 1 1 1 1 1 1 1 1 1	130.5-132.1* - grayish yellow, (5Y 8/4), weak (R2), 15-20% coverage of 1/6*-1/8* small voids, larger (1/4*-3/4*) cavities/fossil molds, fritable No Recovery 132.1-135.0* Limestone 135.0-135.2* - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild HCI reaction, finely laminated, bedding plane partings (1/4*) 135.2-138.7* - grayish orange to yellowish orange, (10/YR 7/4 to 10/YR 8/6), mild HCI reaction, medium strong (R3), small voids (1/16*-1/8*) exhibit variable density across interval (<5% up to 20/4%) partings/breaks concentrate along zones with higher percentage of voids, sparse large cavities (1/4*-1/2*) <5% (fossil molds) No Recovery 138.7* - grayish vellow, (5Y below ground surface, soft drilling, possible void stilling, possible void drilling, po	135 135.0	-				zones	╀		
135_0-135.2' - Bedding plane, horizontal, smooth, multiple 1/4"-1/2" thick partings 135.4' - Fracture or mechanical break, horizontal, rough, planar 136.7' - Mechanical break, rough, undulating 136.9-138.2' - Fracture zone, irregular, undulating surfaces, possible vertical fracture, fine black staining on few fragments 138.2' - Mechanical break, 60 deg, rough, planar 140_140.0	8/4), weak (R2), 15-20% coverage of 1/6"-1/8" small voids, larger (1/4"-3/4") cavities/fossil molds, friable No Recovery 132.1-135.0' Limestone 135.0-135.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild HCl reaction, finely laminated, bedding plane partings (1/4") 135.2-138.7' - grayish orange to yellowish orange, (10/YR 7/4 to 10/YR 8/6), mild HCl reaction, medium strong (R3), small voids (1/16"-1/8") samily voids, sparse large cavities (1/4"-1/2") <5% (fossil molds) No Recovery 138.7-140.0' Limestone 135.0-135.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild HCl reaction, finely laminated, bedding plane partings (1/4") 135.2-138.7' - grayish orange to yellowish orange, (10/YR 8/6), mild HCl reaction, medium strong (R3), small voids (1/16"-1/8") schibit variable density across interval (<5% up to 20+%) partings/breaks concentrate along zones with higher percentage of voids, sparse large cavities (1/4"-1/2") <5% (fossil molds) No Recovery 138.7-140.0' Limestone 135.0-135.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild HCl reaction, finely laminated, bedding plane partings (1/4") 135.2-138.7' - grayish orange to yellowish orange, (6) mild HCl reaction, medium strong (R3), small voids (1/16"-1/8") schibit variable density across interval (<5% up to 20+%) partings/breaks concentrate along zones with higher percentage of voids, sparse large cavities (1/4"-1/2") <5% (fossil molds) No Recovery 138.7-140.0' Limestone 135.0-135.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild HCl reaction, finely laminated, bedding plane partings (1/4") 135.2-138.7' - grayish orange, (10/YR 7/4 to 10/YR 8/6), mild HCl reaction, medium strong (R3), small voids (1/16"-1/8") 240.0-140.5' - pale yellowish orange, (10/YR 8/6), very weak to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and larger cavities/fossil molds (up to 1/4"), some infilling of cavities with soft white carbonate material	helding plane, horizontal, smooth, multiple 14"-1/2" thick partings 135.0-135.2" - Bedding plane, horizontal, smooth, multiple 14"-1/2" thick partings 135.4" - Fracture or mechanical break, horizontal, rough, planar 135.7" - Fracture, horizontal, rough, planar 136.7" - Mechanical break, rough, undulating surfaces, possible vertical racture, fine black staining on few fractures (pryfte) 138.2" - Acceptable vertical racture, fine black staining on few fractures (pryfte) 138.2" - Fracture zone, irregular, undulating surfaces, possible vertical racture, fine black staining on few fractures (pryfte) 138.2" - Fracture zone, irregular, undulating surfaces, possible vertical fracture, fine black staining on few fractures (pryfte) 138.2" - Fracture zone, irregular, undulating surfaces, possible vertical fracture, fine black staining on few fractures (pryfte) 138.2" - Fracture zone, irregular, undulating surfaces, possible vertical fracture, fine black staining on few fractures (pryfte) 138.2" - Fracture zone, irregular, undulating surfaces, possible vertical fracture, fine black staining on few fractures (pryfte) 138.2" - Fracture zone, irregular, undulating strong (R3), small volds (1/16"-118" strings/breaks concentrate along zones with higher percentage of volds, sparse large cavities (1/14"-1/2") - 5% (fossil molds) No Recovery 138.7-140.0" Limestone 140.0 140.0 - 99.4 11 1 140.0 - Fracture, 40 deg, smooth, planar 141.1" - Fracture or mechanical break, vertical, rough, undulating, laled, tight 142.8" - Fracture zone, limestone fragments <1" 142.2" - Fracture zone, imestone fragments <1" 142.2" - Fracture zone, imestone fragments <1" 142.2" - Fracture zone, imestone fragments <1" 141.2" - Fracture or bedding plane, horizontal, smooth 142.8" - Fracture, vertical, rough, undulating, black coating (possibly pyrite) on surface						Ш		
NR 135 135.0 -94.4 -94.4 -94.4 -94.4 -94.4 -94.4 -95.6 -10 R19-NQ -5 ft 7/4% -10 -10 -10 -10 -10 -10 -10 -1	## 1.1/6" -1/8" small voids, larger (1/4"-3/4") cavities/fossil molds, friable No Recovery 132.1-135.0' Limestone	NR 135	1 7		U			Ш	8/4) weak (R2) 15-20% coverage of	
NR 135 135.0 -94.4 -	(1/4"-3/4") cavities/fossil molds, friable No Recovery 132.1-135.0' Limestone 135.0-135.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild HCl reaction, finely laminated, bedding plane partings (1/4") 135.0-138.7' - grayish orange to yellowish orange, (10YR 7/4 to 10YR 8/6), mild HCl reaction, medium strong (R3), small voids (1/16"-1/8") 135.2-138.7' - grayish orange to yellowish orange, (10YR 7/4 to 10YR 8/6), mild HCl reaction, medium strong (R3), small voids (1/16"-1/8") 135.2-138.7' - grayish orange to yellowish orange, (10YR 7/4 to 10YR 8/6), mild HCl reaction, medium strong (R3), small voids (1/16"-1/8") 27 - Fracture zone, inestone 18 - Control of the black staining on few fractures (pyrite) 19 - Control of the black staining on few fractures (pyrite) 135.0-138.7' - grayish orange to yellowish orange (10YR 7/4 to 10YR 8/6), mild HCl reaction, medium strong (R3), small voids (1/16"-1/8") 28 - Fracture sone, limestone 19 - Control of the black staining on few fractures (pyrite) 135.0-136.6' 135.0-135.2' - yellowish gray to light olive gray, to light olive gray, (5Y 7/2 to 5Y 5/2), mild HCl reaction, finely laminated, bedding plane partings (1/4") 135.0-138.7' - grayish orange to yellowish orange (10YR 7/4 to 10YR 8/6), mild HCl reaction, medium strong (R3), small voids (1/16"-1/8") 136.6' 136.6' 136.6' 137 - Tacture voids and larger cavities (1/16"-1/8") 137 - Tacture voids and larger cavities/fossil molds (up to 1/4"), some infilling of cavities with soft white carbonate material	NR 135. 135.0 -94.4 State	-	1270				╂┯╂		
Table No Recovery 132.1-135.0' R18: 4 minutes R18: 10 mi	No Recovery 132.1-135.0' Limestone 135.0-135.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild HCI reaction, finely laminated, bedding plane partings (1/4") 135.2-138.7' - grayish orange to yellowish orange, (10YR 7/4 to 10YR 8/6), mild HCI reaction, medium strong (R3), small voids (1/16"-1/8") exhibit variable density across interval (<5% up to 20+%) partings/breaks concentrate along zones with higher percentage of voids, sparse large cavities (1/4"-1/2") <5% (fossil molds) No Recovery 132.1-135.0' R18: 4 minutes Fine black staining on few fractures (pyrite) SC-4 collected at 135.7- 136.6' Fine black staining on few fractures (pyrite) SC-4 collected at 135.7- 136.6' Fine black staining on few fractures (pyrite) SC-4 collected at 135.7- 136.6' Fine black staining on few fractures (pyrite) SC-4 collected at 135.7- 136.6' Fine black staining on few fractures (pyrite) SC-4 collected at 135.7- 136.6' Fine black staining on few fractures (pyrite) SC-4 collected at 135.7- 136.6' Fine black staining on few fractures (pyrite) SC-4 collected at 135.7- 136.6' Fine black staining on few fractures (pyrite) SC-4 collected at 135.7- 136.6' Fine black staining on few fractures (pyrite) SC-4 collected at 135.7- 136.6' Fine black staining on few fractures (pyrite) SC-4 collected at 135.7- 136.6' Fine black staining on few fractures (pyrite) SC-4 collected at 135.7- 136.6' Fine black staining on few fractures (pyrite) SC-4 collected at 135.7- 136.6' Fine black staining on few fractures (pyrite) SC-4 collected at 135.7- 136.6' Fine black staining on few fractures (pyrite) SC-4 collected at 135.7- 136.6' Fine black staining on few fractures (pyrite) SC-4 collected at 135.7- 136.6' Fine black staining on few fractures (pyrite) SC-4 collected at 135.7- 136.6' Fine black staining on few fractures (pyrite) SC-4 collected at 135.7- 136.6' Fine black staining on few fractures (pyrite) SC-4 collected at 135.7- 136.6' Fine black staining on few fractures (pyrite) SC-4 collected at 135.7- 136.6' Fine b	finable No Recovery 132.1-135.0' R18: 4 minutes R18: 4 minut	-			NR		世		-
135.0 -94.4 -	Limestone 135.2' - Bedding plane, horizontal, multiple 1/4"-1/2" thick partings Fracture or mechanical break, al, rough, planar Fracture, horizontal, rough, planar Mechanical break, rough, undulating 8.2' - Fracture zone, irregular, gs surfaces, possible vertical fine black staining on few fragments Mechanical break, 60 deg, rough, Fracture, 40 deg, smooth, planar Fracture or mechanical break, rough, undulating 2.2' - Fracture zone, limestone sis <1" Fracture, vertical, rough, undulating, ight Limestone 135.0-135.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild HCI reaction, finely laminated, bedding plane partings (1/4") 135.2-138.7' - grayish orange to yellowish orange, (10YR 7/4 to 10YR 8/6), mild HCI reaction, medium strong (R3), small voids (1/16"-1/8") exhibit variable density across interval (<5% up to 20+%) partings/breaks concentrate along zones with higher percentage of voids, sparse large cavities (1/4"-1/2") <5% (fossil molds) No Recovery 138.7-140.0' Limestone 135.0-135.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild HCI reaction, finely laminated, bedding plane partings (1/4") 136.6' Fine black staining on few fractures (pyrite) SC-4 collected at 135.7- 136.6' Fracture supplies or sup	135. 0.135.0 135. 0.135.2' - Bedding plane, horizontal, smooth, multiple 1/4"-1/2" thick partings 135.0-135.2' - yellowish gray to light of smooth, multiple 1/4"-1/2" thick partings 135.0-135.2' - yellowish gray to light of the year, (5Y 7/2 to 5Y 5/2), mild HCl reaction, finely laminated, horizontal, rough, planar 136.7' - Mechanical break, rough, undulating 136.9-138.2' - Fracture zone, irregular, undulating 136.9-138.2' - Fracture zone, irregular, including surfaces, possible vertical fracture, fine black staining on few fractures (pyrite) SC-4 collected at 135.7-136.6' NR						Щ		_
135.0-135.2' - Bedding plane, horizontal, smooth, multiple 1/4"-1/2" thick partings 135.4' - Fracture or mechanical break, horizontal, rough, planar 135.7' - Fracture, horizontal, rough, planar 136.7' - Mechanical break, rough, undulating 136.9' - 138.2' - Fracture zone, irregular, undulating surfaces, possible vertical 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	multiple 1/4"-1/2" thick partings Fracture or mechanical break, al, rough, planar Al, rough, planar Mechanical break, rough, undulating 8.2' - Fracture zone, irregular, go surfaces, possible vertical fine black staining on few fragments Mechanical break, 60 deg, rough, Mechanical break, 60 deg, rough, Fracture, 40 deg, smooth, planar Fracture or mechanical break, rough, undulating 8.2' - Fracture zone, limestone is <1" In 135.0-135.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild HCl reaction, finely laminated, bedding plane partings (1/4") 135.2-138.7' - grayish orange to yellowish orange, (10YR 7/4 to 10YR 8/6), mild HCl reaction, medium strong (R3), small voids (1/16"-1/8") exhibit variable density across interval (<5% up to 20+%) partings/breaks concentrate along zones with higher percentage of voids, sparse large cavities (1/4"-1/2") <5% (fossil molds) No Recovery 138.7-140.0' Limestone 140.0-140.5' - pale yellowish orange, (10YR 8/6), very weak to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and larger cavities/fossil molds (up to 1/4"), some infilling of cavities with soft white carbonate material Eracture, vertical, rough, undulating, ight	-94.4 315.0-135.2' - Bedding plane, horizontal, smooth, multiple 1/4"-1/2" thick partings 135.4' - Fracture or mechanical break, horizontal, rough, planar 136.7' - Mechanical break, rough, undulating 136.9-138.2' - Fracture zone, irregular, undulating 136.9-38.2' - Fracture zone, irregular, planar 136.7' - Mechanical break, 60 deg, rough, planar 140.0 - 40.0 - 5 ft 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1						Н	No Recovery 132.1-135.0'	R18: 4 minutes
135.0-135.2' - Bedding plane, horizontal, smooth, multiple 1/4"-1/2" thick partings 135.4' - Fracture or mechanical break, horizontal, rough, planar 135.7' - Fracture, horizontal, rough, planar 136.7' - Mechanical break, rough, undulating 136.9-138.2' - Fracture zone, irregular, undulating surfaces, possible vertical 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	multiple 1/4"-1/2" thick partings Fracture or mechanical break, al, rough, planar Al, rough, planar Mechanical break, rough, undulating 8.2' - Fracture zone, irregular, go surfaces, possible vertical fine black staining on few fragments Mechanical break, 60 deg, rough, Mechanical break, 60 deg, rough, Fracture, 40 deg, smooth, planar Fracture or mechanical break, rough, undulating 8.2' - Fracture zone, limestone is <1" In 135.0-135.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild HCl reaction, finely laminated, bedding plane partings (1/4") 135.2-138.7' - grayish orange to yellowish orange, (10YR 7/4 to 10YR 8/6), mild HCl reaction, medium strong (R3), small voids (1/16"-1/8") exhibit variable density across interval (<5% up to 20+%) partings/breaks concentrate along zones with higher percentage of voids, sparse large cavities (1/4"-1/2") <5% (fossil molds) No Recovery 138.7-140.0' Limestone 140.0-140.5' - pale yellowish orange, (10YR 8/6), very weak to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and larger cavities/fossil molds (up to 1/4"), some infilling of cavities with soft white carbonate material Eracture, vertical, rough, undulating, ight	-94.4 -94.4 -94.4 -94.4 -94.4 -99.4 -99.4 -99.4 -99.4 -99.4 -99.4 -99.4 -80.0 -99.4 -80.0	125	125.0				П	-	1
smooth, multiple 1/4"-1/2" thick partings 135.4' - Fracture or mechanical break, horizontal, rough, planar 135.7' - Fracture, horizontal, rough, undulating 136.9-138.2' - Fracture zone, irregular, undulating surfaces, possible vertical fracture, fine black staining on few fragments 140 140.0 -99.4 1 Smooth, multiple 1/4"-1/2" thick partings 135.0-135.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild HCI reaction, finely laminated, bedding plane partings (1/4") 135.2-138.7' - grayish orange to yellowish orange, (10YR 7/4 to 10YR 8/6), mild HCI reaction, medium strong (R3), small voids (1/16"-1/8") exhibit variable density across interval (<5% up to 20+%) partings/breaks concentrate along zones with higher percentage of voids, sparse large cavities (1/4"-1/2") <5% (fossil molds) No Recovery 138.7-140.0' Limestone 140.0-140.5' - pale yellowish orange, (10YR 8/6), very weak to weak (R1 to	multiple 1/4"-1/2" thick partings Fracture or mechanical break, al, rough, planar Al, rough, planar Mechanical break, rough, undulating 8.2' - Fracture zone, irregular, go surfaces, possible vertical fine black staining on few fragments Mechanical break, 60 deg, rough, Mechanical break, 60 deg, rough, Fracture, 40 deg, smooth, planar Fracture or mechanical break, rough, undulating 8.2' - Fracture zone, limestone is <1" In 135.0-135.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild HCl reaction, finely laminated, bedding plane partings (1/4") 135.2-138.7' - grayish orange to yellowish orange, (10YR 7/4 to 10YR 8/6), mild HCl reaction, medium strong (R3), small voids (1/16"-1/8") exhibit variable density across interval (<5% up to 20+%) partings/breaks concentrate along zones with higher percentage of voids, sparse large cavities (1/4"-1/2") <5% (fossil molds) No Recovery 138.7-140.0' Limestone 140.0-140.5' - pale yellowish orange, (10YR 8/6), very weak to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and larger cavities/fossil molds (up to 1/4"), some infilling of cavities with soft white carbonate material Eracture, vertical, rough, undulating, ight	smooth, multiple 1/4"-1/2" thick partings 135.4' - Fracture or mechanical break, horizontal, rough, planar 135.7' - Fracture, horizontal, rough, planar 135.2' - yellowish orange to yellowish orange, (10YR 7/4 to 10YR 8/6), mild HCl reaction, medium strong (R3), small voids (1/16"-1/8") exhibit variable density across interval (<5% up to 20+%) partings/breaks concentrate along zones with higher percentage of voids, sparse large cavities (1/4"-1/2") <5% (fossil molds) No Recovery 138.7-140.0' Limestone 140.0-140.5' - pale yellowish orange, (10YR 8/6), very weak to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and larger cavities/fossil molds (up to 1/4"), some infilling of cavities with soft white carbonate material		133.0			135 0-135 2' - Bedding plane, horizontal	╂┴┼	Limestone	
135.4' - Fracture or mechanical break, horizontal, rough, planar 135.7' - Fracture, horizontal, rough, planar 135.7' - Fracture, horizontal, rough, planar 136.7' - Mechanical break, rough, undulating 136.9-138.2' - Fracture zone, irregular, undulating surfaces, possible vertical fracture, fine black staining on few fragments 138.2' - Mechanical break, 60 deg, rough, planar 140.0	olive gray, (5Y 7/2 to 5Y 5/2), mild HCl reaction, finely laminated, bedding plane partings (1/4") 135.2-138.7' - grayish orange to yellowish orange, (10YR 7/4 to 10YR 8/6), mild HCl reaction, medium strong (R3), small voids (1/16"-1/8") exhibit variable density across interval (<5% up to 20+%) partings/breaks concentrate along zones with higher percentage of voids, sparse large cavities (1/4"-1/2") <5% (fossil molds) No Recovery 138.7-140.0' Limestone 140.0-140.5' - pale yellowish orange, (10YR 8/6), very weak to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and larger cavities/fossil molds (up to 1/4"), some infilling of cavities with soft white carbonate material	135.4' - Fracture or mechanical break, horizontal, rough, planar 136.7' - Fracture, horizontal, rough, planar 136.7' - Mechanical break, rough, undulating 136.9-138.2' - Fracture zone, irregular, undulating surfaces, possible vertical fracture, fine black staining on few fragments 138.2' - Mechanical break, 60 deg, rough, planar 140.0	-			>10		╀┼		
1 135.7' - Fracture, horizontal, rough, planar 136.6' 135.2' - Fracture, horizontal, rough, planar 136.7' - Mechanical break, rough, undulating 136.9-138.2' - Fracture zone, irregular, undulating surfaces, possible vertical fracture, fine black staining on few fragments 138.2' - Mechanical break, 60 deg, rough, planar 140.0	In fough, planar in Fracture, horizontal, rough, planar Mechanical break, rough, undulating its. 2' - Fracture zone, irregular, go surfaces, possible vertical fine black staining on few fragments Mechanical break, 60 deg, rough, Fracture, 40 deg, smooth, planar rough, undulating its rough, undulating its rough, undulating its racture or bedding plane, horizontal, interval (<5% up to 20+%) partings/breaks concentrate along zones with higher percentage of voids, sparse large cavities (1/4"-1/2") <5% (fossil molds) No Recovery 138.7-140.0' Limestone 140.0-140.5' - pale yellowish orange, (10YR 8/6), very weak to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and larger cavities/fossil molds (up to 1/4"), some infilling of cavities with soft white carbonate material	R19-NQ					135.4' - Fracture or mechanical break,	П	olive gray, (5Y 7/2 to 5Y 5/2), mild	
R19-NQ 5 ft 74% 11 136.7' - Mechanical break, rough, undulating 136.9-138.2' - Fracture zone, irregular, undulating surfaces, possible vertical fracture, fine black staining on few fragments 1 138.2' - Mechanical break, 60 deg, rough, planar 1 1 140 140.0 -99.4 1 1 136.9' - Fracture zone, irregular, undulating surfaces, possible vertical fracture, fine black staining on few fragments 1 1 136.9' - Fracture zone, irregular, undulating surfaces, possible vertical fracture, fine black staining on few fragments 1 1 1 136.9' - Mechanical break, 60 deg, rough, planar 1 1 1 1 136.9' - Fracture zone, irregular, undulating surfaces, possible vertical fracture, fine black staining on few fragments 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Mechanical break, rough, undulating 8.2' - Fracture zone, irregular, g surfaces, possible vertical fine black staining on few fragments Mechanical break, 60 deg, rough, Tracture, 40 deg, smooth, planar fracture, 40 deg, smooth, planar fracture or mechanical break, rough, undulating 2.2' - Fracture zone, limestone sis <1" Tracture, vertical, rough, undulating, light Deducting plane partings (1/4) 135.2-138.7' - grayish orange to yellowish orange, (10YR 7/4 to 10YR 8/6), mild HCI reaction, medium strong (R3), small voids (1/16"-1/8") exhibit variable density across interval (<5% up to 20+%) partings/breaks concentrate along zones with higher percentage of voids, sparse large cavities (1/4"-1/2") <5% (fossil molds) No Recovery 138.7-140.0' Limestone 140.0-140.5' - pale yellowish orange, (10YR 8/6), very weak to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and larger cavities/fossil molds (up to 1/4"), some infilling of cavities with soft white carbonate material	R19-NQ 5 ft 74% 13 3 R20-NQ - 99.4						Н		
R19-NQ 5 ft 74% 136.9-138.2' - Fracture zone, irregular, undulating surfaces, possible vertical fracture, fine black staining on few fragments 1 1 38.2' - Mechanical break, 60 deg, rough, planar 140 140.0 -99.4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	yellowish orange, (10YR 7/4 to 10YR 8/6), mild HCl reaction, medium strong (R3), small voids (1/16"-1/8") exhibit variable density across interval (<5% up to 20+%) partings/breaks concentrate along zones with higher percentage of voids, sparse large cavities (1/4"-1/2") <5% (fossil molds) No Recovery 138.7-140.0' Limestone 140.0-140.5' - pale yellowish orange, (10YR 8/6), very weak to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and larger cavities/fossil molds (up to 1/4"), some infilling of cavities with soft white carbonate material Fracture, vertical, rough, undulating, ight	R19-NQ 5 ft 74% 27 >10	1 7			1		ш		100.0
undulating surfaces, possible vertical fracture, fine black staining on few fragments 1 1 38.2' - Mechanical break, 60 deg, rough, planar NR 140 140.0 -99.4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	g surfaces, possible vertical fine black staining on few fragments Mechanical break, 60 deg, rough, Mechanical density across interval (<5% up to 20+%) Mapartings/breaks concentrate along Zones with higher percentage of voids, sparse large cavities (1/4"-1/2") <5% (fossil molds) No Recovery 138.7-140.0' Exhibits "punky" texture on fresh surfaces Mechanical break, 60 deg, rough, Mechanical break, 60 deg, rough, 90 deg, 61 deg, 61 deg, 62 deg, 6	St t 74% 27 >10	-	D10 NO				╂┯╂		-
fracture, fine black staining on few fragments 1 1 1 38.2' - Mechanical break, 60 deg, rough, planar NR 140 140.0 -99.4 1 1 1 140.0' - Fracture, 40 deg, smooth, planar Take fracture, fine black staining on few fragments strong (R3), small voids (1/16"-1/8") exhibit variable density across interval (<5% up to 20+%) partings/breaks concentrate along zones with higher percentage of voids, sparse large cavities (1/4"-1/2") <5% (fossil molds) No Recovery 138.7-140.0' Limestone 140.0-140.5' - pale yellowish orange, (10YR 8/6), very weak to weak (R1 to	strong (R3), small voids (1/16"-1/8") exhibit variable density across interval (<5% up to 20+%) partings/breaks concentrate along zones with higher percentage of voids, sparse large cavities (1/4"-1/2") <5% (fossil molds) No Recovery 138.7-140.0' Limestone 140.0-140.5' - pale yellowish orange, (10YR 8/6), very weak to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and larger cavities/fossil molds (up to 1/4"), some infilling of cavities with soft white carbonate material strong (R3), small voids (1/16"-1/8") exhibit variable density across interval (<5% up to 20+%) partings/breaks concentrate along zones with higher percentage of voids, sparse large cavities (1/4"-1/2") <5% (fossil molds) No Recovery 138.7-140.0' Limestone 140.0-140.5' - pale yellowish orange, (10YR 8/6), very weak to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and larger cavities/fossil molds (up to 1/4"), some infilling of cavities with soft white carbonate material	fracture, fine black staining on few fragments 1 38.2' - Mechanical break, 60 deg, rough, planar NR 140 140.0 -99.4 - 1 R20-NQ 5 ft 60% NR NR NR NR NR NR NR NR NR N	_			>10		₽		_
1 138.2' - Mechanical break, 60 deg, rough, planar 1 138.2' - Mechanical break, 60 deg, rough, planar 140 140.0 -99.4 1 1 138.2' - Mechanical break, 60 deg, rough, planar 140 140.0 -99.4 1 1 138.2' - Mechanical break, 60 deg, rough, planar 140 140.0	exhibit variable density across interval (<5% up to 20+%) partings/breaks concentrate along zones with higher percentage of voids, sparse large cavities (1/4"-1/2") <5% (fossil molds) No Recovery 138.7-140.0' Limestone 140.0-140.5' - pale yellowish orange, (10YR 8/6), very weak to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and larger cavities/fossil molds (up to 1/4"), some infilling of cavities with soft white carbonate material Fracture, vertical, rough, undulating, ight	1 1 138.2' - Mechanical break, 60 deg, rough, planar						Ш		
planar planar partings/breaks concentrate along zones with higher percentage of voids, sparse large cavities (1/4"-1/2") <5% (fossil molds) No Recovery 138.7-140.0' Limestone 140.0-140.5' - pale yellowish orange, (10YR 8/6), very weak to weak (R1 to 140.0') - Fracture, 40 deg, smooth, planar (10YR 8/6), very weak to weak (R1 to 140.0') - Fracture, 40 deg, smooth, planar (10YR 8/6), very weak to weak (R1 to 140.0') - Fracture, 40 deg, smooth, planar (10YR 8/6), very weak to weak (R1 to 140.0') - Fracture, 40 deg, smooth, planar (10YR 8/6), very weak to weak (R1 to 140.0') - Fracture, 40 deg, smooth, planar (10YR 8/6), very weak to weak (R1 to 140.0') - Fracture, 40 deg, smooth, planar (10YR 8/6), very weak to weak (R1 to 140.0') - Fracture, 40 deg, smooth, planar (10YR 8/6), very weak to weak (R1 to 140.0') - Fracture, 40 deg, smooth, planar (10YR 8/6), very weak to weak (R1 to 140.0') - Fracture, 40 deg, smooth, planar (10YR 8/6), very weak to weak (R1 to 140.0') - Fracture, 40 deg, smooth, planar (10YR 8/6), very weak to weak (R1 to 140.0') - Fracture, 40 deg, smooth, planar (10YR 8/6), very weak to weak (R1 to 140.0') - Fracture, 40 deg, smooth, planar (10YR 8/6), very weak to weak (R1 to 140.0') - Fracture, 40 deg, smooth, planar (10YR 8/6), very weak to weak (R1 to 140.0') - Fracture, 40 deg, smooth, planar (10YR 8/6), very weak to weak (R1 to 140.0') - Fracture, 40 deg, smooth, planar (10YR 8/6), very weak to weak (R1 to 140.0') - Fracture, 40 deg, smooth, planar (10YR 8/6), very weak to weak (R1 to 140.0') - Fracture, 40 deg, smooth, planar (10YR 8/6), very weak to weak (R1 to 140.0') - Fracture, 40 deg, smooth, planar (10YR 8/6), very weak to weak (R1 to 140.0') - Fracture, 40 deg, smooth, planar (10YR 8/6), very weak to weak (R1 to 140.0') - Fracture, 40 deg, smooth, planar (10YR 8/6), very weak to weak (R1 to 140.0') - Fracture, 40 deg, smooth, planar (10YR 8/6), very weak (R1 to 140.0') - Fracture, 40 deg, smooth, planar (10YR 8/6), very weak (R1 to 140.0') - Fracture, 40 deg, smooth, planar (10YR 8/6	partings/breaks concentrate along zones with higher percentage of voids, sparse large cavities (1/4"-1/2") <5% (fossil molds) No Recovery 138.7-140.0' Limestone 140.0-140.5' - pale yellowish orange, (10 YR 8/6), very weak to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and larger cavities/fossil molds (up to 1/4"), some infilling of cavities with soft white carbonate material Fracture, vertical, rough, undulating, ight	planar planar	1 7			1		H]
NR 140 140.0 -99.4 1 1 140.9' - Fracture, 40 deg, smooth, planar Tones with higher percentage of voids, sparse large cavities (1/4"-1/2") <5% (fossil molds) No Recovery 138.7-140.0' Limestone 140.0-140.5' - pale yellowish orange, (10YR 8/6), very weak to weak (R1 to	zones with higher percentage of voids, sparse large cavities (1/4"-1/2") <5% (fossil molds) No Recovery 138.7-140.0' Limestone 140.0-140.5' - pale yellowish orange, (10 YR 8/6), very weak to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and larger cavities/fossil molds (up to 1/4"), some infilling of cavities with soft white carbonate material Fracture, vertical, rough, undulating, ight	NR 140 140.0 -99.4 1 1 R20-NQ	1 -			'_		╅		
voids, sparse large cavities (1/4"-1/2") <5% (fossil molds) No Recovery 138.7-140.0' Limestone 140.0-140.5' - pale yellowish orange, (10YR 8/6), very weak to weak (R1 to	voids, sparse large cavities (1/4"-1/2") <5% (fossil molds) No Recovery 138.7-140.0' Limestone 140.0-140.5' - pale yellowish orange, (10YR 8/6), very weak to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and larger cavities/fossil molds (up to 1/4"), some infilling of cavities with soft white carbonate material Exhibits "punky" texture on fresh surfaces	140 140.0 -99.4 1 1 1 1 1 1 1 1 1 1	-				P	口	zones with higher percentage of	P10: 10 minutes
140 140.0	(1/4"-1/2") < 5% (fossil molds) No Recovery 138.7-140.0' Limestone 140.0-140.5' - pale yellowish orange, (10YR 8/6), very weak to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and larger cavities/fossil molds (up to 1/4"), some infilling of cavities with soft white carbonate material Fracture, vertical, rough, undulating, ight	140.0140.0 -99.4 1				NR		╁┼┼	voids, sparse large cavities	13. 10 minutes
No Recovery 138.7-140.0' Limestone 140.0' - Fracture, 40 deg, smooth, planar 140.9' - Fracture, 40 deg, smooth, planar 140.9' - Fracture, 40 deg, smooth, planar 140.9' - Fracture, 40 deg, smooth, planar	Limestone 140.0-140.5' - pale yellowish orange, (10YR 8/6), very weak to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and larger cavities/fossil molds (up to 1/4"), some infilling of cavities with soft white carbonate material Fracture, vertical, rough, undulating, ight	No Recovery 138.7-140.0' Limestone 140.0-140.5' - pale yellowish orange, (10YR 8/6), very weak to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and larger cavities/fossil molds (up to 1/4"), some infilling of cavities with soft white carbonate material R20-NQ 5 ft 60% NR R20-NQ 5 ft 13 8 NR R20-NQ 5 ft 142.5' - Fracture zone, limestone fragments <1" 142.5' - Fracture or bedding plane, horizontal, smooth 142.8' - Fracture, vertical, rough, undulating, healed, tight 143.0' - Fracture, rough, undulating, black coating (possibly pyrite) on surface R20-NQ 140.0-140.5' - pale yellowish orange, (10YR 8/6), very weak to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and larger cavities/fossil molds (up to 1/4"), some infilling of cavities with soft white carbonate material R20: 13 minutes	140	140.0				Ш	(1/4"-1/2") <5% (fossil molds)	
Timestone 140.0-140.5' - pale yellowish orange, (10YR 8/6), very weak to weak (R1 to	Limestone 140.0-140.5' - pale yellowish orange, (10YR 8/6), very weak to weak (R1 to R2), 5-7% coverage of 1/16"-1/8" small voids and larger cavities/fossil molds (up to 1/4"), some infilling of cavities with soft white carbonate material Fracture, vertical, rough, undulating, ight	The standard of the surfaces o					_	14		Exhibits "punky" texture on
140.9' - Fracture, 40 deg, smooth, planar (10YR 8/6), very weak to weak (R1 to	Fracture, 40 deg, smooth, planar Fracture or mechanical break, rough, undulating 2.2' - Fracture zone, limestone ts <1" Fracture or bedding plane, horizontal, racture, vertical, rough, undulating, light Fracture, 40 deg, smooth, planar (10YR 8/6), very weak to weak (R1 to R2), 5-7% coverage of 11/6"-1/8" small voids and larger cavities/fossil molds (up to 1/4"), some infilling of cavities with soft white carbonate material	R20-NQ 5 ft 60% 13	-			1		╂┼┼	Limestone	
	Fracture or mechanical break, rough, undulating 2.2' - Fracture zone, limestone sis <1" Fracture or bedding plane, horizontal, eight Fracture, vertical, rough, undulating, aight R2), 5-7% coverage of 1/16"-1/8" small voids and larger cavities/fossil molds (up to 1/4"), some infilling of cavities with soft white carbonate material	R20-NQ 5 ft 60% 13 3	-				140.9' - Fracture, 40 deg smooth planar	口	190.0-190.0 - paie yellowish orange, (10YR 8/6) very weak to weak (R1 to	
	rough, undulating 2.2' - Fracture zone, limestone ss <1" Fracture or bedding plane, horizontal, eight small voids and larger cavities/fossil molds (up to 1/4"), some infilling of cavities with soft white carbonate material	retical, rough, undulating 141.4-142.2' - Fracture zone, limestone				2		╨		
vertical, rough, undulating small voids and larger cavities/fossil	cavities with soft white carbonate material cavities, with soft white carbonate material cavities with soft white carbonate material cavities with soft white carbonate material cavities with soft white carbonate material	fragments <1" 142.5' - Fracture or bedding plane, horizontal, smooth 142.8' - Fracture, vertical, rough, undulating, healed, tight NR NR 143.0' - Fracture, rough, undulating, hostic coating (possibly pyrite) on surface R20: 13 minutes					vertical, rough, undulating		small voids and larger cavities/fossil	
	Fracture or bedding plane, horizontal, ————————————————————————————————————	5 ft 60% 13 3 fragments <1" 142.5' - Fracture or bedding plane, horizontal, smooth 142.8' - Fracture, vertical, rough, undulating, healed, tight 143.0' - Fracture, rough, undulating, black coating (possibly pyrite) on surface R20: 13 minutes	1	R20-NQ				\Box]
- 5 ft 13 3 tragments <1" -	Fracture, vertical, rough, undulating,	smooth 142.8' - Fracture, vertical, rough, undulating, healed, tight 143.0' - Fracture, rough, undulating, black coating (possibly pyrite) on surface R20: 13 minutes	-	5 ft		3		╂┴╂		-
	ight	142.8' - Fracture, vertical, rough, undulating, healed, tight NR 143.0' - Fracture, rough, undulating, black coating (possibly pyrite) on surface R20: 13 minutes	1 4	60%					materiai -	_
	ight	healed, tight 143.0' - Fracture, rough, undulating, black coating (possibly pyrite) on surface R20: 13 minutes						Д	_	
healed, tight		coating (possibly pyrite) on surface	1 1				healed, tight	ш	-]
		_ coating (possibly pyrite) on surface	-			NR			-	R20: 13 minutes
_ coating (possibly pyrite) on surface	possibly pyrite) on surface	145 145.0	-				coating (possibly pyrite) on surface	\Box	-	-
1 145 145 0	F-4 I			1450				Н		
	- +		145	170.0						
			145	140.0						
			145	140.0						



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-13 SHEET 9 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722927.1 N, 457933.5 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT: CME 55 S/N 252345; CME 75 S/N 252437, mud rotary, NQ tools, HW casing ORIENTATION: Vertical

CORING METHO	D AND	EQUIP	MENT : CME 55 S/N 252345; CME 75 S/N 252437, mud	otary,	NQ tools, HW casing	ORIENTATION : Vertical
WATER LEVELS	: 2.0 ft l	ogs on 5	5/6/07 START: 5/6/2007 END: 5/	23/200	7 LOGGER : C. Sump, P. De Sa're	ego
			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft) CORE RUN, LENGTH, AND RECOVERY (%)	(%)	, \$‼	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-104.4		>10	145.0-145.4' - Fracture zone, rock fragments		140.5-143.0' - very pale yellowish gray, (5Y 7/2), moderate HCl reaction, medium strong to strong	-
		4	146.3' - Fracture or mechanical break, rough, undulating	Ħ	(R3 to R4), small zones (<1") of dark gray, fossil molds up to 3/4", numerous small voids (5%-20%	-
5	-NQ ft 1')%	7 >10	146.4' - Bedding plane, horizontal, rough, discontinuity with fine grained limestone 146.6' - Fracture, >80 deg, rough, undulating,		surface area) becoming denser, hard below 142.0', black coating on some fracture faces (pyrite)	Disaggregate carbonate - sand 146.8-147.2' _
		3	healed 146.8' - Bedding plane, discontinuity with yellowish brown, weak, loose, carbonate		No Recovery 143.0-145.0' Limestone 145.0-146.8' - yellowish gray, (5Y	
150 150.0		NR	limestone fragments 1-1/2"-3"		7/2), mild HCl reaction, medium strong to strong (R3 to R4), small voids (1/16"-1/8") and larger	R21: 15 minutes
-109.4		2	147.8, 148.0' - Bedding plane (2), horizontal, — smooth 148.6' - Mechanical break, horizontal, rough, undulating		cavities/fossil molds up to 1/2" - variable across interval from trace to >10%, thin (1") fine grained beds show indications of very fine]
		>10	440.0 440.01	Ħ	laminations of very line laminations 146.8-147.2' - medium olive brown, fragmented (1/4"-3/4" size), friable.	-
5	ft 1: 0%	5 6	horizontal, rough, planar 150.9' - Fracture, >80 deg, rough, undulating 151.0-152.0' - Fracture zone, mostly rough,		coarse carbonate sand 147.2-147.7' - medium olive brown, weak (R2)	- Weak along laminae, dark -
_		>10	undulating harizantal fractures, fow 45 dec	崫	147.7-149.0' - Same as 145.0-146.8' except light olive gray, (5Y 5/2) No Recovery 149.0-150.0'	laminations may be biofeature (algae)
155 155.0		>10	152.0, 152.1, 152.3, 152.5, 152.7, 152.9' - Fractures (6), horizontal, rough, undulating 153.0-154.0' - Fracture zone, horizontal, —		Limestone 150.0-152.8' - Same as 145.0-146.8' — except light olive gray, (5Y 5/2), mild	R22: 15 minutes
-114.4 - -		2	rough, undulating, partings controlled by bedding lamination 154.0-155.0' - Fracture zone, 20-45 deg,	Ħ	HCl reaction, medium strong (R3) 152.8-153.9' - mottled grayish yellow and light olive gray, (5Y 8/4 and 5Y	-
		3	rough, undulating 155.3' - Fracture, 15 deg, rough, planar 155.4, 155.6' - Fractures (2), 10-15 deg,		5/2), medium strong (R3), thin (1"-2") dark yellowish brown (10YR 4/2) fine wavy laminations, dark laminations	-
5	FNQ ft 2: 3%		rough, undulating 156.5' - Fracture, horizontal, rough, planar 156.6' - Fracture, rough, undulating	Ħ	slightly inclined (5-10 deg) 153.9-155.0' - Same as 150.0-152.8' except strong (R4), denser, fewer	-
-		>10 NR	156.8' - Fracture, horizontal, rough, planar 157.2' - Bedding plane, 4-5 deg, break on fine grained layer	日	voids 155.0-156.3' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), strong	R23: 11 minutes
160 <u>160.0</u> -119.4		INF	157.Ž-158.4' - Fracture zone, horizontal, planar, rock fragments 3/4"-2" in length		(R4), mottled appearance, <5-10% coverage of 1/16"-1/8" small voids and larger cavities/fossil molds up to	-
-		>10			1/2" increasing with depth, dense 156.3-158.4' - Same as 155.0-156.4' except increasing percentage of small voids uniformly distributed,	-
	-NQ	1	161.3' - Fracture, 75 deg, undulating, slightly radial, 6" long		smail voids uniformly distributed, color darkening to medium olive brown (5Y 4/4), very fine laminated dense interbed at 157.6-158.1'	The rig CME 55 (S/N
5	ft 0				No Recovery 158.4-160.0' Limestone 160.0-162.5' - light olive gray to olive gray, (5Y 5/2 to 5Y 3/2), medium strong (R3), dense, few small voids or cavities/fossil molds (<5%)	252345) was changed to CME 75 (S/N 252437) at depth 162 feet below ground surface R24: 10 minutes Core barrel stuck at 162.3'
165 165.0				H	No Recovery 162.5-165.0'	
			1	1		<u> </u>



PROJECT NUMBER: BORING NUMBER: 338884.FL

A-13

SHEET 10 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722927.1 N, 457933.5 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345; CME 75 S/N 252437, mud rotary, NQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS : 2.0) ft bgs	on 5/	6/07 START : 5/6/2007 END : 5/2	23/20	D7 LOGGER : C. Sump, P. De Sa're	go
≥∩≎	(%)			DISCONTINUITIES	ပ္ထ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	SEES	R	유립	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	·
-124.4 - -			>10	165.0-166.1' - Fracture zone		Limestone - 165.0-167.4' - medium dark gray, (N5), fine grained, mild HCl reaction, strong (R4), 10-15% coverage of	5/9/07, 14:00 hrs - Rig changed to one with a - cathead to allow pull-back hammering
-	R25-NQ		>10	166.35' - Fracture, <10 deg, rough, undulating, 1/8"-3/16" relief 166.35-165.55' - Fracture zone, vertical.		strong (R4), 10-13/8 coverage of small (<1/8") voids, 10% coverage of 1"-1-3/8" fossil molds/cavities, trace carbonate infill of cavities, light olive	16:00 hrs - Only 10' of rods - removed, decide to - overdrill with HQ tools
-	5 ft 76%	0	8	rough, planar, <1/16" gray carbonate infill 166.6' - Fracture, horizontal, smooth, planar 166.8, 166.9, 167.0, 167.2' - Fractures (4),		 gray (5Y 6/1) coloration of fractured surfaces 167.4-168.8' - medium dark gray to 	16:20 hrs - Start installing - HQ 19:00 hrs - HQ tools will
-			>10 NR	<10 deg, smooth, undulating 167.4, 167.8, 167.9' - Bedding plane (3), horizontal, smooth, planar		yellowish gray, (N5 to 5Y 5/2), fine grained, mild to moderate HCI reaction, medium strong to strong	not go through 4" bit, HQ - tools pulled and resumed back hammering -
170 -129.4	170.0		8	167.7' - Mechanical break 167.9-168.8' - Fracture zone 170.0-170.2' - Fracture zone 170.2-170.8' - Fracture, 60 deg, smooth,		(R3 to R4), trace to 10% coverage of 1/16" voids increasing with depth, visible casts/cavities No Recovery 168.8-170.0"	Driller's Remark: Core – barrel retrieved, hole currently cased from 0-60' with HW casing –
			>10	undulating 170.8' - Mechanical break 170.95-171.25' - Fracture zone		Limestone 170.0-170.2' - Same as 165.0-167.4' 170.2-171.1' - Same as 165.0-167.4'	Driller's Remark: extending HW casing to 90' Driller's Remark: HW
-	R26-NQ 5 ft	7	>10	171.4, 171.6, 172.05, 172.2, 173.1, 173.45, 173.8, 174.2' - Fractures (8), <10 deg, rough, undulating		except no visible casts/cavities 171.1-172.1' - Same as 165.0-167.4' 172.1-174.5' - Same as 167.4-168.4'	casing installed to 90', NQ rod and tri-cone bit equipped to reach
-	90%		6	172.4-17ž.6' - Fracture zone 172.8-173.0' - Fracture zone		except size of large casts/cavities up to 1-3/16"x3/4" over 30% of rock at 173.5-174.5'	sampling depth of 165' P. De Sa'rego begins logging R25: 28 minutes
-			1	-	Ħ	-	Driller's Remark: Chatter approximately 145'
175	175.0		NR	-	Ħ	No Recovery 174.5-175.0'	Driller's Remark: Chatter
-134 <u>.4</u> -			>10	175.0-176.1' - Fracture zone		Limestone - 175.0-176.0' - pale yellowish brown to dark gray, (10YR 8/2 to N3), fine	approximately 150'-155' — Driller's Remark: Chatter at approximately 160'
_			>10	176.35, 176.45, 176.7, 176.75, 176.8' - Fractures (5), horizontal, smooth, planar to		grained, mild HCl reaction, medium strong to strong (R3 to R4), trace voids up to 1/16" in size, 10-15%	R26: 24 minutes – Driller's Remark: Chatter – Driller's Remark: Chatter
-	R27-NQ 5 ft 58%	8	2	undulating 176.45-176.7' - Fracture zone 176.8-177.0' - Fracture zone 177.4' - Fracture, horizontal, rough, planar to		coverage of 1-3/16"x3/8" - casts/cavities, with infill/ recrystallization of yellowish brown, fine to medium grained carbonate	-
-			NR	undulating - 177.75' - Fracture, 60 deg, rough, undulating 177.76' - Mechanical break		- 176.0-177.9' - pale yellowish brown, (10YR 8/2), fine to medium grained, mild to moderate HCl reaction, medium strong (R3), 10-15%	- R27: 58 minutes
	180.0				H	coverage of <3/16" voids]
-139.4 _			>10	- 180.75-180.9' - Fracture zone, possibly due	H	No Recovery 177.9-180.0' Limestone 180.0-184.5' - Same as 176.0-177.9'	Driller's Remark: Chatter -
			6	to cavities in rock 181.2' - Fracture, horizontal, smooth to rough, undulating, 1/4"-3/8" relief		except 40-50% casts/cavities at 180.75-181.1' and 183.7-183.9' (up to 1-3/16"x9/16"), and highly	Driller's Remark: Chatter
-	R28-NQ 5 ft 90%	20	>10	181.5, 181.55' - Fractures (2), 25 deg, smooth, planar, along laminae of darker material		fossiliferous with 50% voids up to 1-3/16" at 183.1-184.1' and thin (1/16"-3/16") dark laminae from 181.4-182.4']
-			>10	181.75, 181.80' - Fractures (2), <10 deg, rough, undulating, 1/4"-3/8" relief 182.0-182.2' - Fracture zone 182.4' - Bedding plane, smooth, planar, 1/8"		-	- R28: 46 minutes
185	185.0		1 NR	relief		No Recovery 184.5-185.0'	-
100_	100.0			182.5-182.9' - Fracture zone			



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	A-13	SHEET	11	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722927.1 N, 457933.5 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345; CME 75 S/N 252437, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	WATER LEVELS : 2.0 ft bgs on 5/6/07								
				DISCONTINUITIES	U	LITHOLOGY	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	CIZE AND DEDTH OF CACING		
불병은	E F F F F F F F F F F F F F F F F F F F	(%) O	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	1 👸	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND		
FF.F.	NG CO	αD	AC-	PLANARITY, INFILLING MATERIAL AND	Ŋ.	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.		
	898	Ř	E H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Š	CHARACTERISTICS	BROFO, TEOT REGGETO, ETG.		
-144.4			>10	183.2-183.9' - Fracture zone	\vdash	Limestone			
-			>10	184.1' - Bedding plane, horizontal, rough, planar	\perp	 185.0-187.6' - pale yellowish brown, fine to medium grained, mild to 	1		
-				185.2-185.9' - Fracture zone	╁	moderate HCl reaction, medium	1		
-			>10	186.0' - Mechanical break 186.3' - Fracture, horizontal, rough,	Ħ	 strong to strong (R3 to R4), 10% coverage of <3/16" voids, trace 	1		
-	R29-NQ			undulating, 3/8" relief, <1/16" carbonate infill	╂┴	casts/cavities up to 9/16"x3/8" with	-		
-	5 ft	22	3	186.4' - Mechanical break	\blacksquare	 partial carbonate recrystallization on 	1		
-	86%			186.7-186.95' - Fracture zone 187.5' - Fracture, <5 deg, smooth, undulating	世	surfaces 187.6-189.3' - Same as 185.0-187.6'	-		
-			>10	187.8' - Fracture, <5 deg, rough, undulating,	╆	 except 15-35% voids up to 1/8" 	-		
-				<1/8" relief 187.95' - Fracture, horizontal, rough,		increasing with depth, with trace			
l _			2	undulating, <3/16" relief	╨	casts/cavities up to 9/16"x1" No Recovery 189.3-190.0'	R29: 37 minutes		
190_	190.0		NR	188.2-188.4' - Fracture zone	\coprod				
-149.4	П		>10	188.55, 188.9, 189.0, 189.1, 189.15' - Fractures (5), horizontal, smooth, planar to	上	Limestone - 190.0-193.6' - Same as 175.0-176.0']		
			/10	undulating, 1/16" relief	\vdash	except 10-15% voids up to 3/16" and]		
-				190.0-190.55' - Fracture zone 190.9-191.1' - Fracture zone	1	black laminations from 190.5-192.3',	1		
-			>10	190.9-191.1 - Fracture 2016 191.3' - Fracture, 15 deg, smooth to rough,	╁┼	 increased (50% by volume) carbonate infill of cavities and casts 	1		
-	R30-NQ			undulating	口	_ carbonate iniii of cavities and casts	-		
-	5 ft	8	>10	191.5-191.6' - Fracture zone 191.8-192.1' - Fracture zone		-	-		
-	72%			192.3' - Fracture, 30 deg, rough, undulating		_	-		
-			3	192.4-192.6' - Fracture zone, 60 deg, smooth		=	-		
-				to rough, undulating, gray staining over <10% of fracture surface	₽	No Recovery 193.6-195.0'			
-			NR	192.95' - Fracture, 30 deg, smooth to rough,	ш	_	R30: 51 minutes		
	195.0			undulating, gray staining over 75% surface 193.15-193.3' - Fracture zone	\perp				
-154.4			>10	195.0-195.3 - Fracture zone		Limestone - 195.0-196.1' - yellowish gray, (5Y			
			/10	195.7-196.0' - Fracture zone		7/2), fine to medium grained, mild			
-			1		₽	HCl reaction, strong (R4), 40-50%	1		
-				196.3-196.8' - Fracture zone or mechanical break, 40 deg, rough, undulating, pale	ш	 lenses of medium dark gray (4N), 5% coverage of small (1/16") voids on 	1 7		
-	R31-NQ			yellowish brown recrystallization (carbonate,	╁╴	surface, trace casts/cavities up to	Driller's Remark: 100%		
-	5 ft	16		fine to medium grained) on 100% of surface, 3/16"-3/8" relief	F	- 3/8"x3/8" 196.1-196.8' - Same as 175.0-176.0'	fluid loss at 196' -		
-	36%			3/10 -3/0 Tellel		except 5-10% casts/cavities up to			
-			NR		+	– 9/16"x1-3/16"	-		
-					厂	No Recovery 196.8-200.0'	R31: 15 minutes		
-					\vdash	-	1.01. 10 Hilliules		
200_	200.0				\vdash				
-159.4				_	1	Bottom of Boring at 200.0 ft bgs on - 5/23/2007]		
]		
-					1		1		
-					1	<u> </u>	1		
I -					1	-	1		
-					1	-	-		
-					1	-	-		
-					-	_	-		
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					4_				



PROJECT NUMBER:	BORING NUMBER:	
338884.FL	A -14	SH

A-14

SHEET 1 OF 12

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722999.7 N, 457929.8 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT : CME 55 S/N 299205; Dietrich D-50 S/N 240, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 1.7 ft bo	gs on 03/2	20/07 S	START : 3/14/2007	
				STANDARD	SOIL DESCRIPTION _© COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILL DRILLING FLUID LOSS, TE INSTRUMENTATIO	INC DATE
H BE ACE ATIO		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILL D	STS, AND
EPT URF LEV			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DN
<u>42.4</u>				(14)	16:35 - Began drilling	
-						-
-					†	-
-					1	-
-					1	1
]	
	3.5					
_				2-2-1	Silty Sand (SM) 3.5-5.0' - dark yellowish orange to light brown, (10YR	
_		1.5	SS-1	(3)	6/6 to 5YR 5/6), wet, very loose, fine grained, no HCI	_
5 37.4	5.0				reaction, 20-25% nonplastic fines, trace medium to coarse grained sand-sized iron-cemented concretions	
37.4					1	4
-					-	-
-					-	-
-					 	=
_					-	=
-	8.5				1	=
					Clayey Sand (SC)	_
		1.2	SS-2	3-4-5 (9)	8.5-9.7' - very light gray, (N8), wet, loose, fine grained, no HCl reaction, 30% medium plastic fines, trace]
10	10.0			(-)	organics (roots), trace green mineral	
32.4					_	_
_						_
-					-	-
-						-
-					 	-
-	13.5				1	4
-	10.0				Clayey Sand (SC)	1
-		1.3	SS-3	1-3-5 (8)	13.5-14.0' - medium light gray, (N6), wet, loose, no HCl reaction, fine silica sand with 3 distinct CH layers	-
15	15.0			(0)	at 13.5-13.55', 13.7-13.75', and 13.8-14.0'; CH is	
27.4					\highly plastic	
_					\sumsite Silt (ML) 14.0-14.8' - grayish orange, (10YR 7/4), wet, medium -	
-					stiff, nonplastic, rapid dilatancy, strong HCl reaction,	_
-					carbonate material	4
-						-
-						-
-	18.5				Clayey Sand (SC) 17:30 - Stopped drilling for the	e day at 20'
-		1.3	SS-4	2-4-2	18.5-18.6' - very light gray, (N8), wet, loose, fine grained, no HCl reaction, 30% medium to high	· -
20	20.0			(6)	plasticity fines, silica sand	-



PROJECT NUMBER:	BORING NUMBER:
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338884.FL A-14

SHEET 2 OF 12

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722999.7 N, 457929.8 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 299205; Dietrich D-50 S/N 240, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical

DRILLIN	GIVIETH	OD AND	EQUIPINI	ENT : CIVIE 55 S/I	N 299205; Dietrich D-50 S/N 240, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 1.7 ft bo	gs on 03/2	20/07	START : 3/14/2007 END : 4/9/2007 LOGGER : C. Wallestad
				STANDARD	SOIL DESCRIPTION COMMENTS
8 ₽€	SAMPLE	INTERVA	L (ft)	PENETRATION	00
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE	ERY (ft)	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
H Ä Ä			<u> </u>	011 011 011	MOISTURE CONTENT, RELATIVE DENSITY OR ONSISTENCY, SOIL STRUCTURE, MINERALOGY INSTRUMENTATION
			#TYPE	6"-6"-6" (N)	Solvate Find To Tell, Wilhelf Alegar
22.4				(* -)	Poorly Graded Sand (SP) Began drilling on 3/15/07 at 08:25
-					│
_					grained, <5% fines, no HCl reaction, silica sand
I _					Clayey Sand (SC) 19.4-19.8' - very light gray, (N8), wet, loose, fine -
					grained, 30% fines, medium to high plasticity, no HCl
					reaction, silica sand
l -					
-	00.5				
-	23.5				Clayey Sand (SC)
-				5-7-8	23.5-24.6' - medium light gray, (N6), wet, medium
_		1.2	SS-5	(15)	dense, fine grained, no HČI reaction, 22% medium
25	25.0				plastic fines, trace very fine sand-sized black minerals, CH lenses at 23.55-23.6', 24.2-24.25' and ————————————————————————————————————
17.4					24.55-24.6'
I -					Silt (ML)
-					24.6-24.7' - grayish orange, (10YR 7/4), wet, stiff,
-					\nonplastic, rapid dilatancy, moderate HCl reaction, \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
-					bedrock -
-					
l _]
	28.5				
_					Silt With Sand (ML)
-		1.1	SS-6	5-8-29	28.5-29.6' - grayish orange, (10YR 7/4), wet, hard, low
-		'''		(37)	plasticity, slow to rapid dilatancy, 15% fine sand, 5-10% medium to coarse sand, lenses of coarse sand
30 12.4	30.0				│ at 28.6' and 29.4-29.6', 1" limestone fragment near — │ │ │
12.4					bottom of sample; Sandy Fat Clay (CH) lenses at
_					\28.65' and 29.0'
-					1 1
-					
-					
-					
-	33:5		00 -	50// 5	-
I _		0.1	\ <u>SS-7</u>	50/1.5 (50/1.5")	Sandy Silt (ML) 33.5-33.6' - dark vellowish orange, (10YR 6/6), wet.
I -				(30/1.3)	hard, nonplastic, rapid dilatancy, moderate HCl
35					\reaction, 40-45% fine to coarse grained sand, all -
7.4					carbonate material — Driller's Remark: Lost circulation at 36.5' at
-					- 10:07 -
-					_ 36.5-38.5' Intermittent medium chattering _ 37.0-38.5' Hard/slow drilling
-					37.0-30.3 Fialu/slow dillillig
I -					<u> </u>
-					1
I -	20 5				1
-	38.5 38.8	0.0	SS-8	50/3	Limestone Fragments 12:25 Set 6" diameter casing to 8.5' and 20'
-		\		(50/3")	│ \ 38.50-38.55' - light olive gray, (5Y 6/1), mild HCl /
I -					reaction, fragments up to 1/2", voids up to 1/16" over 14:30 - End drilling on 3/15/07
40					\15-20% of surface
1					
I		1		I	l



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-14 SHEET 3 OF 12

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722999.7 N, 457929.8 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT : CME 55 S/N 299205; Dietrich D-50 S/N 240, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION : Vertical

					N 299203, Dietrich D-30 3/10 240, midd fotary, aut			
WATER	LEVELS	. 1./ 1[100	ıs on 03/2		START : 3/14/2007 END : 4/9/2007 SOIL DESCRIPTION	LUGGER	. U.	Wallestad COMMENTS
ŞQ⊋I	CAMPIT	INTERVA	1 (6)	STANDARD PENETRATION	SOIL DESCRIF HOW		og	OCIVIIVILINIO
ELO N (SAMPLE		. ,	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL,	COLOR	ICL	DEPTH OF CASING, DRILLING RATE,
H B ATIC		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DEN	ISITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MIN	ERALOGY	SYMBOLIC LOG	INSTRUMENTATION
<u>о</u> мш 2.4				(IN)			6	Water level at 1.7' at 12:30 on 3/20/07
						-		Driller's Remark: Set HW casing from 20-38' -
_						-		at 15:00 Driller's Remarks Begin drilling from 39.5'
_						_		Driller's Remark: Begin drilling from 38.5' with AWJ rod and 2-7/8" tricone bit (new bit)
_						_		at 15:20
_	42.5 42.8							
	42.8	0.2	SS-9	50/3 \ (50/3") /	Silt With Limestone (ML)	1	ш	SS-9 collected from 42.5' to 44.0'
				(50/3)	42.5-42.65' - light olive gray, (5Y 5/2), well plasticity, mild to moderate HCl reaction,	medium to		1
					coarse sand-sized and fine gravel-sized li	mestone,		1
-					voids up to 1/16" in diameter covering 15- surface, no visible casts or molds	·25% of -		1
45					Sarrage, no visible easts of moles			-
-2.6								Driller's Remark: Tagged hole at 52.5', 1'
-						-		short of presumed depth on 3/21/07
-						-		at 08:40; Assuming change in bit on morning of 3/20/07 reconciles loss of 1' in measured
-						-		depth -
_						-		-
-	47.5		00.40	FO/4 F	On the Oile (BAL)	_		00 40 11 47 5 40 01
_	47.9	0.3	SS-10	50/4.5 (50/4.5")	Sandy Silt (ML)	6/2). wet. /-	Ш	SS-10 collected from 47.5-49.0'. 16:45 Stopped drilling at 53.5' for the day on
				(00, 110)	hard, nonplastic to low plasticity, rapid dila	atancy, mild		3/20/07
					to moderate HCl reaction, 30-35% fine to sand, all carbonate material	coarse		
					Sana, an oarbonate material			
50								
-7.6								Driller's Remark: Reamed borehole from
						_		38.5' to 52.5' with 3-7/8" tricone bit on - 3/21/07
_						_		At 08:50; hole tagged at 52.5'
-						_		1
-						-		1
-						_		-
-						-		-
-	53.5				Sandy Silt (ML)		Ш	-
-		1.3	SS-11	33-50-50/4	53.5-54.8' - moderate vellowish brown, (1	0YR 5/4), -		
-	54.8	1.0	30-11	(100/10")	wet, hard, low plasticity, slow to rapid dila HCl reaction, 30% fine to medium grained	tancy, mild		
55	34.0				thick grayish black (N2) organic lens at 53	4.75', other $-$	ш	
-12.6					\irregular organic lenses and stringers thro			_
					\sample			<u> </u>
						_		
]						_		1
]						_		1
						-		1
-	58.5					-		1
-	50.5			26-50/5			Ш	
-	59.4	0.9	SS-12	(76/11")		-		-
-	55.4			, ,	h	Γ=		
60								



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-14 SHEET 4 OF 12

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722999.7 N, 457929.8 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT : CME 55 S/N 299205; Dietrich D-50 S/N 240, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION : Vertical

WATER	LEVELS	: 1.7 ft bo	ıs on 03/2	20/07 S	START: 3/14/2007 END: 4/9/2007 LOGGER: C. Wallestad	
				STANDARD	SOIL DESCRIPTION 5 COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	
I BEI		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND	
TPT JRF/			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
-17.6				(N)		
-17.6					Silt (ML) 58.5-59.4' - moderate yellowish brown, (10YR 5/4), -	-
_					wet, hard, low plasticity, rapid dilatancy, mild to moderate HCl reaction, 10-15% very fine to fine	-
_					grained sand, trace black particles, carbonate	-
_					material	-
_					-	
_					-	_
_	63.5	2.4	00.40	F0/F	Cita Metals Count (All)	_
_	63.9	0.4	SS-13	50/5 (50/5")	Silt With Sand (ML)	_
_					\orange, (10YR 6/6), up to 20% fine to medium sand _	_
65					_	
-22.6					-	4
_					_	4
_					-	4
_					Driller's Remark: 66.5-67' hard layer, light chatter	_
_					-	_
_					-	-
_	68.5					_
_	69.3	0.7	SS-14	25-50/4 (75/10")	Silty Sand With Limestone Lenses (SM) 68.5-69.15' - moderate yellowish brown, (10YR 5/4),	4
_	69.3			(73/10)	\ wet, very dense, fine to coarse grained, mild to	4
70					moderate HCl reaction, 25% low plasticity fines, around 50% of sample is limestone lenses up to 1" in	_
-27.6					size, voids up to 1/16" in size over 5-10% of surface, all carbonate material	•
_					all carbonate material	_
_					-	_
_					-	_
_					-	_
_					-	_
_	7 3:5	0.0	SS-15 /	50/1	Dillada Dawayiy Adyanaa INA aasiay fuana	_
_		0.0/	\33-13/	(50/1")	Limestone Fragments 73.5-73.55' - Fragments up to 1/2" in size, with Silty Driller's Remark: Advance HW casing from 38.0' to 73.5'	_
_					\Sand (SM) as in 68.5-69.15'	-
75 <u> </u>					-	\dashv
-32.0					-	-
_					-	-
-						4
-						-
-						-
-						4
-	78.5	0.0	CC 10	50/5	☐ Limestone Fragments	-
-	78.9	0.0	SS-16	50/5 (50/5")	Limestone Fragments 78.50-78.55' - moderate yellowish brown, (10YR 5/4),	4
-					mild HCl reaction, up to 1/2" in size, voids up to 1/16"	-
80					OVEL 30-70 /6 OF SUFFACE, TO VISIBLE TOSSIES OF CAVILLES	



PROJECT NUMBER:	BORING NUMBER:		
338884 FI	Δ-14	CHEET	5 OF 12

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722999.7 N, 457929.8 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT : CME 55 S/N 299205; Dietrich D-50 S/N 240, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION : Vertical

WATER	LEVELS	: 1.7 ft bo	s on 03/2	20/07 S	START : 3/14/2007 END : 4/9/2007 LOGGEF	3 : €	C. Wallestad
				STANDARD	SOIL DESCRIPTION	ن	COMMENTS
LOW N (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COLL NAME TIGOG OBOLID OWNDON OOLOD	-	DEDTIL OF GAGING DRILLING DATE
H BE ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	Z Z	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SOLOLIONAS	INSTRUMENTATION
-37.6				(14)		ť	Driller's Remark: 81.5-82.5' soft rock
-					-	1	Driller's Remark: 82.5-83.5' hard, heavy - chattering
-					-	1	1 1
-					-	1	Driller's Remark: Stopped drilling at 83.5' at - 18:10
]	Driller's Remark: Start SPT with AWJ rod on
_					_	1	3/22/07 at 08:10
_	83.5				City Cond With Lineary (ON)	<u> </u>	_
_	04.4	0.0	SS-17	37-50/5 (87/11")	Silty Sand With Limestone (SM) 83.5-83.55' - moderate yellowish brown, (10YR 5/4),	-	-
	84.4			(07/11)	wet, very dense, fine to coarse grained, mild to moderate HCl reaction, 29% low plasticity fines, 50%	┨	-
85 <u> </u>					of sample is gravel-sized limestone fragments up to 1/2" in size, voids up to 1/16" over 40-60% of surface,	┨	1 -
-					all carbonate material	1	1
-					-	1	1
-					-	1	1
_					-	1	Driller's Remark: 87.5-88.0' heavy chatter,
							hard rock
	88.5					L.	
_	88.8	0.0	SS-18	50/3 \ (50/3") /	Limestone Fragments 88.50-88.55' - pale yellowish brown, (10YR 6/2),	1	
_				(-17)	moderate HCI reaction, very poor recovery, fragments up to 1/2", voids up to 1/16" over 15-25% of surface,	1	1
90 <u> </u>					moderately fossiliferous, no visible cavities	1	Driller's Remark: 90.0-93.5' moderate
-					-	┨	chatter, slow drilling, hard rock
-					-	┨	-
-					-	1	1
-					-	1	1
_					-	1	1
	93.5 93.8					L]
_	93.8	0.1	SS-19	50/3 (50/3") /	Sandy Silt With Limestone (ML) 93.5-93.6' - grayish olive, (10YR 4/2), wet, hard, very	Г	<u> </u>
_				(00.0)	dense, low plasticity, moderate HCl reaction, 30% fine to medium grained sand, pale yellowish brown (10YR	1	-
95 <u> </u>					6/2) limestone lenses up to 1/4" thick	-	1 -
-52.0					-	┨	
-					-	┨	1
-					-	1	
-					-	1	1
-	98.5				·	1	1
	98.9	0.3	SS-20	50/5	Limestone	P	1
				(50/5")	98.5-98.8' - pale yellowish brown, (10YR 6/2), moderate HCl reaction, limestone fragments up to	1]
					\\\1/2"x3/4" \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	1]
100					See the next sheet for the rock core log	╀	
L							1



PROJECT NUMBER: BORING NUMBER:

338884.FL A-14

SHEET 6 OF 12

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722999.7 N, 457929.8 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205; Dietrich D-50 S/N 240, mud rotary, NQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 1.7 ft bgs on 03/20/07 START: 3/14/2007 END: 4/9/2007 LOGGER: C. Wallestad DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD <u>0</u> MINERALOGY, TEXTURE RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 98.4 Water level 2.9' below Limestone 98.4-102.6' - yellowish gray, (5Y 7/2), ground surface on 3/23/07 >10 98.9-99.2' - Fracture zone (2), rough, undulating, 1-3/4"x1-3/4" fragments, many fine to medium grained, strong HCI at 08:20, borehole depth at reaction, very weak to medium fracture orientations 100 strong (R1 to R3), 40% of rock Driller's Remark: 5 99.4' - Fracture or mechanical break, 20 deg, mottled with irregularly shaped infilled cavities (bioturbation zones), Assembled NQ coring -57.6 rough, undulating, potential mechanical assembly (NW casing with R1-NQ break, tight, fossils on surface voids (1/16") over <5% of surface attached drill bit is 8.15' 10 >10 5 ft 99.6, 99.75, 99.95' - Fractures or mechanical (25-50% in bioturbated zones), up to 83% long) break (3), 30, 90, 90 deg, smooth, undulating 100.15-101.1, 101.6-102.6' - Fracture zone 1/4"x3/4" trace fossils, highly Driller's Remark: At 98.5' >10 fractured, many discontinuities; very switch to NQ rock coring (4), 45 deg, smooth, undulating, 1"-3 weak rock from 98.4-99.2', assembly at 10:25, length fragments, broken along weaker rock 100.15-101.1' and 101.6-102.6' from kelly down position to >10 No Recovery 102.6-103.4' ground is 3.3' NR Start coring at 11:50 103.4 R1: 19 minutes Limestone 103.4-107.5' - grayish orange, (10YR 1 103.8' - Fracture, 15 deg, smooth, undulating, 7/4), medium grained, moderate to potential mechanical break, tight strong HCl reaction, medium strong 104.5' - Fracture or mechanical break, 20 105 >10 (R3), voids (1/16") over 0-20% of deg, rough, stepped to undulating, tight $-62.\overline{6}$ surface in mottled pattern, fossils up 104.7-104.9' - Fracture zone (2), 1/2"-1-1/2" to 1/4"x1/2" over 5-10% of surface R2-NO fragments, multiple orientations >10 30 5 ft 104.9' - Fracture, 70 deg, smooth, undulating, 82% open 105.0' - Fracture or mechanical break, 80 >10 deg, smooth, undulating, open, intersects 104.9' fracture 0 R2: 18 minutes 105.1' - Fracture, <10 deg, rough, undulating, No Recovery 107.5-108.4' NR open 1084 105.2' - Mechanical break, 45 deg, rough, Limestone undulating, open 1/2" to tight 108.4-112.8' - moderate yellowish brown, (10YR 5/4), medium grained, 6 105.5' - Fracture, 50 deg, smooth, undulating 106.1-106.9' - Fracture zone (2), fragments moderate to strong HCI reaction, up to 1"x2", multiple orientations, tight to 110 5 medium strong (R3), voids (1/16") open 1/4" -67.6 107.1' - Fracture, 55 deg, smooth, undulating, over 35-45% of surface, fossil casts tight up to 1/4"x1/2" over <5% of surface R3-NQ 2 5 ft 38 107.3' - Fracture, 45 deg, rough, undulating 88% to stepped, tight 108.5' - Fracture, 70 deg, rough, undulating, 5 loose 108.8' - Fracture, 20 deg, rough, undulating to stepped, loose 108.9-109.1' - Fractures (2), 5 deg, rough, 0 R3: 15 minutes No Recovery 112.8-113.4' NR undulating, tight 113.4 109.0' - Fracture, 80 deg, smooth, undulating, Driller's Remark: 115-Limestone black staining (crystal faces) on surface, tight 1 113.4-118.2' - Same as 108.9-112.8' 115.5', void, lost to open 1/4" circulation, using more 109.7' - Fracture zone, black staining, up to pressure to drill 115 1/2"x1-1/4" fragments 4 SC-1 collected at 114.8--72.6 109.9-110.2' - Fractures (2), 80 deg, rough, 115.9 undulating, loose R4-NQ 110.0' - Fracture, 70 deg, same as 109.9' 82 1 5 ft 110.1' - Fracture or mechanical break, 5 deg, 96% rough, stepped, tight 110.7' - Fracture, 10 deg, rough, undulating, 1 open 110.9' - Fracture, 10 deg, rough, undulating, R4: 10 minutes 1 black metallic crystals, tight to open 1/8" Stop drilling for day at 17:10 on 3/23/07 at 118.4' 118.4



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-14

SHEET 7 OF 12

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722999.7 N, 457929.8 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205; Dietrich D-50 S/N 240, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

						y, NQ (0015, HW casing	
WATER	LEVELS: 1.7	7 ft bg:	s on 0		<u>4/9/200</u>		
>00	<u>.</u>			DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표보인	N Y Y	(%)	FRACTURES PER FOOT			MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
FATE	H F F N	(%) Q	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	8	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
	RNG	Ø	RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	. ≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	038	22		THICKNESS, SORFACE STAINING, AND HIGHTNESS	s (v		
_			NR/	111.6-111.7' - Fractures or mechanical break	\perp	No Recovery 118.2-118.4'	Start drilling on 3/24/07 at
-			>10	(2), 5 deg and 70 deg, rough, undulating,	+	Limestone	08:05
I _			_	tight		118.4-122.0' - Same as 108.9-112.8'	Still no circulation -
120			>10	111.8-111.9' - Fractures (2), 10 deg and 70 deg, smooth, undulating, tight		except voids up to 1/16" over 15-25% of surface	Driller's Remark: 121.4-
-77.6			10	112.8-113.4' - Fracture zone (2), 1"x1-1/2"	\dashv	or surface	121.6' small void
-	R5-NQ			fragments	+	-	-
I _	5 ft	20	>10	114.2-114.4' - Fracture zone (2), 1"x1-1/2"			
	72%			fragments	\vdash		
-			4	114.5-114.6' - Fractures (2), 30 deg, smooth,	1	 -	-
-			<u> </u>	undulating, intersecting, tight to open 1/4"	\pm	No Decement 422 0 422 4	_
				114.65-114.8' - Bedding plane or mechanical	\Box	No Recovery 122.0-123.4'	
			NR	break (2), horizontal, smooth, undulating, tight to open 1/4"	\perp		R5: 9 minutes
-	123.4			115.9' - Fracture, same as 114.65', tight	+	†	
-	123.4			117.3' - Fracture, 45 deg, smooth, undulating	+	Limestone	_
			9	to stepped, tight	\perp	123.4-125.9' - Same as 108.9-112.8'	
1 7				117.8' - Fracture or mechanical break, 10	1	except voids up to 1/16" over 15-40%	1
				deg, smooth, undulating to stepped, tight to		of surface increasing with depth,	-
125			4	open 1/4"	\perp	trace fossil casts up to 1/16"x1/4"	Driller's Remark: Void at
-82.6				118.6,-118.7' - Bedding plane or mechanical break (2), horizontal, smooth to undulating,	\vdash		124.7-125.8'
-	R6-NQ		1	stepped, tight to open 1/8"	1	Ī	
-	5 ft 50%	16		118.7-119.6' - Fracture zone (2), up to	$-\Box$	No Recovery 125.9-128.4'	-
I -	30 /6			1-3/4"x2" sized fragments, many fractures at	+-		_
				0 deg, a few at 70-80 deg	\vdash		
			NR	119.7 - Fracture, 80 deg, smooth, undulating,		Ī	
-				tight	1-	-	R6: 12 minutes
-				120.3' - Fracture, 40 deg and 45 deg, smooth, undulating, tight	┵	_	_
	128.4			120.8' - Fracture, 80 deg, rough, undulating,			
				tight	1	Limestone	Water level at 1.9' below
-			7	120.9' - Mechanical break	+	128.4-131.2' - pale yellowish brown, (10YR 6/2), fine to medium grained,	ground surface on 3/26/07 _ at 08:00
_				121.0-121.5' - Fracture zone (2), breaks at	\perp	mild to moderate HCl reaction,	Water level 1.9' below
130			7	80-90 deg, many discontinuities up to		medium strong (R3), voids up to	ground surface on 3/27/07
-87.6			'	1-3/4"x1-3/4" fragments	\dashv	3/16" over 10-20% of surface, trace	at 08:08
-	R7-NQ			121.5' - Bedding plane, horizontal, smooth,	+	fossil casts up to 1/4" diameter	Driller's Remark: No
-	5 ft	9	>10	undulating, open 121.8-121.9' - same as 121.5' except tight		 -	circulation during run
	56%			121.85' - Fracture, 80 deg, rough, undulating,	\perp	No Recovery 131.2-133.4'	Driller's Remark: Light
1 7				open	1	[chatter from 128.4-132.4' – Driller's Remark: no
-				123.4-123.7' - Fracture zone (2), three rock		<u> </u>	chatter, faster drilling from
-			NR	fragments	\perp	-	132.4-132.9'
				123.9, 124.2, 124.45' - Fracture or		L	R7: 12 minutes
	133.4			mechanical break (3), horizontal and 10 deg,			
-				rough, undulating, open 124.7-124.75' - Bedding plane or mechanical	$+$ \square	Limestone	Driller's Remark: Very soft
-			>10	break (2), horizontal, smooth, planar to	+	_ 133.4-134.25' - light olive gray, (5Y	from 133.4-135.4', harder _
			L	undulating, tight to 1/4" open		5/2), very fine to fine grained, mild to	from 135.4-137.4', soft
135			>10	125.0' - Bedding plane or mechanical break,	Ш	moderate HCl reaction, medium	from 137.4-138.4'
-92.6				horizontal, smooth, planar to undulating,	╅	strong (R3), voids (1/16") over <10% of surface, trace fossil casts up to	
	R8-NQ			open	+	1/2"x1/4"	_
	5 ft	0		125.4' - Fracture, 60 deg, planar to stepped, open 1/4"-1/2"	Ш	134.25-134.65' - dusky yellow, (5Y	
I -	28%	ĺ		128.5' - Fracture, 40 deg, rough, undulating,	\perp	6/4), medium to coarse grained,	
-			NR	open	++	moderate HCl reaction, medium	
-				128.8' - Fracture, 70 deg, rough, undulating,	\perp	strong (R3), voids (3/16") over	_
				tight to open 1/5"		15-30% of surface, 5-10% fossil	
1 7				128.85' - Fracture, 30 deg, rough, undulating,	1	- casts up to 3/6"x1/2" 134.65-134.8' - Same as	R8: 8 minutes
-	130 /			tight to open 1/8"	世	133.4-134.25'	
	138.4				+	.33	

Rev. 7



PROJECT NUMBER: BORING NUMBER: 338884.FL

A-14

SHEET 8 OF 12

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722999.7 N, 457929.8 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205; Dietrich D-50 S/N 240, mud rotary, NQ tools, HW casing ORIENTATION: Vertical

DESCRIPTION Section	VATER I	LEVELS : 1.7	ft bgs	s on 03	3/20/07 START : 3/14/2007 END : 4	/9/200	LOGGER : C. Wallestad	
140	≥ □ ≥	(%			DISCONTINUITIES	၂ ၅	LITHOLOGY	COMMENTS
140	N G	AND % (%	_	ZES T	DESCRIPTION	CLC		SIZE AND DEPTH OF CASING,
140	H BI	E RU STH, OVEF	(%)	FS	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
140	EN EN	SECORE	ΩΩ	RAC		√ME		DROPS, TEST RESULTS, ETC.
January Librations (1977 128		0 1 12	œ	шФ		- V		
140				3	undulating, tight		_ Limestone	
140						Н	138.4-139.2' - pale yellowish brown	
97.6 R9-NO 0 30% 0 129-129.75 - Fracture (2), 70 deg, smooth, undulating, tight 130.0 - Fracture, 20 deg, smooth, undulating, tight 29.85 - 70 deg, smooth, undulating, tight 10 open 142 - 133.6 - Fracture, 75 deg, smooth, undulating, tight to open 144 - 134.4 - 143.7 - Fracture 20ne, up to 1*x1-1/2" fragments 138.6 - Fracture zone, up to 1*x2.6 - Fracture, 20 deg, smooth, undulating, tight to open 1/2* 139.66 - Fracture, 50 deg, smooth, planar to undulating, tight to open 1/2* 139.66 - Fracture, 50 deg, smooth, planar to undulating, tight to open 1/2* 139.66 - Fracture, 50 deg, smooth, planar to undulating, tight to open 1/2* 139.66 - Fracture, 50 deg, smooth, planar to undulating, tight to open 1/2* 147.3 - Fracture, 50 deg, smooth, planar to undulating, tight to open 1/2* 147.3 - Fracture, 50 deg, smooth, planar to undulating, tight to open 1/2* 147.3 - Fracture, 50 deg, smooth, undulating, tight to open 1/2* 157.4 - Fracture, 50 deg, smooth, undulating, tight to open 1/2* 157.4 - Fracture, 50 deg, smooth, undulating, tight to open 1/2* 157.4 - Fracture, 50 deg, smooth, undulating, tight to open 1/2* 157.4 - Fracture, 50 deg, smooth, undulating, tight to open 1/2* 157.4 - Fracture, 50 deg, smooth, undulating, tight to open 1/2* 157.4 - Fracture, 50 deg, smooth, undulating, tight to open 1/4* 1				4		Щ		_
undulating, dark staining, tight 130.9 Fracture, 20 deg, smooth, undulating, tight 130.3 Fracture, 20 deg, smooth, undulating, tight 130.5 Fracture, 20 deg, smooth, undulating, tight 133.5 Fracture, 20 deg, smooth, undulating, tight to gene 11/2* 2 133.8 Fracture, 27 deg, smooth, undulating, tight to gene 11/2* 2 133.6 Fracture, 20 deg, smooth, undulating, tight to gene 11/2* 2 134.6 Fracture zone, up to 1*x2* 148.4 NR 148.4 NR 148.4 NR 150.6 Fracture, 20 deg annoth, undulating, tight to gene 11/2* 148.4 NR 148.5 Fracture, 20 deg annoth to rough, undulating, tight to gene 11/2* 149.6 Fracture, 20 deg annoth, undulating, tight to gene 11/2* 140.1 44.5, 14.5, 3 14.54, 146.15 flowers and unable to capture core. 150.1 10 secondary to the deg smooth, undulating, tight to gene 11/2* 140.1 44.5, 14.5, 3 14.54, 146.15 flowers and unable to capture core. 150.1 10 secondary to the deg smooth to rough, undulating, tight to open 11/2* 140.1 44.5, 14.5, 3 14.54, 146.15 flowers and unable to capture core. 150.1 10 secondary to the deg smooth to rough, undulating, tight to open 11/2* 140.1 14.5, 14.5, 3 14.54, 146.15 flowers and unable to capture core. 150.1 10 secondary to the deg smooth to rough, undulating, tight to open 11/2* 140.1 14.5, 14.5, 3 14.54, 146.15 flowers and unable to capture core. 150.1 10 secondary to the deg smooth to rough, undulating, tight to open 11/2* 150.1 12.2 2 secondary to the deg smooth, planar to undulating, tight to open 11/2* 150.2 Mechanical break (b), 0-5 deg, smooth, undulating, tight to open 11/2* 150.3 14.0 14.4 5, 14.5, 3 14.54, 146.15 flowers and unable to capture core. 150.4 14.5 14.5 14.5 14.5 14.5 14.5 14.5 14	-97.6					Ш	grained, medium strong (R3), voids	
143.4 129.85 - 70 deg, smooth, undulating, tight 130.0 - Fracture, 20 deg, smooth, undulating, tight 130.0 - Fracture, 30 deg, smooth, undulating, tight 130.3 - 130.3 - Fracture, 30 deg, smooth, undulating, tight 130.3 - Fracture, 30 deg, smooth, undulating, tight 130.3 - Fracture, 30 deg, smooth, undulating, tight 130.3 - Fracture, 70 deg, smooth, undulating, tight 130.3 - Fracture, 70 deg, smooth, undulating, tight 130.5 - Mechanical break, horizontal, smooth, planar, tight, open 1/2" 130.8 - Fracture zone, up to 1"x1-1/2" fragments 13.4 - 134.6 - Fracture zone, up to 1"x1-1/2" fragments 13.4 - 134.6 - Fracture, 20 deg, smooth, undulating, tight to open 1/2" 143.7 - Fracture, 20 deg, smooth, undulating, tight to open 1/4" 143.7 - Fracture, e0 deg, smooth, undulating, tight to open 1/4" 179 - Fracture, 20 deg, smooth, undulating, tigh	1					\mathbb{H}		
tight, dark staining of 30.05 - Fracture, 35 deg, smooth, undulating, tight 130.3-130.35 - Fracture, 75 deg, smooth, undulating, tight 130.3-130.35 - Fracture, 75 deg, smooth, undulating, tight 130.3-130.35 - Fracture, 75 deg, smooth, undulating, tight 133.5 - Fracture, 75 deg, smooth, undulating, tight 133.5 - Fracture, 75 deg, smooth, undulating, tight 133.5 - Fracture, 75 deg, smooth, undulating, tight 134.65 - Fracture, 75 deg, smooth, undulating, tight 150 deg, smooth, planar, tight to open 1/2" and 144.4-145.3" smooth, planar, open 134.25 - Fracture zone, up to 1"x1-1/2" fragments 134.5-134.65 - Fracture zone, up to 1"x2" fragments 138.9-139.7 - Fracture zone, up to 1"x2" fracture, 150 deg, smooth to rough, undulating, tight to open 1/2" 139.65 - Fracture, 50 deg, smooth, undulating undulating to stepped, tight to open 1/2" 139.4-131.7 - Fracture, 50 deg, smooth, undulating, open 147.9 - Fracture, 50 deg, smooth, undulating, open 147.0 - Fracture, 50 deg,	1				129.85' - 70 deg, smooth, undulating, tight	H	5% of surface, mineralization (pyrite)	
143.4 143.4 2 1 30.05 - Fracture (2), 15 deg, smooth, undulating, tight 130.3-130.35' - Fracture, 70 deg, smooth, undulating, tight 130.3-130.35' - Fracture, 70 deg, smooth, undulating, tight 130.3-130.36' - Mechanical break, horizontal, smooth, planar, tight, nopen 1/2" 133.65 - Mechanical break, horizontal, smooth, planar, open 10-pen 1/2" 133.65 - Mechanical break, horizontal, smooth, planar, open 10-pen 1/2" 133.65 - Mechanical break, horizontal, smooth, planar, open 10-pen 1/2" 134.05 - Mechanical break, horizontal, smooth, planar, open 134.5-134.65' - Fracture zone, up to 1"x1-1/2" fragments 134.5-134.65' - Fracture zone, up to 1"x2" fragments 138.4-138.7' - Fracture zone, up to 1"x2" fragments 138.95, 139.2, 139.5, 139.7, 139.8' - Mechanical break (5), horizontal and 10 deg, rough, undulating, tight to open 1/2" 139.65' - Fracture, 50 deg, smooth, undulating, tight to open 1/2" 139.65' - Fracture, 60 deg, smooth, undulating, tight to open 1/2" 147.3' - Fracture, 50 deg, smooth, undulating, tight to open 1/2" 147.3' - Fracture, 50 deg, smooth, undulating, tight to open 1/2" 147.3' - Fracture, 50 deg, smooth, undulating, tight to open 1/2" 147.3' - Fracture, 50 deg, smooth, undulating, tight to open 1/2" 147.3' - Fracture, 50 deg, smooth, undulating, tight to open 1/2" 147.3' - Fracture, 50 deg, smooth, undulating, tight to open 1/2" 147.3' - Fracture, 50 deg, smooth, undulating, tight to open 1/2" 147.3' - Fracture, 50 deg, smooth, undulating, tight to open 1/2" 147.3' - Fracture, 50 deg, smooth, undulating, tight to open 1/2" 147.3' - Fracture, 50 deg, smooth, undulating, tight to open 1/2" 147.3' - Fracture, 50 deg, smooth, undulating, tight to open 1/2" 147.3' - Fracture, 50 deg, smooth, undulating, tight to open 1/2" 147.3' - Fracture, 50 deg, smooth, undulating, tight to open 1/2" 147.3' - Fracture, 50 deg, smooth, undulating, tight to open 1/2" 147.3' - Fracture, 50 deg, smooth, undulating, tight to open 1/2" 147.3' - Fracture, 50 deg, smooth, undulating, tight to open 1/2" 147.3' - Fracture, 50 d	1			NR		\Box		
143.4 130.3-130.35' Fractures (2), 15 deg, smooth, undulating, tight to open 1/8' 133.5' Fracture, 70 deg, smooth, undulating, tight to open 1/8' 133.6' Fracture 2 one, up to 1"x2" fragments 134.5-134.6' Fracture 2 one, up to 1"x2" fracture, 150.5 deg, smooth, undulating, tight to open 1/8' 143.5' Fracture 2 one of 1/5' 147.3' Fracture, 20 deg, smooth, planar, tight, open 1/8' 143.5' Fracture 2 one, up to 1"x2" fracture 2 one undulating, tight to open 1/8' 143.5' Fracture, 20 deg, smooth, planar to undulating, tight to open 1/8' 147.3' Fracture, 20 deg and horizontal, smooth, undulating, tight to open 1/8' 147.3' Fracture, 20 deg and horizontal, smooth, undulating, tight to open 1/8' 147.3' Fracture, 20 deg and horizontal, smooth, undulating, tight to open 1/8' 147.3' Fracture, 20 deg and horizontal, smooth, undulating, tight to open 1/8' 147.3' Fracture, 20 deg and horizontal, smooth, undulating, tight to open 1/8' 147.3' Fracture, 50 deg, smooth, undulating, tight to open 1/8' 147.3' Fracture, 50 deg, smooth, undulating, tight to open 1/8' 147.3' Fracture, 50 deg, smooth, undulating, tight to open 1/8' 147.3' Fracture, 50 deg, smooth, undulating, tight to open 1/8' 147.3' Fracture, 50 deg, smooth, undulating, tight to open 1/8' 147.3' Fracture, 50 deg, smooth, undulating, tight to open 1/8' 147.3' Fracture, 50 deg, smooth, undulating, tight to open 1/8' 147.3' Fracture, 50 deg, smooth, undulating, tight to open 1/8' 147.3' Fracture, 50 deg, smooth, undulating, tight to open 1/8' 147.3' Fracture, 50 deg, smooth, undulating, tight to open 1/8' 147.3' Fracture, 50 deg, smooth, undulating, tight to open 1/8' 147.3' Fracture, 50 deg, smooth, undulating, tight to open 1/8' 147.3' Fracture, 50 deg, smooth, undulating, tight to open 1/8' 147.3' Fracture, 50 deg, smooth, undulating, tight to open 1/8' 147.3' Fracture, 50 deg, smooth, undulating, tight to open 1/8' 147.3' Fracture, 50 deg, smooth, undulating, tight to open 1/8' 147.3' Fracture, 50 deg, smooth,	1				130.05' - Fracture, 35 deg, smooth,	111	voids (1/16"), no visible cavities or	
smooth, undulating, tight to pen 1/2" 145	1					\blacksquare		
145	-	143.4			smooth, undulating, tight	世	_ 1.0 1.0001019 100.0-140.4	Continued circulation loss,
145 102.6	1					+		potentially rock fragment
145	-				133.65' - Mechanical break, horizontal,	\Box		and unable to capture rock
tight to open 1/4" 134.05 - Mechanical break, horizontal, smooth, planar open 134.55 - Fracture zone, up to 1"x1-1/2" fragments 134.51-334.65 - Fracture zone, up to 1"x2" fragments 138.4 - 138.7 - Fracture zone, up to 1"x2" fragments 138.95, 139.2, 139.5, 139.7, 139.8' - Fracture zone, up to 1"x2" fragments 138.95, 139.2, 139.5, 139.7, 139.8' - Fracture zone, up to 1"x2" fragments 150 - 107.6 - Stit 92% 10 - Stit 20 - Stit	1/15				smooth, planar, tight, open 1/2"	\Box	moderate HCl reaction, weak to	core
134.05 - Mechanical break, horizontal, smooth, planar, open 134.25 - Fracture zone, up to 1"x1-1/2" fragments 134.4-145.31, 25 - Fracture zone, up to 1"x2" fragments 134.5-134.65 - Fracture zone, up to 1"x2" fragments 134.4-145.31, 25 - Fracture zone, up to 1"x2" fragments 134.5-134.65 - Fracture zone, up to 1"x2" fragments 138.4-138.7 - Fracture zone, up to 1"x2" fragments 138.4-138.7 - Fracture zone, up to 1"x2" fragments 138.5, 139.2, 139.5, 139.7, 139.8' - Mechanical break (5), horizontal and 10 deg, rough, undulating, tight to open 1/2" 139.65' - Fracture, 60 deg, smooth to rough, undulating, tight to open 1/4" 143.7 - Fracture, evertical and horizontal, rough, undulating, tight to open 1/8" 144.0, 144.5, 145.3, 145.4, 146.15' - Mechanical break (5), 0-5 deg, smooth, planar to undulating, tight to open 1/8" 147.3' - Fracture, 50 deg, smooth, planar, open 147.95-148.05' - Fracture, 60 deg, smooth, planar, open 147.95-148.05' - Fracture zone (2), up to 1"x1-12" fragments 148.5' - Fracture, 50 deg, smooth, undulating, tight 150.2' - Mechanical break (5), 0-5 deg, smooth, planar, open 147.95-148.05' - Fracture zone (2), up to 1"x1-12" fragments 148.5' - Fracture, 60 deg, smooth, undulating, tight to open 1/8" 151.7-153.0' - moderate yellowish brown, (10YR 5/4), fine to medium grained, mild to moderate HCl reaction, weak to medium strong (R2 to R3), voids (3/16") over 20-40% of surface, fine to medium grained, mild to moderate the switched to 3rd at 300ps 16 rR1-1AV 1712" fragments 148.5' - Fracture, 50 deg, smooth, undulating, tight 150.2' - Mechanical break, horizontal, rough, dark metallic staining, tight 150.2' - Mechanical break, horizontal, rough, dark metallic staining, tight 150.2' - Mechanical break, horizontal, rough, dark metallic staining, tight 150.2' - Mechanical break, horizontal, rough, dark metallic staining, tight 150.2' - Mechanical break, horizontal, rough, dark metallic staining, tight 150.2' - Mechanical break, horizontal, rough, dark metallic staining, tight 150.2' - Mechanical break, hor				2	tight to open 1/4"	Ш		drilling for the day at 143.4'
134.25' - Fracture zone, up to 1"x1-1/2" at 1.44.4.145.3', 5% dissolution cavities at 1.43.4.145.3', 5% dissolution cavities at 1.43.7' and 1.44.2-145.3'. 5% dissolution cavities at 1.43.4.145.3', 5% dissolution cavities at 1.43.4.145.3', 5% dissolution cavities at 1.43.7' and 1.44.2-145.3'. 5% dissolution cavities at 1.45.3'. 5% dissolution cavities at 1.43.4'.143.7' and 1.44.2-145.3'. 5% dissolution cavities at 1.43.5' 5% dissolution cavities at 1.43.4' 1.43.7' and 1.44.2-1	-					+	surface (varies with bedding), trace	on 3/27/07 at 18:00
fragments 1 1 13.4.5-134.65' - Fracture zone (2), up to 1"x1-1/2" fragments 138.4-138.7' - Fracture zone, up to 1"x2" fragments 138.4-138.7' - Fracture zone, up to 1"x2" fragments 138.95, 139.2, 139.5, 139.7, 139.8' - Mochanical break (6), horizontal and 10 deg, rough, undulating, tight to open 1/2" 139.65' - Fracture, 60 deg, smooth, undulating, tight to open 1/2" 143.7' - Fracture, vertical and horizontal, rough, undulating to stepped, tight to open 1/5" 144.0, 144.5, 145.3, 145.4, 146.15' - Mechanical break (5), 0-5 deg, smooth, planar to undulating, tight to open 1/5" 147.9' - Fracture, 60 deg, smooth, undulating, degree in 147.9' - Fracture, 60 deg, smooth, undulating, degree in 147.9' - Fracture, 60 deg, smooth, undulating, degree in 147.9' - Fracture, 60 deg, smooth, undulating, degree in 147.9' - Fracture, 40 deg, smooth, undulating, degree in 147.9' - Fracture, 60 deg, smooth, undulating, degree in 147.9' - Fracture, 60 deg, smooth, undulating, tight in 150.2' - Mechanical break, horizontal, rough, dark metallic staining, tight in 150.4' - Fracture, 60 deg, smooth, undulating, tight in 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight in 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight in 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight in 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight in 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight in 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight in 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight in 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight in 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight in 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight in 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight in 150.4' - Fracture, 60 deg, smoo	-		65	2		丗	fossil casts (1/4"x1/8") concentrated at 144 4-145 3'_5% dissolution	Water level at 2.4' below ground surface on 3/28/07
1%1-1/2" fragments 138.4-138.7" - Fracture zone, up to 1"x2" fragments 138.95, 139.2, 139.5, 139.7, 139.8'- Mochanical break (5), horizontal and 10 deg, rough, undulating, tight to open 1/2" 139.65' - Fracture, 60 deg, smooth to rough, undulating, tight to open 1/2" 143.7' - Fracture, vertical and horizontal, rough, undulating to stepped, tight to open 1/5" 144.0, 144.5, 145.3, 145.4, 146.15' - Machanical break (5), 0-5 deg, smooth, planar to undulating, tight to open 1/5" 147.3' - Fracture, 50 deg, smooth, undulating, tight 153.4 NR St. Fracture, 60 deg, smooth, undulating, tight 150.2' - Mechanical break, horizontal, rough, dark metallic staining, tight 150.8' - Fracture, 60 deg, smooth, undulating, tight 150.8' - Fracture, 60 deg, smooth, undulating, tight 150.8' - Fracture, 50 deg, smooth, undulating, tight 150.8' - Fracture, 60 deg, smooth, undulating, tight 150.8' - Fracture, 50 deg, smooth, undulating, tight 150.8' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.8' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.8' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.8' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.8' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.8' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.8' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.8' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.8' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.8' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.8' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.8' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.8' - Fracture, 60 deg, smooth, planar,	-	0070			fragments	\Box	 cavities at 143.4-143.7' and 	at 08:00
138.4-138.7° - Fracture zone, up to 1"x2" fragments 138.95, 139.2, 139.5, 139.7, 139.8′ - Mechanical break (5), horizontal and 10 deg, rough, undulating, tight to open 1/2" 139.65′ - Fracture, vertical and horizontal, rough, undulating to stepped, tight to open 1/5" 144.0, 144.5, 145.3, 145.4, 146.15′ - Mechanical break (5), 0.5 deg, smooth, planar to undulating, tight to open 1/5" 147.3° - Fracture, 60 deg, smooth, undulating, dight to open 1/5" 150.2° - Mechanical break (5), 0.5 deg, smooth, planar, open 147.95′ - Fracture, 60 deg, smooth, undulating, tight to open 1/5° 150.4° - Fracture, 60 deg, smooth, undulating, tight to open 1/5° 150.4° - Fracture, 60 deg, smooth, undulating, tight to open 1/5° 150.4° - Fracture, 60 deg, smooth, undulating, tight to open 1/5° 150.4° - Fracture, 60 deg, smooth, undulating, tight to open 1/5° 150.4° - Fracture, 60 deg, smooth, undulating, tight to open 1/5° 150.4° - Fracture, 60 deg, smooth, undulating, tight to open 1/5° 150.4° - Fracture, 60 deg, smooth, undulating, tight to open 1/5° 150.4° - Fracture, 60 deg, smooth, undulating, tight to open 1/5° 150.4° - Fracture, 60 deg, smooth, undulating, tight to open 1/5° 150.4° - Fracture, 60 deg, smooth, undulating, tight to open 1/5° 150.4° - Fracture, 60 deg, smooth, undulating, tight to open 1/5° 150.4° - Fracture, 60 deg, smooth, undulating, tight to open 1/5° 150.4° - Fracture, 60 deg, smooth, undulating, tight to open 1/5° 150.4° - Fracture, 60 deg, smooth, undulating, tight to open 1/5° 150.4° - Fracture, 60 deg, smooth, undulating, tight to open 1/5° 150.4° - Fracture, 60 deg, smooth, undulating, tight to open 1/5° 150.4° - Fracture, 60 deg, smooth, undulating, tight to open 1/5° 150.4° - Fracture, 60 deg, smooth, undulating, tight to open 1/5° 150.4° - Fracture, 60 deg, smooth, undulating, tight to open 1/5° 150.4° - Fracture, 60 deg, smooth, undulating, tight to open 1/5° 150.4° - Fracture, 60 deg, smooth, undulating, tight to open 1/5° 150.4° - Fracture, 60 deg, smooth, undulating, tight to open 1/5° 150.4° - Fractu	-			1	134.5-134.65 - Fracture zone (2), up to 1"x1-1/2" fragments	+	_ 144.2-145.3'	Driller's Remark: Retrieved
148.4 NR 138.95, 139.2, 139.5, 139.7, 139.8'- Mechanical break (5), horizontal and 10 deg, rough, undulating, tight to open 1/2" 139.65' - Fracture, 60 deg, smooth to rough, undulating, tight to open 1/4" 144.0, 144.5, 145.3, 145.4, 146.15' - Mechanical break (5), 0-5 deg, smooth, undulating, tight to open 1/5" 147.3' - Fracture, 50 deg and horizontal, rough, undulating, tight to open 1/5" 147.3' - Fracture, 60 deg, smooth, planar, open 147.95 - 148.05' - Fracture, 20 deg and horizontal, smooth, undulating, tight to open 1/8" 147.95 - Fracture, 60 deg, smooth, planar, open 147.95 - 148.05' - Fracture, 20 deg, smooth, undulating, tight to open 1/8" 155 - 112.6 R12-NQ	-				138.4-138.7' - Fracture zone, up to 1"x2"	$+\Box$	-	
Mechanical break (5), horizontal and 10 deg, rough, undulating, tight to open 1/2" 150 150 170.6 R11-NQ 5 ft 58 92% 100 101 102 153.4 R12-NQ 1555 -112.6 R12-NQ 5 ft 73% R12-NQ 1550 R12-NQ	4	440.4				\pm	No Docovery 449 05 449 41	Driller's Remark: Add <1
139.65' - Fracture, 60 deg, smooth to rough, undulating, tight to open 1/4" 130,65' - Fracture, evertical and horizontal, rough, undulating, tight to open 1/4" 143.7' - Fracture, evertical and horizontal, rough, undulating to stepped, tight to open 1/5" 144.0, 144.5, 145.3, 145.4, 146.15' - Mechanical break (5), 0-5 deg, smooth, planar to undulating, tight to open 1/8" 147.3' - Fracture, 50 deg, smooth, undulating, toght to open 1/8" 147.85' - Fracture, 60 deg, smooth, undulating, open 147.95-148.05' - Fracture, 40 deg, smooth, undulating, tight to open 1/8" 155. 115.	-}	148.4		INK	Mechanical break (5), horizontal and 10 deg,	+		cup synthetic mud mix at
undulating, tight to open 1/4" 143.7' - Fracture, vertical and horizontal, rough, undulating to stepped, tight to open 1/5" 144.0, 144.5, 145.3, 145.4, 146.15' - Mechanical break (5), 0-5 deg, smooth, undulating, tight to open 1/5" 147.3' - Fracture, 50 deg, amooth, undulating, smooth, undulating, open 147.9' - Fracture, 40 deg, smooth, undulating, tight to open 1/8" 155112.6 R12-NQ -	4			1	rough, undulating, tight to open 1/2" 139 65' - Fracture 60 deg smooth to rough	$-\Box$	_ 148.4-151.7' - yellowish gray to	145.0'
150 -107.6 R11-NQ 5 ft 92% 10 R11-NQ 10 R12-NQ 10 R14-NG-NG	4			\vdash	undulating, tight to open 1/4"	$-\Box$		
R11-NQ 5 ft 92% 10 1144.0, 144.5, 145.3, 145.4, 146.15' - Mechanical break (5), 0-5 deg, smooth, planar to undulating, tight to open 1/8" 147.3' - Fracture, 50 deg and horizontal, smooth, undulating, tight to open 1/8" 147.85' - Fracture, 60 deg, smooth, undulating, tight 10 1153.4 NR 1155 112.6 R12-NQ 155 112.6 R12-NQ 155 115.6 R12-NQ 155 115.6 R12-NQ 155 115.6 R12-NQ 155 115.6 R12-NQ 155 156 157 158 158 175" 144.0, 144.5, 145.3, 145.4, 146.15' - Mechanical break (5), 0-5 deg, smooth, planar, open 1/8" 147.85' - Fracture, 50 deg and horizontal, smooth, undulating, tight to open 1/8" 147.95 - Itacure, 60 deg, smooth, undulating, tight 150.8' - Fracture, 55 deg, smooth, undulating, tight 150.8' - Fracture, 60 deg, smooth, undulating, tight 150.8' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar				2		ᅪᅱ	reaction, medium strong (R3), voids	SC-2 collected at 144.5-
144.5, 143.5, 145.3, 145.15 Mechanical break (5), 0-5 deg, smooth, planar to undulating, tight to open 1/5"	-107.6	P11-NO			1/5"	\Box	(1/16") over 10-25% of surface, dissolution cavities up to 1"x3"	
planar to undulating, tight to open 1/5" 147.3' - Fracture, 50 deg and horizontal, smooth, undulating, tight to open 1/8" 147.85' - Fracture, 60 deg, smooth, undulating, open 147.9' - Fracture, 40 deg, smooth, planar, open 147.9' - Fracture, 40 deg, smooth, undulating, open 147.9' - Fracture zone (2), up to 147.95-148.05' - Fracture zone (2), up to 147.95-148.05' - Fracture zone (2), up to 148.5' - Fracture, 55 deg, smooth, undulating, tight 150.2' - Mechanical break, horizontal, rough, dark metallic staining, tight 150.8' - Fracture, 60 deg, smooth, undulating, tight 150.4' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.6' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.6' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.6' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.6' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.6' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.6' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.6' - Fracture, 60 deg, smooth, undulating, tight 150.6' - Fracture, 50 deg, smooth, undulating, tight 150.6' - Fracture, 60 deg, smooth, undulating, tight 150.6' - Fracture, 60 deg, smooth, undulating, tight 150.6' - Fracture, 50 deg, smooth, undulating, tight 150.6' - Fracture,	4	5 ft		3		\perp	_ following 60-70% angle fracture	Driller's Remark: 2nd gear
smooth, undulating, tight to open 1/8" 147.85' - Fracture, 60 deg, smooth, undulating, open 147.9' - Fracture, 40 deg, smooth, planar, open 147.95 - 148.05' - Fracture zone (2), up to 1"x1-1/2" fragments 148.5' - Fracture, 55 deg, smooth, undulating, tight 150.2' - Mechanical break, horizontal, rough, dark metallic staining, tight 150.8' - Fracture, 60 deg, smooth, undulating, tight 150.8' - Fracture, 60 deg, smooth, undulating, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.8' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.8' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.8' - Fracture, 50 de	_	92%			planar to undulating, tight to open 1/5"	₽	pattern –	then switched to 3rd gear
147.85' - Fracture, 60 deg, smooth, undulating, open 147.9' - Fracture, 40 deg, smooth, planar, open 147.95 - 148.05' - Fracture zone (2), up to 1"x1-1/2" fragments 148.5' - Fracture, 55 deg, smooth, undulating, tight 150.2' - Mechanical break, horizontal, rough, dark metallic staining, tight 150.8' - Fracture, 60 deg, smooth, undulating, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 6				10	147.3' - Fracture, 50 deg and horizontal,	尸		at 300psi for R11-NQ in
Standard Processing Componed Processing Comp				\vdash	147.85' - Fracture, 60 deg, smooth,	口		
153.4 NR open 147.95-148.05' - Fracture zone (2), up to 1/4"x1/8", dissolution cavities up to 1/4"x1/8", dissolution cavities up to 1/4"x1/8", over 10-15% of surface No Recovery 153.0-153.4' Limestone 153.4-157.1' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 7/2), fine to medium grained, mild to moderate HCI reaction, medium strong (R3), voids (1/16") over 15-30% of surface (increasing percentage with depth),						\coprod	reaction, weak to medium strong (R2	R11: 17 minutes
155 -112.6 R12-NQ 5 ft 73% R12-NQ 5 ft 73% 4 147.95-146.05 - Fracture, 55 deg, smooth, undulating, tight 150.2' - Mechanical break, horizontal, rough, dark metallic staining, tight 150.8' - Fracture, 60 deg, smooth, undulating, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining		153.4		NR	open		to R3), voids (3/16") over 20-40% of	
148.5' - Fracture, 55 deg, smooth, undulating, tight 150.2' - Mechanical break, horizontal, rough, dark metallic staining, tight 150.8' - Fracture, 60 deg, smooth, undulating, tight 150.8' - Fracture, 60 deg, smooth, undulating, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.6' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.6' - Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 150.6' - Fracture, 50 deg, smooth, undulating, tight 150.6' - Fracture, 50 deg, smooth, undulating, tight 150.8' - Fracture, 60 deg, smooth, undu				>10		耳	_ 1/4"x1/8", dissolution cavities up to	
155 -112.6 R12-NQ					148.5' - Fracture, 55 deg, smooth, undulating,	Ш		
R12-NQ 5 ft 73% 2 2 7 dark metallic staining, tight 150.8' - Fracture, 60 deg, smooth, undulating, tight 150.8' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 150.4' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth, planar, heavy dark metallic staining, tight 153.4-157.1' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 7/2), fine to medium grained, mild to moderate HCI reaction, medium strong (R3), voids (1/16") over 15-30% of surface (increasing percentage with depth),				4		Ш		
R12-NQ 5 ft 73% 22 2 150.8' - Fracture, 60 deg, smooth, undulating, tight 150.4' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight 151.35' Fracture, 60 deg, smooth 151.35' Fracture, 60 deg, smooth, undulating, medium grained, mild to moderate HCI reaction, medium strong (R3), voids (1/16") over 15-30% of surface (increasing percentage with depth),	-112.6					Ш]
150.4' - Fracture, 50 deg, smooth, planar, heavy dark metallic staining, tight heavy dark metallic staining, tight (increasing percentage with depth),	1			2	150.8' - Fracture, 60 deg, smooth, undulating,	\mathbb{H}		
heavy dark metallic staining, tight (increasing percentage with depth),	1					\mathbb{H}	HCl reaction, medium strong (R3),	
	1			4	heavy dark metallic staining, tight	\Box		
undulating dark metallic staining open poorly lossililerous, trace casts to	1			\vdash		111	poorly fossiliferous, trace casts to	
NR 151.5' - Mechanical break, 40 deg, rough, NR Recovery 157 1-158 4'	1			NR	151.5' - Mechanical break, 40 deg, rough,	111		
undulating to stepped, tight		158.4			unuulating to stepped, tight	囯		
						Ш		



PROJECT NUMBER: BORING NUMBER:

338884.FL A-14

SHEET 9 OF 12

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1722999.7 N, 457929.8 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205; Dietrich D-50 S/N 240, mud rotary, NQ tools, HW casing WATER LEVELS: 1.7 ft bgs on 03/20/07 START: 3/14/2007 END: 4/9/2007 LOGGER: C. Wallestad DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD <u>0</u> MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 152.0' - Fractures, 80 deg, rough, undulating, Driller's Remark: Heavy Limestone 1 dark metallic staining, intersecting, tight 158.4-160.65' - light olive gray, (5Y chatter from 154.0-155.5', 152.1' - Fracture, 10 deg, smooth, undulating, 5/2), fine to coarse grained, mild to at 155.5' - cannot advance, open 1/4", lightly stained moderate HCI reaction, weak to removing casing to check medium strong (R2 to R3), laminated bedding, voids (3/16") over 10-40% of surface (variable), trace fossil 160 152.25-153.0' - Fracture zone (2), up to 2"x2" bit, stop drilling on 3/28/07 4 -117.6 fragments at 16:10 at approximately 153.4-153.55' - Fracture zone (2), up to R13-NQ 3/4"x1-1/4" fragments casts up to 1/8" diameter, cavities 78 2 5 ft 153.7' - Fracture, 10 deg, smooth, undulating, over 5-10% up to 1/4"x1/8", trace Water level at 2.1' below 98% infill of weak rock (R2) dusky yellow ground surface on 3/29/07 light tan thin coating on surface, tight to open (5Y 6/4); 160.65-160.85' weak rock 1 at 08:20 153.8' - Fracture, vertical, same as 153.7' (R2) moderate yellowish brown, 153.95-154.05' - Fracture zone (2), up to voids (1/16") over 20-25% of surface Water level at 2.7' below 160.65-160.85' - moderate yellowish brown, (10YR 5/4), weak (R2), voids 2 1/2"x1" fragments ground surface on 4/3/07 154.25' - Fracture, same as 153.7' at 09:10 163.4 NR 154.35' - Fracture, 30 deg, smooth, undulating, tight to open 1/4" (1/16") over 15-25% of surface 160.85-163.3' - moderate yellowish Water level at 2.8' below 7 154.6' - Mechanical break, horizontal, rough, brown, (10YR 5/4), voids (1/16") over ground surface on 4/4/07 undulating, tight 155.1-155.15' - Fractures (2), 60 deg and 40 15-25% of surface, trace cavities at 08:20 (1/16"-1/2"), trace fossils (1/8"-1/4") 165 4 deg, rough, undulating, open No Recovery 163.3-163.4 Water level at 7.6' below -122.6 155.15-155.4' - Fracture zone (2), fragments ground surface on 4/5/07 Limestone R14-NQ 163.4-168.25' - grayish orange, up to 3/4"x1-1/2" at 08:10, inside core barrel 7 18 5 ft (10YR 7/4), fine to coarse grained, 155.4' - Fracture, 75 deg, rough, undulating, casing 97% dark staining 156.05-156.2' - Fractures (2), 70 deg and 55 R 12: 25 minutes mild to moderate HCI reaction, SC-3 collected at 161.35laminated bedding, alternating beds 7 deg, rough, undulating, tight to open 1/8" up to 1" thick, mottled with light olive 162.4' 156.6' - Fracture or mechanical break, gray (5Y 5/2), contains grayish R13: 17 minutes vertical, rough, undulating, tight orange beds that are weak rock (R2) R14: 16 minutes 4 156.65, 156.7, 156.8, 156.9' - Bedding plane and coarse grained, voids (3/16") 168 4 NR or mechanical break (4), smooth, horizontal over 10-40% of surface; light olive to 10 deg, planar to undulating, tight beds are medium strong rock (R3), 2 156.9-157.1' - Fracture zone (2), up to fine grained, voids (1/16") over 1/2"x1-1/2" fragments 5-15% of surface, fossil casts up to 158.4-158.55' - Fracture zone (2), up to 1"x2" 1/4"x1/8" over 5-10% of surface from 170 1 167 0-168 25 -127.6 fragments No Recovery 168.25-168.4' 158.55' - Fracture, 40 deg, rough, undulating, R15-NO Limestone 58 4 5 ft 159.8-160.0' - Fractures (2), 30 deg, rough, 168.4-173.35' - pale yellowish brown, 98% undulating, tight (10YR 6/2), fine to medium grained, 160.2' - 70 deg, same as 159.65' 160.65' - Fracture or bedding plane, mild to moderate HCI reaction, 5 medium strong (R3), voids (1/16") horizontal, smooth, planar, tight over 15-25% of surface, void size R15: 17 minutes 161.35-162.4' - Fractures (2), 20 deg, rough, increasing up to 3/16" with depth, 4 undulating, tight trace dissolution cavities (up to 173.4 163.05' - Fracture, 20 deg, smooth, 1-1/2"x1/8"), trace organic NR undulating, tight laminations >10 163.65, 163.9, 164.0, 165.2, 165.05, 165.35, 165.45, 165.5, 165.55, 166.05, 166.45, 166.6, No Recovery 173.35-173.4' Limestone 166.9, 167.25' - Mechanical break (14), 173.4-177.1' - pale yellowish brown, 175 >10 horizontal and 50 deg, smooth, planar, tight (10YR 6/2), fine to medium grained, -132.6 163.8, 165.1, 165.6' - Fractures (3), rough, undulating, horizontal to 10 deg, tight mild to moderate HCI reaction, R16-NQ medium strong (R3), voids (3/16") 0 >10 5 ft 164.15' - Fracture, 60 deg, same as 163.8' over 15-25% of surface, trace 73% 166.2' - Fracture, 60 deg, rough, undulating, cavities up to 1-1/2"x1/16", trace tight fossil casts up to 1/8"x1/16", trace >10 166.65' - Fractures (2), 30 deg, rough, laminations undulating, intersecting fractures, tight 167.1-167.15' - Fractures (2), 40 deg and 70 No Recovery 177.1-178.4' R16: 17 minutes NR deg, rough, undulating, tight 178.4



PROJECT NUMBER: BORING NUMBER:

338884.FL A-14

SHEET 10 OF 12

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722999.7 N, 457929.8 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205; Dietrich D-50 S/N 240, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 1.7	ft bgs	s on 00	3/20/07 START : 3/14/2007 END : 4/	9/200	7 LOGGER : C. Wallestad	
> O ::	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
ANI (#	N, AND ?Y (%		ES T	DESCRIPTION	000	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH BE	E RU STH, OVEF	(%) _Q	FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RO	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-	011			167.6-167.7' - Fractures (2), 40 deg and 70		Limestone	-
-			>10	deg, rough, undulating, intersecting, tight 167.85-167.95' - Fractures (2), 30 deg and 70	╁	178.4-182.1' - Same as 173.4-177.1' except trace cavities up to	-
-				deg, rough, undulating, intersecting, tight	F	1-1/2"x1/4", dark discoloration	-
180 -137.6			8	168.55' - Fracture, 10 deg, rough, undulating, _ tight	Ħ	associated with cavities	-
-	R17-NQ			169.05' - Fracture, 50 deg, rough, undulating,	Ħ	-	
-	5 ft 73%	22	0	tight 169.7' - Fracture, 60 deg, smooth, undulating	Ħ	-	1
-			5	to stepped, tight 170.15' - Fracture or mechanical break, 5	世	<u> </u>	1
-				deg, smooth, stepped, open 1/8", dark	₽	No Recovery 182.1-183.4'	1
-			NR	staining 170.55' - Fracture, 55 deg, rough, undulating,	₽	-	R17: 15 minutes
	183.4			open 1/8"-3/4" 170.8' - Fracture zone, 3/4"x1-1/2" fragments	F	[]
			2	171.2' - Fracture, 20 deg, rough, undulating,	oxdot	Limestone 183.4-188.4' - dark yellowish brown	
_				tight 171.35, 171.5, 171.8, 172.0, 172.45, 173.2' -	厂	to pale yellowish brown, (10YR 4/6 to 10YR 6/2), fine to coarse grained,	
185			2	Bedding plane or mechanical break,	上	mild to moderate HCl reaction,	
-142.6 -	R18-NQ			horizontal, smooth, undulating, tight to open 1/8"	上	medium strong (R3), abrupt color change at 184.45', voids (1/16" to	
_	5 ft 100%	77	5	172.1' - Fracture, 60 deg, rough, undulating, tight	士	_ 3/16") over 5-30% of surface, moderately fossiliferous, fossil casts	-
-				172.4' - same as 172.1' except 30 deg	╁╌	up to 1"x1/2" over 5-10% of surface	SC-4 collected at 186.25- 187.05'
-	-		4	173.25' - same as 172.1' except vertical 173.4-174.4' - Fracture zone (2),	H	(percent increases with depth), trace cavities up to 1-1/4"x1/4"	187.05
-				1-1/2"x2-1/2" fragments 175.2' - Fracture, 20 deg, smooth, undulating,	Ħ		R18: 18 minutes
-	188.4		3	tight to open 1/4"	Ħ	-	-
-				175.6' - Fracture zone, 1"x1/2" fragments 175.9' - Fracture, 30 deg, rough, undulating,	Ħ	Limestone	Driller's Remark: Hard
-			4	tight		L 188.4-193.25' - light olive gray to moderate yellowish brown, (5Y 5/2 to	material, about 2" thick at _ 189.6'
190			3	176.0-176.1' - Fracture zone (2), fragments up to 1"x1/2"	世	10YR 5/4), fine to coarse grained, mild to moderate HCl reaction, weak	Driller's Remark: Hard
-147.6				176.3' - Fracture, 70 deg, rough, undulating, tight to open 1/4"	H	to medium strong (R2 to R3), voids	material, about 2" thick
	R19-NQ 5 ft	67	3	176.4' - Fracture, horizontal, rough,	\vdash	up to 3/16" over 30% of surface, moderately fossiliferous from]
_	97%	"		undulating, tight 176.5' - Mechanical break, horizontal,	oxdot	188.4-190.1', poorly fossiliferous from 190.1-191.9', casts up to	
_			3	smooth, planar, tight 176.6-177.1' - Fracture zone (2), up to	oxdot	_ 1/2"x1/4", trace laminations, fine	
-				1-1/2"x1-1/2" fragments	\perp	grained infill over 20-40%, trace cavities up to 1-1/2"x1/8", short	-
-	400.4		2	178.4-179.3' - Fracture zone (2), up to 1/2"x1-3/4" fragments	厂	(1/4"x1/2") stacked 60 deg fractures from 188.95-189.0' (micro structural	-
-	193.4		NR.	179.3' - Fracture, 40 deg, smooth, undulating,	世	- feature)	R19: 14 minutes
-			7	179.55' - Fractures (2), 20 deg and 10 deg,	士	No Recovery 193.25-193.4' Limestone	-
105				rough, undulating, open, intersecting 179.75' - Fracture, 50 deg, rough, undulating,		- 193.4-193.75' - Same as 188.4-191.9'	-
195_ -152.6			5	tight — 179.85' - Fracture, 40 deg, rough, undulating,	╁	100.4-191.9	-
-	R20-NQ			open	F	-	1
-	5 ft 98%	26	4	180.0' - Fracture, 20 deg, smooth, undulating to stepped, tight, dark staining	Ħ	-	1
-	_		2	180.15' - Fracture, 10 deg, rough, undulating,	Ħ	T .	1
				open 180.33- 180.37' - Fractures (2), <10 deg,]#		1
			6	smooth, undulating, tight to open 1/2" 181.45' - Bedding plane, horizontal, smooth,	片		1
	198.4			planar, dark staining, tight	\vdash		
					_	l	<u> </u>



WATER LEVELS: 1.7 ft bgs on 03/20/07

210

-167.6

215

-172.6

R23-NQ

5 ft

R24-NQ

5 ft

3%

NR 0

213.4

218.4

0 NR PROJECT NUMBER: BORING NUMBER:

338884.FL A-14

SHEET 11 OF 12

ORIENTATION: Vertical

R23: 15 minutes

COMMENTS

ROCK CORE LOG

LOGGER: C. Wallestad

LITHOLOGY

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1722999.7 N, 457929.8 E (NAD83)

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205; Dietrich D-50 S/N 240, mud rotary, NQ tools, HW casing

DISCONTINUITIES

192.3' - same as 190.05'

planar, tight

fragments

1"x3/4" fragments

tight to open 1/4"

smooth, undulating, tight

1-3/4"x3" fragments

tight

192.95-193.15' - Fractures (2), 40 deg and 25 deg, smooth, undulating, intersecting, tight

193.75-193.85' - Fractures (2), smooth,

193.8' - Fracture, 75 deg, smooth, planar,

193.95, 194.1, 194.6' - Fractures (3), 30 deg and 60 deg, rough, undulating, tight 194.3' - 50 deg, same as 194.1' 194.85' - vertical, same as 194.1'

195.0-195.2' - Fracture zone (2), up to 2"x1"

195.45, 195.65, 195.85' - Fractures (3), 60 deg, rough to smooth, undulating, tight 196.3, 196.5, 196.9' - Fractures (3), 10 deg and 20 deg, rough, undulating, tight 197.4-197.55' - Fracture zone (2), up to

197.75' - Fracture, 70 deg, same as 195.45' 198.0' - <10 deg, same as 195.45'

198.6' - Fracture, 10 deg, rough, undulating,

198.3' - 70 deg, same as 195.45', open

199.35-199.55' - Fractures (2), 40 deg,

199.85' - 60 deg, same as 198.85' 199.95-201.55' - Fracture zone (2), up to

START: 3/14/2007

DESCRIPTION

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: R. Woodard

CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS NR 181.65' - Fracture, 70 deg, smooth, planar to 193.75-198.3' - yellowish gray to R20: 14 minutes 3 undulating, tight moderate yellowish brown, (5Y 7/2 to End drilling on 4/5/07 at 181.7' - Bedding plane, horizontal, smooth, 10YR 5/4), fine to coarse grained, 18:00 at 198.4' planar to stepped, open mild to moderate HCl reaction, very Water level at 3.3' below 200 weak to medium strong (R1 to R3), voids up to 3/16" over 5-25% of 181.8' - Mechanical break, hardness test 2 ground surface on 4/6/07 -157<u>.6</u> 181.9' - Fracture, vertical, rough, undulating, at 07:56 surface increasing percentage with Begin coring at 08:00 R21-NQ tiaht 184.05, 184.2, 184.5, 185.6, 185.65, 185.7, 185.85, 186.25, 188.05' - Fractures or depth, trace fossil casts up to 11 >10 5 ft 1/4"x1/8", 196.4-197.7' has moderate Driller's Remark: Slow, 63% hard coring from 201.0-<10 bedding plane (9), 5 deg, smooth, undulating, coverage (15-10%) of cavities up to 201.5', rock core fragment 1"x1/2", grain size coarsens with 185.7-185.85' - Fracture zone (2), up to depth was jammed inside shoe of NR 1-1/2"x2/3" fragments No Recovery 198.3-198.4' core barrel Limestone 187.05, 187.2, 187.35' - Fractures (3), 10 deg R21: 26 minutes 198.4-199.9' - moderate yellowish and 20 deg, rough, undulating, tight 203.4 187.25' - Fracture, vertical, rough, undulating, brown, (10YR 5/4), medium grained, R22: 15 minutes mild to moderate HCl reaction, weak tight to medium strong (R2 to R3), voids up to 3/16" over 15-20% of surface, 188.4' - Fracture, 45 deg, rough, undulating, tiaht 188.5, 189.1, 189.2, 189.3, 189.55' - Bedding trace cavities up to 1/4" diameter, 205 trace fossil casts up to 1/4"x1/3" -162.6 plane (5), horizontal, smooth, planar, open to 199.9-201.55' - grayish orange, tiaht R22-NO 189.1-189.2' - Fracture zone (2), 1"x1-1/4" (10YR 7/4), mild HCl reaction, NR 5 ft 0 fragments medium strong (R3), trace voids up 0% 189.5' - Fracture, horizontal, smooth, planar to 1/16' 190.05' - Fracture, 10 deg, rough, undulating, No Recovery 201.55-218.25' tight 191.05-191.2' - Fractures (2), 30 deg and 60 deg, smooth, undulating, intersecting, tight Driller's Remark: 1.2' 191.3' - horizontal, same as 190.05' slough at bottom of boring 208 4 191.55' - Fracture, 65 deg, rough, undulating, tight

END: 4/9/2007

90



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-14	SHEET	12	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722999.7 N, 457929.8 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205; Dietrich D-50 S/N 240, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	ATER LEVELS : 1.7 ft bgs on 03/20/07		on 03	3/20/07 START: 3/14/2007 END	: 4/9/20	2007 LOGGER : C. Wallestad
>∩≎	(%			DISCONTINUITIES	ഉ	US LITHOLOGY COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, MEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS DROPS, TEST RESULTS, ETC.
220 -177.6	R25-NQ 5 ft 0%		NR	THICKNESS, SURFACE STAINING, AND TIGHTNE	55 (6	CHARACTERISTICS Limestone 218.25-218.4' - pale yellowish brown, (10YR 6/2), fine to medium grained, moderate HCl reaction, medium strong (R3), trace voids up to 1/16" over 5-10% of surface No Recovery 218.4-223.4' R24: 12 minutes Driller's Remark: Circulation almost returned, hard coming up casing; harder rock at bottom of run
- - - -	223.4					R25: 18 minutes Bottom of Boring at 223.4 ft bgs on Driller's Remark: Switched
-					-	to split spoon to attempt to recover a sample Stop coring for day on 4/6/07 at 13:45 Water level at 2.4' below ground surface on 4/7/07
- - - - -					-	at 07:50 End of boring at 223.4'. Driller's Remark: Hole terminated short of 250.0' total depth due to borehole collapse from 174.0-223.0' and ground collapse around the surface casing and under the drill rig
- - - -						 - - - - -
-					-	
-					- - - - -	



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-14A

SHEET 1 OF 6

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722992.6 N, 457934.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 2-15/16 tri-cone bit ORIENTATION : Vertical

WATER	WATER LEVELS : 3.6 ft bgs on 6/13/07								
				STANDARD	SOIL DESCRIPTION	⅃	g	COMMENTS	
A P P P P P P P P P P P P P P P P P P P	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS			3 LO	DEDTIL OF CACING DRIVING DATE	
A BE		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	-	3OLI(DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND	
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	-	SYMBOLIC LOG	INSTRUMENTATION	
42.2	0.0			(. 1)	Silty Sand With Organics (SM)	┪	Ī	11:30 - Start sampling using AWJ rods, 2'x2"	
-		1.3	SS-1	2-2-3 (5)	0.0-0.55' - brownish black, (SYŔ 2/1), moist, loose, bark and root matter present, sand is light gray (N7),	/†		split spoon, drilling with 2-15/16" tri-cone bit	
-	1.5			(3)	\fine grained, silica, 22% fines /	/1		Wet at 1'	
-					Poorly Graded Sand (SP) 0.55-1.3' - pale yellowish brown to moderate yellowish	/1		_	
					brown, (10YR 6/2 to 10YR 5/4), moist to wet, loose, very fine to fine grained, trace non-plastic fines, 10%				
_					roots and organics	1		_	
-						4		_	
-						4		_	
-						4		-	
5 37.2	5.0				Poorly Graded Sand (SP)	4	. 1.	-	
-		1.1	SS-2	1-1-0	5.0-6.1' - yellowish gray, (5Y 7/2), wet, very loose,	+		-	
-	0.5	1.1	33-2	(1)	very fine to fine grained, medium plasticity, 4% nonplastic fines, sand is silica	<i>/</i> ‡		-	
-	6.5					1		-	
-						1		-	
-						1		-	
-						1		-	
-						1		-	
-						1		_	
10	10.0					_			
32.2				0-0-1	Clayey Sand (SC) 10.0-10.25' - light bluish gray, (5B 7/1), wet, very			_	
-		0.3	SS-3	(1)	loose, no HCl reaction, 33% high plasticity fines, fine	1		_	
-	11.5				to coarse sand and fine gravel-sized limestone	4		_	
-					\HCI reaction	/ ┨		 Driller's Remark: Slight loss of circulation at	
-						+		12' -	
-						\exists		-	
-						┨		-	
-						+		-	
15	15.0					1		-	
27.2	15.4	0.3	SS-4	50/5	Silt (ML)	寸	\prod	14:40 - 15' of HW casing installed	
-				(50/5")	15.0-15.33' - very pale orange to grayish orange, (10YR 8/2 to 10YR 7/4), wet, hard, nonplastic, rapid	П		-	
-					dilatancy, mild to moderate HCl reaction, 3% fine sand, trace organics, all carbonate material	1		_	
					Sand, trace organics, all carbonate material]			
								15:00 - Add bentonite chips around surface casing and borehole to prevent caving	
_						1		- sasing and perential to prevent daving	
-						4		_	
-						4		-	
-						+		-	
20						+			
						_			



PROJECT NUMBER:	BORING NUMBER:		
338884.FI	Δ-14Δ	SHEET	2 OF 6

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722992.6 N, 457934.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 2-15/16 tri-cone bit ORIENTATION: Vertical

						END: 0/42/2007			ORIENTATION : Vertical
WATER	LEVELS	: 3.6 ft bo	us on 6/13		TART : 6/12/2007	END: 6/13/2007 SOIL DESCRIPTION	LUGGE	τ : υ. Τ	Whitaker COMMENTS
≥□₽				STANDARD PENETRATION		SOIL DESURIPTION		<u>8</u>	COIVIIVIEN 15
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	SOIL NAME I	USCS GROUP SYMBOL,	COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H BI ATIO		RECOVE	ERY (ft)		MOISTURE C	ONTENT, RELATIVE DEN	ISITY OR	ğ	DRILLING FLUID LOSS, TESTS, AND
FA'S			#TYPE	6"-6"-6"	CONSISTENCY	, SOIL STRUCTURE, MIN	ERALOGY	ΣME	INSTRUMENTATION
<u> </u>	00.0			(N)	Silt With Sand (N	AL \		S	
	20.0			10-16-13		ייב) sh orange, (10YR 7/4), v	vet, very stiff,	4	_
-		1.0	SS-5	(29)	nonplastic, rapid of	dilatancy, moderate HCI	reaction,	Ш	_
l _	21.5				to fine gravel-size	medium grained sand, co ed lenses at 20.0-20.5', a	oarse sand	1	_
l _					material	, a .ooo at 2010 2010 ; c	60.20.10.0		
								ı	
							-	1]
-							•	1]
-							-	1	-
25	25.0							1	-
17.2	25.0 25.4	0.4	SS-6	50/4.5	Silt With Sand (N	/L)		Ш	-
-	20.1		000	(50/4.5")	25.0-25.4' - grayis	sh orange to dark yellow		╂‴	1
-					(10YR 7/4 to 10Y)	R 6/6), moist, hard, non ate HCl reaction, 15% fin	olastic, rapid / . le sand	1	-
-					sized, all carbona			-	-
-								-	-
_								1	_
_									_
								ı	
-							•	1	1
30	30.0							1	1
12.2	30.0				Sandy Silt (ML)			ш	-
-		0.6	SS-7	14-5-9		sh orange to dark yellow R 6/6), wet, stiff, nonpla		₩	-
-	24.5			(14)		ate HCl reaction, 40% fir		1	-
-	31.5					fine gravel-sized grains,	all /	┨	-
-					carbonate			┨	-
-								-	-
-								-	-
-								-	
-								1	40.40 5 00.0 1 11 1 1 1
_								1	16:10 - Recover SS-8, decide to start rock coring; add 20' HW casing to 34' (1' stickup)
35	35.0								' ' ' '
7.2	35.3	0.3	SS-8	50/3.5 (50/3.5")	Silt And Limesto	ne Fragments (ML) sh orange to pale yellow	ich brown	lacksquare	SS-8 may be slough/cuttings Borehole drilled from 35.3-36.0' without
				(30/3.3)	(10YR 7/4 to 10Y	R 6/2), wet, moderate to	strong HCI	1	sampling to set stroke
					reaction, 60% of s	sample is silt (similar to	SS-7), 40%	1	, , , , , , , , , , , , , , , , , , , ,
-					of sample is limes	stone fragments up to 1/ al	4", all	1	1
-					Begin Rock Corin	ng at 36.0 ft bgs		1	-
-					See the next shee	et for the rock core log		1	-
-								1	-
-								1	
-							-	1	-
-								-	-
40								╄	
								ĺ	



PROJECT NUMBER: BORING NUMBER: 338884.FL

A-14A

SHEET 3 OF 6

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722992.6 N, 457934.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

WATER	LEVELS : 3.6			/13/07 START: 6/12/2007 END: 6/		D7 LOGGER : D. Whitaker	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
AND (#)	-, N N N N N N N N N N N N N N N N N N N		S	DESCRIPTION) Loc	ROCK TYPE, COLOR,	OUZE AND DEDTH OF GARING
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-	36.0		1	36.7' - Mechanical break or bedding plane,		Limestone - 36.0-41.0' - light olive gray, (5Y 7/2), fine grained, moderate HCl reaction,	Water level at 3.6' below ground surface on 6/13/07 – at 07:30
-			1	10 deg, rough, undulating, tight to 1/4" open		weak (R2), 25% voids up to 1/16" increasing to 40% at 37.5', many oblong cavities (3/16" to 9/16") with	Begin rock coring at 36' below ground surface - 07:55 on 6/13/07
-	R1-NQ 5 ft 100%	91	2	37.9' - Mechanical break or bedding plane, 10 deg, smooth to rough, undulating, tight 38.55, 38.9' - Mechanical break or fractures	Ħ	trace recrystallization on inner - surfaces, trace infill	SC-1 collected at 36.7-
40	100 %		0	(2), 25 deg and 45 deg, rough, undulating, tight		-	37.85' -
40 <u> </u>			0		Ħ	-	R1: 11 minutes
-	41.0		0			41.0-43.8' - Same as 36.0-41.0' - except very weak (R1) at 42.6-43.8']
-			2	42 6 42 0 42 7 42 0 44 7 44 05 45 2 45 6		-]
-	R2-NQ 5 ft	84	1	42.6, 42.9, 43.7, 43.9, 44.7, 44.95, 45.3, 45.6' - Mechanical break (8), 5-15 deg, smooth to rough, undulating, tight	Ħ	-	_
-	96%		2			 43.8-45.8' - light olive gray, (5Y 7/2), fine to medium grained, extremely weak (R0), 60% voids up to 1/16" 	
45 -2.8			0		Ħ	with some silt-sized infill and minor recrystallization, few black 1/16" diameter fossils, thin laminations of	R2: 6 minutes
-	46.0		NR 2	46.1, 46.5, 47.6, 47.8, 48.8, 49.15, 49.6, 49.9' - Bedding plane or mechanical break (8), <15	Ħ	 organic material from 45.65-45.8' No Recovery 45.8-46.0' Limestone]
-			2	deg, smooth, undulating, tight to 1/4" open		46.0-47.3' - moderate yellowish brown, (10YR 5/4), fine to medium	Additional mechanical breaks created when
-	R3-NQ 5 ft	53	2		Ħ	weak (R1), up to 1/16" voids over 40% of surface, trace black fragments at 46.1', some silt-sized	placing core into box, due to rock conditions
-	80%		3			infill, some recrystallization in void space, many (>5) black organic fragments up to 3/16" diameter	-
50_ -7.8			NR	_	Ħ	47.3-50.0' - Same as 46.0-47.3' except extremely weak (R0), with trace black fragments at 48.8'	R3: 5 minutes
-	51.0		5	51.15, 51.4' - Fractures or mechanical break		No Recovery 50.0-51.0' Limestone 51.0-53.35' - moderate yellowish]
-			>10	(2), 30 deg, smooth, planar to undulating, tight to 1/2" open 51.75, 51.82' - Bedding plane (2), <10 deg,		brown, (10YR 5/4), fine to medium grained, moderate HCl reaction,]
	R4-NQ		2	smooth, undulating 51.75-51.82' - Fracture, 85 deg, smooth, planar, extends between 2 bedding plane		extremely weak (R0), 5-15% voids <1/16" on surface, trace 1/32" to 1/16" black laminations, many 1/16"]
5 ft 47%		0	NR	fractures 52.0-52.3' - Fracture zone 53.0, 53.15' - Bedding plane or mechanical break (2), 5 deg, rough, undulating		black organic particles No Recovery 53.35-56.0'	R4: 2 minutes
	56.0						



PROJECT NUMBER: BORING NUMBER:

338884.FL A-14A

ROCK CORE LOG

SHEET 4 OF 6

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722992.6 N, 457934.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 3.6 ft bgs on 6/13/07 START: 6/12/2007 END: 6/13/2007 LOGGER: D. Whitaker DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD <u>0</u> RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS No Recovery 56.0-61.0' Driller's Remark: All sand/silt-sized particles fell out/washed out of core R5-NQ barrel during retrieval 5 ft 0 NR **0%** Driller's Remark: Fragments/pieces of rock could be felt at 59.0' 60 -17.8 R5: 2 minutes 61.0 61.0-61.2' - Fracture zone, 2 subrounded Limestone 61.0-62.55' - dusky yellow, (5Y 6/4), >10 gravel sized fragments 61.4' - Bedding plane or mechanical break, fine to medium grained, moderate to horizontal, smooth, undulating, tight strong HCl reaction, extremely weak 2 61.65' - Bedding plane, horizontal, rough, to very weak (R0 to R1), 40% surface voids up to 1/16", trace very thin (<1/32") black laminations at planar, black staining on surface, <1/2" open 61.9' - Bedding plane or mechanical break, R6-NO <10 deg, rough, undulating, tight 62.05' - Fracture or mechanical break, 25 61.25-61.3', oblong black material up to 1-3/16" x 1/16", spherical black 0 5 ft 31% deg, smooth, undulating, tight material at 3/8" diameter, many NR 62.35' - Fracture or mechanical break, 10 cavities up to 3/8"x 3/16" deg, smooth, undulating, tight to 1" open No Recovery 62.55-66.0' 65 -22.8 R6: 2 minutes 66 O Limestone 66.1' - Bedding plane, horizontal, rough, stepped, up to 1" open 66.0-69.75' - moderate yellowish brown, (10YR 5/4), fine to medium 3 09:50 Driller's Remark: grained, moderate HCI reaction, 67.05-67.55' - Fracture zone weak (R2), 30% surface voids <1/16" >10 Hole started caving due to 67.7, 69.1' - Fracture (2), 75 deg, rough, undulating to stepped, tight to <1/2" open 67.9, 68.05' - Bedding plane or mechanical diameter many cavities up to loose interval at 56.0-61.0', 3/8"x3/16", minor recrystallization, installed HW casing from R7-NQ trace black laminations up to 3/16" 35.0-60.0' 5 ft 14 >10 break (2), <10 deg, smooth, undulating 68.25, 68.45, 68.6' - Bedding plane or thick, trace black organic material up to 5/16" diameter moderately 11:20 Casing installed, 2 mechanical break (3), <15 deg fossiliferous (molds, casts) borehole flushed 70 68.7' - Fracture, 45 deg, rough, stepped, tight No Recovery 69.75-71.0' -27 R 69.34-69.5' - Fracture zone R7: 5 minutes NR 71.0 Limestone 1 71.0-72.15' - Same as 66.0-69.75' except very weak (R1), 40% surface 71.8' - Bedding plane, 10 deg, rough, stepped voids <1/16" 72.1' - Bedding plane, horizontal, rough, 72.15-74.1' - Same as 66.0-69.75' 3 stepped except extremely weak (R0), 5% 72.6, 72.9, 73.65, 73.9' - Mechanical break or surface voids <1/16" R8-NC bedding plane (4), <15 deg, smooth, planar 22 3 5 ft to undulating, tight 62% 73.2' - Fracture, 40 deg, tight 0 No Recovery 74.1-76.0' 75 NR -32.8 R8: 4 minutes 76.0



1

NR

3

2

2

1

NR

40 1

R11-NO

5 ft

60%

R12-NO

5 ft

82%

7 >10

90

-47.8

95

-52.8

96.0

91.0

WATER LEVELS: 3.6 ft bgs on 6/13/07

PROJECT NUMBER: BORING NUMBER:

338884.FL **A-14A**

SHEET 5 OF 6

ORIENTATION: Vertical

COMMENTS

ROCK CORE LOG

LOGGER: D. Whitaker LITHOLOGY

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1722992.6 N, 457934.5 E (NAD83)

START: 6/12/2007

DISCONTINUITIES

87.3' - Bedding plane, horizontal, rough,

fractures above and below

smooth, undulating

undulating, tight 93.0-93.33' - Fracture zone

rough, planar to stepped

at 92 2'

undulating, bedding plan splits into 45 deg

88.4' - Mechanical break, smooth, stepped,

91.1, 91.4' - Bedding plane (2), <10 deg,

91.5' - Fracture, 45 deg, smooth, undulating 91.88, 92.2, 92.6' - Bedding plane or

mechanical break (3), <5 deg, rough, undulating to stepped, tight except 1/4" open

92.9' - Mechanical break, horizontal, smooth,

93.33' - Fracture, 60 deg, rough, stepped

93.5' - Fracture, 45 deg, smooth, stepped,

black staining, tight 93.8, 93.95, 94.2' - Fractures (3), 45-60 deg,

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler ELEVATION: 42.2 ft (NAVD88)

90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD <u>0</u> RQD(%) SYMBOL DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS Limestone 1 76.0-80.0' - moderate yellowish 76.55' - Mechanical break brown, (10YR 5/4), fine to medium 76.9-77.05, 77.25-77.43' - Fracture zone, grained, moderate HCI reaction, sand to gravel-sized limestone fragments extremely weak to very weak (R0 to R1), 50% surface voids <1/16", many 2 (5+) cavities, few large cavities up to 1-3/16"x5/16", minor silt-sized infill, R9-NQ 78.05' - Bedding plane, 5 deg, rough, 5 ft 0 >10 stepped, up to 1/4" open minor recrystallization, trace black 80% 78.15' - Bedding plane, horizontal, rough, fossil casts, poorly fossiliferous, zone stepped, up to 3/4" open Driller's Remark: Slight from 77.95-78.75' is weak rock (R2), 1 78.25-78.5, 78.7-78.8' - Fracture zone mud loss at 80.0' 79.65' - Mechanical break, <15 deg, rough, 5% surface coverage of voids <1/16' 80 with minor recrystallization -37.8 R9: 5 minutes stepped No Recovery 80.0-81.0' NR 81.0 Limestone 81.1' - Fracture, horizontal, smooth, planar, 81.0-81.4' - very pale orange, (10YR >10 black organic infill or staining 8/2), fine grained, very weak (R1), laminated bedding, 3/4" black 81.3-81.75' - Fracture zone, angular rock fragments 3 organic layer at 81.0' 81.7' - Fractures (2), 60 deg and 45 deg, 81.4-82.9' - pale olive, (10Y 6/2), weak to medium strong (R2 to R3), smooth, stepped, intersecting, tight R10-NO 81.85' - Fracture, vertical, rough, undulating, >10 20-25% coverage of surface voids up 34 5 ft 1/8" open to 1/16", fossiliferous 84% 82.5, 82.65, 83.4, 83.55' - Fracture (4), 50 82.9-83.6' - grayish orange, (10YR deg, rough, undulating to stepped, tight to 7/4), fine grained, moderate to strong 0 1/4" open HCl reaction, very weak (R1) 83.6-85.2' - yellowish gray, (5Y 7/2), medium strong (R3), 20-25% voids 85 83.0-83.2, 83.76-83.95' - Fracture zone -42.8 84.1' - Fracture, 45 deg, rough, stepped R10: 5 minutes NR up to 1/16" over surface, 1-2% fossil 86.0 molds up to 5/16" No Recovery 85.2-86.0' 3 86.4-86.6' - Fracture zone, bound by 45 deg Limestone fractures, rough, undulating 86.0-89.0' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCl SC-2 collected at 87.3-87.1' - Fracture, 75 deg, smooth, undulating

END: 6/13/2007

R12: 7 minutes No Recovery 95.1-96.0'

reaction, medium strong (R3),

some of the larger molds No Recovery 89.0-91.0'

Limestone

to 1/8", <2% surface coverage of

91.0-91.7' - Same as 86.0-89.0'

91.7-95.1' - moderate yellowish brown, (10YR 5/4), fine to medium

coverage of voids <1/16", trace black

oblong material up to 3/8"x1/16",

grained, strong HCI reaction, extremely weak (R0), 5-10% surface

minor recrystallization

15-20% surface coverage of voids up

cavities/molds up to 3/8" (1"x2" cavity

at 88.9'), sparse soft white infilling in

88.35'

93.0'

R11: 9 minutes

Driller's Remark: Slight mud loss at 92.0', lost

circulation completely at

APPENDIX 2BB-168 Rev. 7



PROJECT NUMBER: BORING NUMBER:

338884.FL A-14A

SHEET 6 OF 6

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1722992.6 N, 457934.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 3.6 ft bgs on 6/13/07 START: 6/12/2007 END: 6/13/2007 LOGGER: D. Whitaker DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS 94.5, 94.8, 95.0' - Bedding plane (3), <10 Limestone 5 deg, rough, undulating, black staining at 96.0-97.8' - light olive gray grading to yellowish gray, (5Y 5/2 to 5Y 7/2), fossiliferous (molds/casts), voids up 94.5', tight to 1/4" open 96.1' - Bedding plane, horizontal, smooth, undulating to 1/16" over 10-15% of surface, >10 96.4' - Fracture, 55 deg, smooth, undulating, 1-2% coverage of molds/casts up to 3/8" diameter R13-NQ tiaht 97.8-100.3' - yellowish gray, (5Y 5/2), fine grained, strong HCl reaction, 96.7-96.95' - Fracture zone 18 >10 5 ft 97.5' - Fracture or mechanical break, 40 deg, 86% weak to medium strong (R2 to R3), rough, undulating, tight 6 97.85, 98.3' - Bedding plane (2), horizontal, 15-30% surface coverage of voids up rough, undulating, tight to 1/8", few large cavities up to 3/8", 100 98.0' - Fracture, 80 deg, smooth to rough, fossiliferous (molds) -57.8 1 R13: 7 minutes undulating, with fragments along length from No Recovery 100.3-101.0' NR 97.55-98.5 101.0 98.5, 98.7' - Fracture (2), 50 deg, smooth, Limestone stepped, V-shaped fractures 101.0-103.9' - Same as 97.8-100.3' 1 98.8, 99.2, 99.4' - Bedding plane or mechanical break (3), horizontal 99.4-99.5' - Fracture zone >10 99.5' - Bedding plane, horizontal, rough, planar R14-NO 99.7, 100.0' - Bedding plane or mechanical break (2), <10 deg, smooth to rough, undulating, tight to 1" open 101.75' - Fracture, 40 deg, smooth to rough, stepped, up to 3/4" open >10 16 5 ft 58% No Recovery 103.9-106.0' 105 NR 101.9-102.45' - Fracture zone -62.8 R14: 9 minutes 102.7' - Fracture, rough, undulating, conchoidal fracture plane, 1/4" open 106.0 102.9, 103.1' - Fractures (2), 50 deg, smooth, Limestone stepped 106.0-110.5' - pale yellowish brown, >10 103.25-103.9' - Fracture zone (10YR 6/2), fine to medium grained, 103.55' - Fracture, 45 deg, smooth, planar moderate HCI reaction, weak to 106.0-106.7' - Fracture zone 106.8, 107.2' - Fractures (2), 70 deg, rough, >10 medium strong (R2 to R3), 25% stepped, tight to 1/8" open 107.05, 107.3' - Bedding plane (2), voids <1/16" on surface, 5+ cavities up to 3/4"x1/4", faint horizontal white R15-NO and black bands throughout core 37 1 5 ft horizontal, rough, undulating 90% 107.4-107.9' - Fracture zone 107.9, 108.2' - Fractures (2), 60 deg, rough, 16:00 - Reached total 1 depth of 111.0' undulating to stepped, up to 3/4" open 110 109.2' - Mechanical break, 65 deg $-67.\overline{8}$ R15: 10 minutes 1 110.2' - Bedding plane or mechanical break, No Recovery 110.5-111.0' NR horizontal, smooth, undulating, tight to 1/2" 111.0 Bottom of Boring at 111.0 ft bgs on 6/13/2007 Water level is 1.7' below ground surface on 6/14/07 at 08:00 before grouting and with casing still in hole



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-15	SHEET	1	OF	11	

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722937.2 N, 457994.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: F. Harrington, M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8 tri-cone bit

ORIENTATION : Vertical

						ary, carriedu, AVVJ 1005, 3			T. I. D. C.	
WATER	LEVELS	: 4.41 π c	ogs on 3/0		START : 2/11/2007	END: 2/20/2007 SOIL DESCRIPTION	LOGGE	R : A. █	Teal, R. Gomez COMMENTS	
≥□⊋1				STANDARD PENETRATION		SOIL DESORIE HON		Jg B	GOIVIIVILIN 13	
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOII NAM	IE, USCS GROUP SYMBO	OL. COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,	
ATICE ATICE		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR				DRILLING FLUID LOSS, TESTS, AND	
			#TYPE	6"-6"-6"	CONSISTEN	ICY, SOIL STRUCTURE,	MINERALOGY	Σ	INSTRUMENTATION	
<u>аош</u> 42.5				(N)				10,	Water level is based on Ground Water	
								-	Monitoring at LNP site (FSAR Table -	
1 -								4	2.4.12.08)"	
1 -								4	-	
1 4								4		
								1	Water levels not recorded during drilling	
									Ī	
1 7	4.5							1	1	
5					Poorly Graded	Sand (SP)			1	
37.5		1.5	SS-1	3-3-4	4.5-6.0' - grayis	sh orange pink, (5YR 7/ e grained, no HCl reacti	2), wet, loose, —	1	-	
1 -				(7)	organics, trace	nonplastic fines, trace	fine rounded	1	1	
1 +	6.0				gravel, silica sa	and		+	-	
1 -								-	-	
1 -								-	-	
-								-	-	
-								4	-	
								4	_	
1 4								1	_	
1 4	9.5								<u> </u>	
10				0.00	Poorly Graded	d Sand (SP) kish gray, (5YR 8/1), we	t medium —			
32.5		1.0	SS-2	6-6-8 (14)	dense, very fin	e to fine grained, no HC	I reaction, trace			
1 7	11.0			()	nonplastic fines	s, trace black minerals,	silica sand			
1 7									1	
1 1									1	
1 1								1	1	
1 7									1	
1 -								1	1	
								1	1	
	445							1	-	
<u>, </u>	14.5				Poorly Graded	d Sand (SP)		+	-	
15 <u> </u>		0.0	SC 2	3-3-2	14.5-15.4' - Sa	me as 9.5-10.5' except	loose -	-		
		0.9	SS-3	(5)				+	-	
	16.0							-	-	
-								-	-	
								1]	
								1	_	
								1]	
]]	
1 1	19.5							1	1	
20									1	
							=	1		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-15	SHEET	2	OF 11	

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722937.2 N, 457994.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: F. Harrington, M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8 tri-cone bit

ORIENTATION : Vertical

						r, cathead, AWJ rods, 3-7/8			ORIENTATION : Vertical	
WATER	LEVELS	: 4.41 ft k	ogs on 3/0		START : 2/11/2007	END: 2/20/2007 SOIL DESCRIPTION	LOGGEF	{ : A.	Teal, R. Gomez COMMENTS	
≥0€	CAMPLE	INTERVA	1 (4)	STANDARD PENETRATION		SOIL DESCRIPTION	OG	OCIVIIVIEIVIO		
ELO ON (SAMPLE	INTERVA	• •	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,				DEPTH OF CASING, DRILLING RATE,	
H B		RECOVE	RY (ft)		MOISTURE C	ONTENT, RELATIVE DEN	SITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND	
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY	/, SOIL STRUCTURE, MIN	ERALOGY	SYMBOLIC LOG	INSTRUMENTATION	
22.5		1.1	SS-4	1-1-0	Poorly Graded S	and (SP)		3	Weight of hammer drove last 6"	
-		'.'	33-4	(1)	☐\19.5-20.35' - San	ne as 14.5-15.4'			-	
-	21.0				Sandy Lean Clay	/ (CL) t olive gray, (5Y 5/2), moi	et verv soft		-	
-					low to medium pla	asticity, slow dilatancy, ne	o HCI -	1	-	
-					reaction, 35-40%	very fine to fine silica sa	nd _	1	-	
-							-		-	
_							_		-	
_							_		-	
-							-		-	
_	24.5				Clayey Sand (SC	4		////	-	
25 <u> </u>			00	2-1-1	24.5-26.0' - very	pale orange, (10YR 8/2),	moist, very -		_	
''.5 -		1.5	SS-5	(2)	loose, very fine to	ofine grained, no HCl rea erbeds 1/8"-5/8" thick at 2	action, 27%		-	
-	26.0				- 25.2', 25.5', 25.85	5' and 25.95' (olive gray [5Y 4/1], /-		-	
-					\moist, very soft, h	nigh plasticity, no dilatano	<u>(y)</u>		-	
_							-		-	
_							_		-	
_							_		_	
_							-		_	
_							-		_	
_	29.5				0:11.145:11.01.4				_	
30				18-19-13	Silt With Sand (N 29.5-30.7' - gravis	и∟) sh orange, (10YR 7/4), m	oist. hard. —			
12.5		1.2	SS-6	(32)	nonplastic, very r	apid dilatancy, mild to mo	oderate HCI		_	
_	31.0				reaction, 19% fine	e to medium sand sized,	carbonate	Ш	<u>-</u>	
_							_		_	
_							_		_	
_							_		_	
_							_		_	
_							_		_	
_							_		_	
_	34.5							<u> </u>	_	
35				21-42-50/4	Silt With Sand (N	/IL) yellowish orange, (10YR	6/6) moist —			
7.5		1.1	SS-7	(92/10")	hard, mild to mod	derate HCl reaction, 10-2	5% very fine		_	
	35.8					sized (varies in sample), 35.1' and 35.3-35.6', all ca			_	
					Socio di Willio di C	and 50.0 00.0, an of			_	
_							_		_	
_							_		_	
_							_		_	
_	39.5								_	
	39.6	0.0	SS-8	50/1.5 (50/1.5")	Limestone Fragr	nents (5Y 3/2), voids over 80-9	20% of		_	
				(50/1.5)	surface, mild HCl	l reaction on unscratched	surface,		_	
40					\moderate HCl rea	action when scratched			Switch to rock coring at 40'	
					Begin Rock Corin	ng at 40.0 ft bgs et for the rock core log				
					See the next shee	et for the rock core log				



ı	PROJECT NUMBER:	BORING NUMBER:					
	338884.FL	A-15	SHEET	3	OF	11	

ORIENTATION: Vertical

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1722937.2 N, 457994.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: F. Harrington, M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

00.1			<u> </u>	1211 . ONE 330 3/11 1000/3, mad rolary, rig 10013, rivi	00.0	9	ORIENTATION: Vertical
WATER	LEVELS: 4.4	1 ft b	gs on	3/06/07 START : 2/11/2007 END : 2/	20/20	07 LOGGER : A. Teal, R. Gomez	
Ĺ.				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		Ś	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
HH H	Z.A.Y.	(%	FRACTURES PER FOOT	22001111 11011	임	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
H F A A	O T T T T T T T T T T T T T T T T T T T	(%) _Q	FS	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BOI	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
989		S O	'RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	ΥM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
2.5		ш.	ш.п.		0)		Pogin rook paring at 40'
2.5	40.0		3	40.0-40.2' - Fracture zone 40.35' - Fracture, vertical, rough, planar, tight		Limestone - 40.0-41.9' - light olive gray, (5Y 5/2),	Begin rock coring at 40' Core run times were not
l _	R1-NQ	70		40.5' - Fracture, 10 deg, rough, undulating,		moderate to strong HCl reaction,	recorded at the time of
	2 ft 95%	70		open	Н	medium strong to strong (R3 to R4),	drilling
-	100		0			 fossiliferous (casts) voids 60-70% coverage, few cavities up to 1/16" 	1
-	42.0		NR.	•	╂┴	No Recovery 41.9-42.0'	1
-			0		口	- Limestone	-
-					+	42.0-47.0' - Same as 40.0-41.9'	1
l _			4	43.3-43.4' - Fracture zone, rock fragments,		except many cavities up to 1/4", voids (1/16") up to 60% coverage,	
1				coarse sand (1/16") to gravel (1") size	\vdash	very weak (R1) below 46.0'	
	R2-NQ			44.1' - Fracture, 5 deg, rough, undulating,	\coprod		1
45	5 ft 100%	60	6	open	1-	-	1
45 -2.5	100%			44.25, 44.4' - Fracture (2), 88 deg and —		-	-
			5	vertical, rough, planar, tight 44.5, 44.6' - Fractures (2), 10 deg, rough,	₽	_	-
I -				undulating, <1" relief	\Box	_	
				44.85, 45.35' - Fractures (2), 40 deg, rough,			
-	47.0		2	planar, tight	╁	_	1
-	77.0			45.55-45.7' - Fracture zone, rock fragments from fine gravel (3/16") to coarse gravel	TIT	Sandy Silt (SM)	1 1
-				(1"x2") size	111	 47.0-50.1' - light olive gray, (5Y 5/2), 	1
-				45.9' - Fracture, 50 deg, rough, undulating,	4111	wet, 20-25% very fine to coarse	-
l _			NIA	open 46.6' - Mechanical break	111	grained sand, trace gravel-sized - limestone fragments, thin (1/16-1/8")	
			NA	46.9' - Fracture zone, 10 deg, smooth,		organic layers throughout (30%	
1 -	R3-NQ			undulating, 1-1/4" relief	1	coverage), section compacted at	1
	5 ft	0		47.0-50.1' - Fracture zone, sandy silt, mostly	1111	- 49.0-50.0' with no cementation	
50 -7.5	62%			loose indurated material, fractures very easily, some fractures may be mechanical	-	L	-
-				casily, some fractures may be medianical	4111.	No Recovery 50.1-52.0'	-
l -			NR			-	
			INIX]		
	52.0				144		1
-				52.0-57.0' - Fractures or mechanical break,		Limestone	Loggers: A. Teal/ C.
-			>10		 	- 52.0-53.8' - light olive gray, (5Y 5/2),	Dougherty -
-			_	material, partially lithified compacted fragments from silt to coarse sand, up to 1"		fine grained, strong HCl reaction, very weak (R1), black organic	1
-			>10		oxdappi	- fragments (1/16"x3/16") distributed]
						throughout the rock (<5%), generally	
	R4-NQ	-		54.0' - Fracture, horizontal, rough, undulating,		horizontal orientation, poorly]
55	5 ft 84%	20	2	3/8" relief 54.4' - Fracture, 3/16" open	1	 fossiliferous 53.8-55.0' - moderate olive brown, 	1
-12.5	0-70				仜	(5Y 4/4), fine grained, strong HCl	-
-			>10		+	reaction, very weak (R1), (<1/16")	1 -
-						voids about 70% of surface, poorly	1
			0		\vdash	fossiliferous, black organic fragments as for 52.0-53.8' above, but more	
	57.0		NR			(still <5%)	1
1 -				EZ OEL Expetimo de descriptions de la constata constata d	1-	55.0-56.2' - Same as 52.0-53.8'	1
-			4	57.25' - Fracture, 15 deg, smooth, undulating, - <1" open		 except more abundant black organics 	1
-				57.5, 60.8' - Fractures (2), 20 deg, rough,	╂┷	No Recovery 56.2-57.0'	-
-			0	undulating, open		-	1
_				57.8' - Fracture, 10 deg, smooth, planar,	\Box	_	
	R5-NQ	00	4	tight, lignite lamination 3/8" thick 57.95' - Fracture, 60 deg, rough, undulating			
60	5 ft 100%	80	1	to planar, tight	$oxed{\square}$		1
	.5570				1		
1							



FRACTURES PER FOOT

3

2

5

0

NR

3

1

>10

>10

NR

>10

1

0

NR

1

1

>10

5 ft 70

tiaht

tight

undulating, tight

46 3

break (5)

<1" relief

<1" relief

open, 1-1/4" relief

undulating, open

open

deg, smooth, undulating, open

lithified limestone fragments

tiaht

RQD(%)

WATER LEVELS: 4.41 ft bgs on 3/06/07

CORE RUN, LENGTH, AND RECOVERY (%)

62.0

67.0

72.0

77.0

R6-NQ

5 ft 28%

R7-NQ 5 ft

R8-NQ

5 ft

86%

R9-NQ

78%

68 0

0

DEPTH BELOW SURFACE AND ELEVATION (ft)

-17.5

65

-22 5

70

-27 5

 $-32.\overline{5}$

80

PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-15 SHEET 4 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722937.2 N, 457994.3 E (NAD83)

START: 2/11/2007

DESCRIPTION

DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND

THICKNESS, SURFACE STAINING, AND TIGHTNESS

59.4' - Fracture, 10 deg, smooth, undulating,

60.5' - Fracture, 10 deg, rough, undulating

61.7' - Fracture, 5 deg, smooth, undulating,

62.0' - Fracture, 15 deg, rough, undulating,

62.1, 62.3, 62.4, 62.5' - Fracture zone (4), 10

62.15' - Fracture, 25 deg, rough, undulating,

62.5-63.4' - Fracture zone, soft, partially

67.2, 67.4' - Fractures (2), 15 deg, rough,

67.3' - Fracture, 30 deg, rough, undulating,

68.4' - Fracture, 70 deg, rough, planar, tight

69.4, 69.7' - Fractures (2), 10 deg, rough,

70.2-72.0' - Fracture zone, soft, partially

72.0-72.6' - Fracture zone, limestone

73.9' - Fracture, 60 deg, rough, planar, tight

76.3' - Fracture, 5 deg, rough, undulating,

77.85' - Fracture, horizontal, smooth,

79.2-79.4' - Fracture zone, limestone

fragments, gravel to cobble-sized

78.65' - Fracture, 10 deg, rough, undulating,

fragments from silt to gravel-sized

73.4, 75.2' - Mechanical break

undulating, tight, open at 69.7' 69.5, 70.0' - Fractures (2), 80 deg and

vertical, rough, planar, tight

lithified limestone fragments

58.3, 58.7, 59.1, 59.7, 61.1' - Mechanical

DISCONTINUITIES

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: F. Harrington, M. Griffin

90

 $\underline{\circ}$

END: 2/20/2007

CORING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION: Vertical LOGGER: A. Teal, R. Gomez LITHOLOGY COMMENTS ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS Limestone 57.0-62.0' - Same as 53.8-55.0' except laminations of organic material present throughout, apparent bioturbation zone from 61 7-62 0' Limestone 62.0-62.5' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, very weak (R1), laminations of organic material about 25% 62.5-63.4' - dusky yellow, (5Y 6/4), fine grained, strong HCI reaction, extremely weak (R0), crumbles easily to silt-sized particles No Recovery 63.4-67.0' 17:00 7/12/07 End of drilling for the day, at 67' Limestone 67.0-70.2' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, weak (R2), voids (<1/16") over 60% of surface, laminations of organic material (<5%) most are in zone from 67.8-68.7 70.2-71.0' - Same as 62.5-63.4' 71.0-71.4' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, very weak (R1), voids (<1/16") over 30% of surface, few organic laminations No Recovery 71.4-72.0' Limestone 72.0-74.7' - yellowish gray, (5Y7/2), fine grained, strong HCl reaction, weak (R2), voids (<1/16") over 80% of surface, few larger (up to 3/8") voids, except larger voids are 10% of surface from 74.0-74.7', moderately fossiliferous, few black organic fragments 74.7-76.3' - dusky yellow, (5Y 6/4), fine grained, strong HCI reaction, very weak to weak (R1 to R2), voids (<1/16") over 75% of surface, few SC-1 collected at 77.0black organic fragments 77.85' No Recovery 76.3-77.0' Limestone 77.0-79.4' - Same as 74.7-76.3'



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-15 SHEET 5 OF 11

ROCK CORE LOG

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722937.2 N, 457994.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: F. Harrington, M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

WATER	LEVELS : 4.4	1 ft b	as on :	3/06/07 START : 2/11/2007 END : 2/	20/20	D7 LOGGER : A. Teal, R. Gomez	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		LES	DESCRIPTION	SLOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE	E RU STH, OVEF	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
EVEN E	SORE	ROL	FRAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-37.5	034			79.8, 78.3, 80.4' - Mechanical break (3)	0,7	Limestone	
-	1		0	-	╁	 79.4-80.9' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, 	-
-	-			-	F	weak to medium strong (R2 to R3),	1
-	82.0		NR	-	F	 voids (<1/16") over 80% of surface, few larger (up to 3/16") voids, 	1
-			. 40	82.0-82.5' - Fracture zone, limestone	H	moderately fossiliferous	Many of the fragments at
]		>10	fragments, coarse sand cobble-sized 82.65' - Fracture, 60 deg, smooth, undulating,	片	 No Recovery 80.9-82.0' Limestone 	82.0-82.5' show tooling marks from drilling;
]		2	open	片	82.0-86.7' - dusky yellow, (5Y 6/4), - fine grained, moderate to strong HCl	fragmentation could be result of drilling
_				83.35' - Fracture, 25 deg, rough, undulating, open	dash	reaction, very weak to weak (R1 to	result of drilling
-	R10-NQ 5 ft	30	>10	83.7, 84.0, 84.1, 84.15' - Bedding plane (4), organic beds, black, thin laminations	H	R2), voids (<1/16") over 80% of surface, moderately fossiliferous,]
85	94%			84.4-85.3' - Fracture zone, limestone	尸	zones at 83.7-84.0' and 86.3-86.7' have few voids, black organic	_
-42.5 -			1	fragments from silt to cobble-sized	F	 laminations (20%), and color closer 	-
-				85.75' - Fracture, 25 deg, rough, undulating,	口	to yellowish gray 5Y 7/2	-
-	.		2	tight 86.0, 86.2' - Fractures (2), 30 deg, rough,	上	_	-
-	87.0		NR	undulating, 2-1/2" relief at 86.0', open at 86.2'	┢	No Recovery 86.7-87.0' Limestone	-
-			3	87.1, 87.15' - Fractures (2), 5 deg and 10 deg, smooth, undulating, open	╀	 87.0-90.95' - yellowish gray, (5Y 7/2), 	-
-	-			87.45-87.75' - Fracture zone, limestone fragments, gravel to cobble-sized	F	fine grained, moderate HCl reaction, weak to medium strong (R2 to R3),	
-	.		2	88.0, 89.0' - Fractures (2), 20 deg and 10	厈	voids (<1/16") over 85% of surface	-
-	l R11-NQ			deg, rough, undulating, open 88.45' - Fracture, 70 deg, smooth, planar,	广	only 30% below 90.3'), larger (up to 3/8") voids over <5% of surface with	1
90	5 ft 79%	46	3	tight	Ħ	 most between 89.0 -90.3', larger voids are fossil molds, moderately 	1
-47.5	- 7570		<u> </u>	89.2, 90.4' - Fractures (2), 40 deg and 20 deg, rough, undulating, open at 89.2', 2-1/2"	世	fossiliferous	
-	1		1	relief at 90.4' 89.45' - Fracture, 70 deg, rough, planar, open	世	=	1
-			NR	89.8, 90.0' - Mechanical break (2)		No Recovery 90.95-92.0'	1
	92.0		INIX		F	_]
_			3	92.2' - Fracture, 75 deg, smooth, planar,	F	Limestone - 92.0-96.6' - yellowish gray, (5Y 7/2),	
-			Ľ	open 92.75, 92.95' - Fractures (2), 20 deg, smooth,	F	fine grained, moderate HCl reaction,]
-	.		3	undulating, tight	口	weak to medium strong (R2 to R3), voids (1/16") over 30% of surface,] _
-				93.0' - Fracture, vertical, smooth, planar, tight 93.2, 93.4' - Fractures (2), 20 deg, smooth,	世	few larger (up to 3/8") voids, poorly to moderately fossiliferous, rock	-
-	R12-NQ 5 ft	49	3	undulating, open at 93.2', tight at 93.4' 93.7' - Mechanical break	士	 appears to continue from material at 	-
95 <u> </u>	92%			94.0' - Fracture, 70 deg, rough, planar, open 🛭 —		90.3 -91.0', some organic laminations below 96.0', also more	SC-2 collected at 94.95-
-			0	94.2, 94.35' - Fractures (2), 15 deg, rough, undulating, open	\vdash	abundant fossils	95.8' -
-			4	<u>-</u>	Ħ	-	
-	97.0		NR	-	F	_ No Recovery 96.6-97.0'	
-	31.U			-	Ħ	Limestone	
-			2	97.3' - Fracture, 20 deg, rough, undulating, - <1" relief		 97.0-97.5' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, 	1
-	1			97.95-98.3' - Fracture zone, 60 deg, smooth, planar, tight/multiple fractures	片	medium strong (R3), matrix with	1
-]		2	98.6' - Fracture, horizontal, rough, undulating,	\vdash	 abundant voids (<1/16"), very fossiliferous at 97.3-97.5', yellowish 	1
	R13-NQ 5 ft	60	2	open 99.3' - Fracture, 10 deg, rough, undulating,	dash	gray (5Y 7/2) fragments held in matrix have few voids]
100	100%	00		2-1/2" relief	\blacksquare	madik nave lew volus	

APPENDIX 2BB-174 Rev. 7



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-15 SHEET 6 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722937.2 N, 457994.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: F. Harrington, M. Griffin

CORING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION: Vertical

WATER LEVELS . 4		
WATER LEVELS . 4.4	ogs on 3/06/07 START : 2/11/2007 END : 2/20/2007	LOGGER: A. Teal, R. Gomez
>00 G	DISCONTINUITIES	LITHOLOGY COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft) CORE RUN, LENGTH, AND RECOVERY (%)	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND WEAR	COCK TYPE, COLOR, IERALOGY, TEXTURE, ITHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-57.5 -102.0 -102.0 -10562.5 -62.5 -107.0 -110.0 -67.5 -1110.0 -67.5 -112.0 -11572.5 -117.0 -117.0 -117.0 -117.0 -117.0 -117.0 -117.0	99.9' - Fracture, 50 deg, rough, planar, tight 100' - Fracture, 75 deg, rough, planar, tight 100' - Fracture, 45 deg, rough, undulating, open 101.6' - Fracture, 70 deg, rough, undulating, 1-1/4' relief 101.65' - Fracture, 25 deg, rough, undulating, 102.25, 102.7' - Fractures (2), 30 deg and 10 102.6' - Fracture, 70 deg, smooth, planar, 102.4' - Fracture, 70 deg, smooth, planar, 103.2' - Fracture, 70 deg, smooth, undulating, 103.5' - Fracture, 5 deg, smooth, undulating, 103.5' - Fracture, 40 deg, rough, undulating, 103.6' - Fracture, 40 deg, smooth, planar, 11 104.2' - Fracture, 25 deg, smooth, undulating, 12 relief 103.8' - Fracture, 40 deg, smooth, undulating, 13 -1/2' relief 104.2' - Fracture, 25 deg, smooth, undulating, 14 open 105.75' - Fracture, 60 deg, rough, stepped, 3-1/2' relief 106.6' - Fracture, 15 deg, rough, undulating, 107.7, 109.4' - Fracture (2), 25 deg, rough, 107.7, 109.4' - Fracture (2), 25 deg, rough, 109.8' - Mechanical break 110.35, 111.35' - Fractures (2), 35 deg, rough, 109.85' - Mechanical break 110.35, 111.35' - Fractures (2), 40 deg and 5 109.7' - Fracture, 15 deg, smooth, undulating, 109.85' - Mechanical break 110.35, 111.35' - Fractures (2), 40 deg and 5 112.0-112.5' - Fracture 20, 70 deg, smooth, 112.0-112.6' - Fractures (2), 70 deg, smooth, 112.0-112.6' - Fractures (2), 70 deg, smooth, 112.0-113.5' - Fractures (2), 70 deg, smooth, 112.0-113.5' - Fractures (2), 70 deg, smooth, 112.0-117.9 deg, rough, undulating, open 113.2, 113.5' - Fractures (2), 70 deg, smooth, 112.0-117.9 deg, rough, undulating, open 113.7, 113.85' - Fractures (2), 70 deg, smooth, 112.0-117.9 deg, rough, undulating, open 113.7, 113.85' - Fractures (2), 70 deg, smooth, 112.0-117.9 deg, rough, undulating, open 113.7, 113.85' - Fractures (2), 70 deg, smooth, 112.0-17.9 deg, rough, undulating, open 113.7, 113.85' - Fractures (2), 70 deg, smooth, 112.0-17.9 deg, rough, undulating, open 113.7, 113.85' - Fractures (2), 70 deg, smooth, 112.0-17.9 deg, rough, undulating, open 113.7, 113.85' - Fractures (2), 20 deg, rough	e - yellowish gray, (5Y 7/2), ed, moderate HCl reaction, trong (R3), few voids 0' - dusky yellow, (5Y 6/4), ed, moderate HCl reaction, trong (R3), voids (<1/16") of surface, few larger (upoids, few organic is, moderately fossiliferous is, moderately fossiliferous is, of - Same as 98.3-102.0' ea of intermixed material gray 5Y 7/2, with few in 102.3-103.3', larger voids of intermixed material gray 5Y 7/2, with few in 102.3-103.3', larger voids of intermixed material gray 5Y 7/2, with few in 102.3-103.3', larger voids of intermixed material gray 5Y 7/2, with few in 102.3-103.3', larger voids of incomplete in 105.3 and fossil molds/casts of 5' appears more moderate of in (5Y 4/4) in color SC-3 collected at 105.75-106.6' SC-3 collected at 105.75-106.6' SC-4 collected at 110.35-111.35'



PROJECT NUMBER: BORING NUMBER: 338884.FL A-15 SHEET 7 OF 11

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1722937.2 N, 457994.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: F. Harrington, M. Griffin

ORIENTATION: Vertical CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing WATER LEVELS: 4.41 ft bgs on 3/06/07 START: 2/11/2007 END: 2/20/2007 LOGGER: A. Teal, R. Gomez DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD <u>0</u> MINERALOGY, TEXTURE RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -77.5 115.75' - Fracture, 5 deg, rough, undulating, Limestone 3 118.7-120.7' - yellowish gray, (5Y 117.25, 117.30, 119.1' - Fractures (3), 25 7/2), fine grained, moderate to strong HCl reaction, weak to medium strong deg, smooth, undulating, tight for 117.25' and 1 (R2 to R3), voids (<1/16") over 60% 117.30', open for 119.1' 117.6, 119.3' - Fractures (2), 5 deg, smooth, undulating, tight for 117.6', open for 119.3' 117.7, 118.7' - Fractures (2), 45 deg, smooth, of surface, few larger (up to 3/16") 122.0 NR voids, gradual color change to dusky Inner sample barrel not yellow (5Y 6/4) at bottom foot of >10 locked in while coring runs planar, tight 119.25' - Fracture, 20 deg, smooth, interval R18 and R19 and no core 120.7-121.7' - mottled dusky yellow was recovered in sample and yellowish gray, (5Y 6/4 and 5Y >10 undulating, tight barrel; after pulling outer 120.1' - Fracture, 15 deg, smooth, undulating, 7/2), fine grained, moderate HCI core barrel 2.3' of core was reaction, medium strong (R3), voids found in outer barrel; >10 R18-NQ 120.8, 120.9' - Fractures (2), 30 deg and 45 (<1/16") over 80% of surface of recovered core is assumed 9 5 ft deg, smooth, planar, tight vellow-colored areas and 30% in 46% to come from 122.0-124.3' 125_ gray areas No Recovery 121.7-122.0' 121.2' - Fracture, 25 deg, smooth, undulating, at top of R18 -82 5 open NR Limestone Fragments 122.0-124.3' - Fracture zone or mechanical 122.0-124.3' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine break fragmented grained, moderate to strong HCI 127.0 reaction, medium strong to strong (R3 to R4), voids (<1/16") over 30-60% of surface, a 5" section core has no voids, with laminated alternating colors, strong (R4), fine grained, strong HCI reaction No Recovery 124.3-132.0' R19-NO 0 NR 5 ft 130 -87 5 132.0 132.0-132.2' - Fracture zone, gravel-sized Limestone Core from R20 stuck in 3 132.0-133.4' - light olive gray grading limestone fragments outer core barrel, driller to yellowish gray, (5Y 5/2 to 5Y 7/2), fine grained, moderate HCl reaction, 132.35' - Fracture, 5 deg, rough, undulating, had to pull outer barrel (137.0') out of hole: 3.6' of open medium strong (R3), voids (<1/16") over 30% of surface, larger (up to 5 132.85' - Fracture, 5 deg, smooth, planar, core recovered; scratches, scores, and tool marks on open 3/8") voids and fossils molds/casts 133.0, 133.3' - Fractures (2), 40 deg and 5 many pieces of core from R20-NQ over 5% of surface, laminated deg, smooth, planar, open for 133.0', very 4 drilling; many fractures in 5 ft 19 coloration and few voids from tight for 133.3 135 72% R20 could be drilling -92.5 133.05, 133.35' - Fractures (2), 5 deg, 132.7-133.2' induced 4 133.4-135.0' - dusky yellow, (5Y 6/4), smooth, planar, very tight 133.5, 134.55' - Fractures (2), 5 deg and 15 fine grained, moderate HCI reaction, deg, rough, undulating, open weak to medium strong (R2 to R3), NR voids (<1/16") over 80% of surface, larger (up to 3/8"x3/4") voids and 134.0, 134.25' - Fractures (2), horizontal, rough, undulating, open 137.0 fossil molds over 10% of surface 134.7' - Fracture, 10 deg, smooth, undulating, 135.0-135.6' - light olive gray, (5Y open 4 5/2), fine grained, moderate HCI 135.0' - Fracture, 5 deg, rough, undulating, reaction, medium strong to strong open 135 0-135 2' - Fracture zone, limestone (R3 to R4), voids (1/16") over 5% of 2 surface. laminated coloration, some fragments, gravel to cobble-sized laminations of organic material 135.3' - Fracture, horizontal, smooth, planar, R21-NQ No Recovery 135.6-137.0' very tight 5 ft 84% 50 4 140



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-15	SHEET	8	OF	11

ORIENTATION: Vertical

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1722937.2 N, 457994.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: F. Harrington, M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

00.1	, <u>.</u>		<u> </u>	TEINT . CIVIL 330 3/11 100073, ITING TOTALLY, THE TOTAL THE	00.0.1.5		ONIENTATION : Vertical
WATER	LEVELS: 4.4	11 ft b	gs on	3/06/07 START : 2/11/2007 END : 2/	20/200	D7 LOGGER : A. Teal, R. Gomez	
>00	. ;;			DISCONTINUITIES	ي ا	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		SI.	DESCRIPTION) LOG	ROCK TYPE, COLOR,	CIZE AND DEDTIL OF CACING
불병은	RUN H, A	(%) Q	N I	DEDTH TYPE OPICHTATION POHOLINESS	SYMBOLIC	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
F A S	RE J	0	ACT R F(DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	MBC I	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SCI	SHE	RQ	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-97.5				135.5' - Fracture, 5 deg, smooth, undulating,	ш	Limestone	
-			1	open	╁┼	- 137.0-137.6' - Same as 135.0-136.6'	1 1
-			2	137.3' - Fracture, vertical, rough, planar, tight 137.6' - Fracture, horizontal, smooth,	₽	except light colored (dusky yellow (5Y 6/4)) laminations have increasing	
-			NR	undulating, open	₽₩	- amount of voids	1 -
l _	142.0		INIX	137.8, 138.15' - Fractures (2), 5 deg, rough,	Ш	137.6-141.2' - dusky yellow, (5Y 6/4),	_
			. 40	undulating, tight	Н	fine grained, moderate to strong HCl	
-			>10	137.9, 138.6' - Fractures (2), 15 deg and 70 deg, rough, undulating, tight for 137.9', open	ш	 reaction, medium strong (R3), voids (<1/16") over 75% of surface 	1 1
-				with gray staining at 138.6'	ш	decreasing to 40% below 139.5',	SC-6 collected at 143.0-
-			>10		H	moderately fossiliferous, molds up to	144.0'
-	500 110			deg, rough, undulating, open, gray staining 139.2' - Fracture, 50 deg, rough, planar,	\Box	3/16"x9/16", few black organic laminations at 138.5-139.8', few	
_	R22-NQ 5 ft	55	>10	open, gray staining	H	inclusions (3/16"x3/4") of grey]
145	94%	- 55		139.9, 141.1' - Fractures (2), 5 deg, smooth,	Ш	limestone material at 138.0' and	
-102.5			_	undulating, tight	\vdash	139.9'	7
-			3	140.45, 141.25' - Fractures (2), 30 deg and 20 deg, rough, undulating, open		No Recovery 141.2-142.0' Limestone	1
-				142.0-143.0, 144.0-145.1' - Fracture zone or	ш	142.0-144.0' - mottled medium light	1 -
-			2	mechanical break (2), sections crushed,	ш	gray and yellowish gray, (N6, 5Y 7/2),	-
l -	147.0		NR	limestone fragments from gravel to cobble-sized	Н	fine grained, moderate HCl reaction, yellowish gray is in bands around	_
			3	145.2' - Fracture, 60 deg, rough, undulating,		_ cavities, few voids (<1/16"), several	
			3	open	ш	larger (up to 3/8") voids and fossil	
-				145.3, 145.5' - Fractures (2), 15 deg, rough,	ш	molds	1 1
-			2	undulating, open, moderate yellowish brown (10Y 5/4) to dusky brown (5Y 2/2) staining	Н	_ 144.0-145.5' - yellowish gray, (5Y 7/2), fine grained, moderate HCl	1 -
-	R23-NQ			145.9' - Mechanical break	ш	reaction, medium strong (R3), voids	
-	5 ft	62	4	146.6, 146.9' - Fractures (2), horizontal and	ш	_ (<1/16") 30% coverage, larger voids	1 -
150_	88%			50 deg, smooth, planar, tight 147.30, 147.6' - Fractures (2), 60 deg, —	Н	(up to 3/4") 15%, organic material on irregular bedding plane and fracture	
-107.5				smooth, planar, tight	\Box	surfaces, moderately to very	
			6	147.35' - Fracture, 20 deg, smooth,	Ш	fossiliferous, gradational contact with	1
-			2	undulating, open	Ш	material below	1 1
-	1.500		NR	148.22' - Fracture, 5 deg, smooth, planar, tight, moderate yellowish brown (10Y 5/4) to		145.5-146.7' - yellowish gray, (5Y 7/2), fine grained, moderate HCl	-
-	152.0			dusky brown (5Y 2/2) staining	口	 reaction, medium strong (R3), few 	-
-			1	148.4' - Fracture, 15 deg, rough, undulating,	₽₩	voids (1/16"), no larger voids, organic	1
I _				open, partial coverage up to 20% of moderate yellowish brown (10Y 5/4) to dusky	Д	lamination - No Recovery 146.7-147.0'	
				brown (5Y 2/2) staining	H	Limestone]
-			0	149' - Fracture, 70 deg, rough, planar, open	H	147.0-151.4' - light olive gray, (5Y	1
-	R24-NQ	!		149.3' - Fracture, 20 deg, rough, undulating, open	1-1-1	 5/2), fine grained, moderate HCI reaction, medium strong (R3), voids] -
	5 ft	78	2	149.4, 149.6' - Fractures (2), 75 deg, rough,	口	(<1/16") over 30% of surface, more	-
155_ -112.5	100%			planar, tight —	+	— abundant in zone from 147.3-148.8'	-
-112.5			2	150' - Fracture, 60 deg, rough, planar, tight	H	and 150.0-151.0', fossiliferous in]
				150.1' - Fracture, 60 deg, slickensided, planar, very tight, light to dark brown staining	Щ	same zones, black staining is on uneven and irregularly laminated	
				(possibly hematite)		bedding at 148.1-148.8', clasts (up to	1
-	157.0		1	150.6' - Fracture, 50 deg, smooth, undulating,	H	3/8"x1-3/16") of yellowish gray (5Y	1
-	157.0			open 150.65, 150.8' - Fractures (2), 30 deg and 10	\Box	 7/2) limestone without voids appear imbedded in the core from 	-
-			3	deg, smooth, undulating, tight	+ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$ $+$	147.0-148.0', coloration on bedding	-
-				150.9' - Fracture, 40 deg, smooth, undulating,	丗	ranging from light olive gray (5Y 5/2)	-
I _			1	tight	尸	to dusky yellow (5Y 6/4)	
			'	151.3, 151.5' - Fractures (2), 5 deg and 35 deg, smooth, undulating, open	Ш	No Recovery 151.4-152.0']
I -	R25-NQ			152.0-152.9' - Fracture zone, limestone	Ш		1
160	5 ft 100%	50	2	fragments, gravel to cobble-sized	Ш	_] 1
160	100 /0						_
1							

Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	Δ-15	SHEET	a	OF	11	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1722937.2 N, 457994.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: F. Harrington, M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION: Vertical WATER LEVELS: 4.41 ft bgs on 3/06/07 START: 2/11/2007 END: 2/20/2007 LOGGER: A. Teal, R. Gomez DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -117.5 152.9' - Fracture, 5 deg, smooth, undulating, Limestone 1 152.0-155.7' - Same as 147.0-151.4' open 154.4' - Fracture, 45 deg, rough, planar, tight except fewer (now 10%) voids 154.9, 156.7, 156.9' - Mechanical break (3) (<1/16") covering surface, thin 155.2' - Fracture, 10 deg, smooth, undulating, bedding from 153.5-155.0', uneven 3 162.0 and irregular laminations from open 155.7' - Fracture, horizontal, smooth, planar, 155 2-155 7 155.7-157.0' - light olive gray, (5Y 1 tiaht 5/2), fine grained, moderate HCI 156.5' - Fracture, 30 deg, rough, undulating, open reaction, medium strong to strong 157.2' - Fracture, 75 deg, rough, planar, open 5 (R3 to R4), few (<5%) voids or fossil 157.4' - Fracture, 20 deg, rough, undulating, molds/casts, thin bedding (1/4") from 155.7-157.0', olive gray (5Y 3/2) R₂₆-N_Q 157.8, 158.4' - Fractures (2), 25 deg and 10 coloration along healed fracture at 32 3 5 ft deg, rough, undulating, tight for 157.8', open 84% 156.8-157.0' 165 157.0-157.4' - Same as 155.7-157.0' 157.4-158.8' - fragments of light olive $-122\overline{5}$ 158.4-159.0' - Fracture zone, limestone 4 fragments, gravel to cobble-sized 159.5- 159.7' - Fracture zone, limestone gray (35%) and yellowish gray (15%) in a dusky yellow matrix (50%), (5Y 5/2 and 5Y 7/2 in 5Y 6/4), fine 2 fragments, gravel to cobble-sized NR 159.5' - Fracture, 5 deg, smooth, planar, tight grained, moderate HCl reaction. 167.0 159.9, 160.4' - Fractures (2), 40 deg, smooth, medium strong (R3), voids (<1/16") over 50% of matrix area but only undulating, tight 0 161.0' - Fracture, 15 deg, smooth, undulating, 10% of other areas, larger (up to 3/16"x3/8") voids and fossil open 161.2' - Fracture, 85 deg, smooth, planar, casts/molds over 5% of area overall 0 tiaht 158.8-160.0' - yellowish gray, (5Y 7/2), fine grained, moderate HCI 161.3' - Fracture, 20 deg, smooth, undulating, R27-NO reaction, strong (R4), voids (<1/16") open 5 ft 62 2 161.3-162.0' - Fracture, limestone fragments, over 5% of surface, mainly in thin 170 gravel to cobble-sized (1/2") zones, thinly bedded, few fossil -127.5 162.4, 163.15' - Fractures (2), 10 deg and 25 casts 2 deg, rough, undulating, open 160.0-162.0' - mottled light olive gray 163.0' - Fracture, 20 deg, smooth, planar, and dusky yellow, (5Y 5/2 and 5Y 6/4), fine grained, moderate to mild tight 0 HCl reaction, medium strong to 163.15-164.2' - Fracture zone, limestone 172.0 fragments, gravel to cobble-sized strong (R3 to R4), voids (1/16") cover 164.0' - Fracture, 60 deg, rough, undulating, 70% of surface, few large voids, 6 fragments of other limestone material tight 165.0, 165.05' - Fractures (2), 15 deg and 5 imbedded in dusky yellow matrix deg, smooth, undulating, open below 161.0' >10 162.0-166.2' - moderate olive brown 165.3' - Fracture, 80 deg, rough, planar, open 165.5' - Fracture, 35 deg, rough, undulating, grading to light olive gray by 165.0', R28-NQ (5Y 4/4 to 5Y 5/2), fine grained, 30 >10 5 ft 165.5-166.0' - Fracture zone, limestone moderate to mild HCI reaction, 175 100% fragments, gravel to cobble-sized 167.0-168.8' - Fracture zone, limestone strong (R4), voids (1/16") only 5% -132.5 from surface area except zones from 4 fragments, gravel to cobble-sized 163.0-163.3' and 165.4-166.0', few 169.2' - Fracture, 5 deg, smooth, planar, tight larger voids (up to 3/16") below 169.4' - Fracture, 30 deg, rough, undulating, 165.4', uneven and disturbed 3 bedding below 165.6' tight 177.0 No Recovery 166.2-167.0' 170.2, 170.4' - Fractures (2), 10 deg, smooth, undulating, tight Limestone >10 167.0-167.9' - Same as 162.0-166.2' 172.25' - Fracture, 40 deg, rough, planar, except presence of breccia (1) 172.3, 172.8' - Fractures (2), 5 deg, rough, fragments) at 167.3-167.9' >10 undulating, tight 167.9-169.0' - dusky yellow, (5Y 6/4), 172.55' - Fracture, 15 deg, rough, stepped, mild to moderate HCl reaction, **R29-NQ** medium strong (R3), voids (<1/16") 0 3 5 ft 172.75' - Fractures, 10 deg, rough, over 80% of surface 100% 180 undulating, tight



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-15	SHEET	10	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722937.2 N, 457994.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: F. Harrington, M. Griffin

ORIENTATION : Vertical CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing WATER LEVELS: 4.41 ft bgs on 3/06/07 START: 2/11/2007 END: 2/20/2007 LOGGER: A. Teal, R. Gomez DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -137.5 172.95' - Fracture, 40 deg, rough, stepped, Limestone 169.0-169.4' - yellowish gray, (5Y 1 tight 7/2), fine grained, moderate HCI 173.2' - Fracture, 40 deg, rough, planar, tight reaction, strong (R4), few voids or 173.4' - Fracture, 50 deg, rough, undulating, 0 cavities open 169.4-172.0' - light olive gray, (5Y 5/2), fine grained, moderate HCl 182.0 173.45, 174.5' - Fractures (2), 5 deg and 20 deg, smooth, undulating, open R30: 10 minutes 173.6, 173.75' - Fractures (2), 10 deg, reaction, medium strong (R3), voids >10 smooth, undulating, tight (<1/16") over 20% of surface (up to 50% from 169.4-170.0'), laminated 174.5-175.0' - Fracture zone, limestone bedding below 171.0' at an angle of >10 fragments, gravel to cobble-sized 175.2' - Fracture, 10 deg, smooth, undulating, 5-10 degrees 172.0-177.0' - Same as 169.4-172.0' R30-NQ 175.25, 175.4' - Fractures (2), 75 deg and 15 except more voids (up to 50% 27 >10 5 ft deg, rough, undulating, open coverage) from 173.5-174.5' and 185 90% 175.8' - Fracture, 80 deg, rough, planar, open presence of cavities (up to $-142\overline{5}$ SC-7 collected at 185.0-3/16"x3/4") below 175.0', laminated to tight 0 186.0' 176.5' - Mechanical break bedding 174.8-175.3' 176.75' - Fracture, 30 deg, rough, planar, 177.0-178.0' - Same as 172.0-177.0' 178.0-178.0' - Same as 172.0-177.1 178.0-178.6' - light olive gray, (5Y 5/2), fine grained, moderate HCI reaction, weak (R2), voids (<1/16") over 40% of surface 1 tight 177.0-182.0' - Fracture, no piece longer than 5", most fractures could be from drilling, NR 187.0 others appear to be in place 1 178.6-182.0' - dusky yellow to light olive gray, (5Y 6/4 to 5Y 5/2), fine 179.1' - Fracture, 70 deg, rough, planar, open 179.3, 179.5' - Fractures (2), 20 deg and 10 deg, rough, undulating, open grained, moderate HCI reaction, 3 180.2' - Fracture, 20 deg, rough, planar, open medium strong (R3), voids (1/16") 182.0-185.0' - Fracture zone or mechanical over 50% of surface area below R31-NO Bioturbation zones appear break, no piece longer than 5", most 180.0', breccia and dark stained 38 3 to be becoming more linear 5 ft fractures could be from drilling, others appear laminated bedding below 180.5', 190 features possibly bedding to be in place some larger (3/16"x3/4") cavities 147.5 features 182.3, 182.5' - Fractures (2), 70 deg and 25 below 180.5' 3 182.0-186.5' - light olive gray with deg, rough, undulating, open for 182.3', tight for 182.5 laminations (uneven and irregular) of 182.8' - Fracture, 30 deg, smooth, undulating, tight, dusky brown to dusky yellow infilling yellowish gray, (5Y 5/2 with 5Y 7/2), moderate HCl reaction, strong (R4), 1 192.0 few areas of voids, few fossil molds, 100% 182.9' - Fracture, 15 deg, smooth, undulating, apparent breccia zones at 0 182.8-184.0' and 186.0-186.3', color tight 186.35' - Fracture, 10 deg, smooth, planar, of core mainly yellowish gray below tight to open up to 1/16" 186.0' 2 187.4' - Fracture, 20 deg, smooth, undulating, No Recovery 186.5-187.0' Limestone R32-NQ 187.4-188.15' - Fracture zone, limestone 187.0-189.0' - mottled yellowish gray 20 >10 5 ft and light olive gray, (5Y 7/2 and 5Y 5/2), fine grained, mild to moderate fragments, gravel to cobble-sized 195 70% 188.25' - Fracture, 5 deg, smooth, undulating, -152.5 >10 HCl reaction, strong (R4), mottling open 188.35' - Fracture, 85 deg. smooth, planar. resolves into laminated bedding by tight 188.0', few voids or fossil molds NR 188.5' - Fracture, 5 deg, smooth, undulating, 189.0-192.0' - dusky yellow with thin beds (1/2" thick) of pale olive, (5Y tight 197.0 6/2 with 10Y 6/2), fine grained, 189.0, 189.2' - Fractures (2), 25 deg and 40 moderate to strong HCI reaction, deg, rough, undulating, open for 189.0', tight 4 for 189.2 medium strong (R3), voids (<1/16") 189.4' - Fracture, 20 deg, smooth, undulating, over 70% of the dusky yellow areas, open larger voids (up to 3/8") also present, >10 189.4-190.0' - Fracture zone, limestone pale olive areas have few voids, fragments, gravel to cobble-sized fewer voids overall below 191.0' 190.35, 190.8' - Fractures (2), 25 deg, rough, undulating, tight for 190.35', open for 190.8' R33-NQ 0 possible breccia from 189.4-190.0' 5 ft 48% 0 200



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-15	SHEET	11	OF	11	

ORIENTATION: Vertical

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1722937.2 N, 457994.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: F. Harrington, M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

CONING	NILTHOUA	ND LC	ZOILIA	IENT: CIVIE 550 S/N 186073, mud rotary, NQ tools, NVV (Jasiii	ıy		ORIENTATION: Vertical
WATER	LEVELS : 4.4	11 ft bo	as on :	3/06/07 START : 2/11/2007 END : 2/2	20/20	07	LOGGER : A. Teal, R. Gomez	
				DISCONTINUITIES		Ť	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		<i>(</i> 0		SYMBOLIC LOG	\vdash		252.110
N A A	₹ _A ×		FRACTURES PER FOOT	DESCRIPTION	<u></u>	ı	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
ACE	목투즘	(%) Q	120	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	딩	ı	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
F 두 등	888	ØΒ	AC R	PLANARITY, INFILLING MATERIAL AND	₩	ı	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
무용되	응끸뿞	R O	FE	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	ı	CHARACTERISTICS	DROFS, TEST RESULTS, ETC.
-157.5				190.7, 191.0' - Fractures (2), 20 deg, rough,	ш	T	Limestone	
-	-		NR	undulating, open -	⊢	╊	192.0-195.0' - Same as 189.0-192.0'	-
l -			INIX	191.5' - Mechanical break	⊢	╁	except with laminated bedding	_
				192.0-193.0' - Fracture zone, limestone		1	(uneven and irregular), cavities (up to 3/8"x3/8") and some fossil molds	
1 -	202.0			fragments, gravel to cobble-sized - 193.6' - Fracture, 20 deg, rough, stepped,	⊢	F	from 192.0-193.5'	1
-	202.0			open	┞	h	195.0-195.5' - yellowish gray, (5Y	Total Depth 202.0' below
-				193.8, 194.3' - Fractures (2), 15 deg and 10		H	7/2), fine grained, moderate HCl	ground surface
l _				deg, rough, undulating, tight for 193.8', open			reaction, medium strong (R3), voids	3
1				for 194.3'	1	Г	(<1/16") over 5% of surface, fossil	
-	1			194.5' - Fracture zone, 15 deg, smooth,	l	H	molds and larger voids <5% of	1
-				planar, open 194.5-195.5' - Fracture zone, limestone	1	F	surface, moderately fossiliferous No Recovery 195.5-197.0'	-
I -				fragments, gravel to cobble-sized		L	Limestone	
1				197.3' - Fracture, 35 deg, rough, undulating,			197.0-199.4' - Same as 195.0-195.5']
1 -				open	1	r	except fossil molds and cavities (up	-
-				197.6, 197.7, 197.9' - Mechanical break (3)	l	F	to 3/16"x3/8") now cover 10% of core	-
I -				197.9-198.2' - Fracture zone, limestone fragments, gravel to cobble-sized		F	surface No Recovery 199.4-202.0'	-
				198.8' - Fracture, 20 deg	l		Bottom of Boring at 202.0 ft bgs on	
-	1			1700.0 1700.010, 20 009	1	Г	2/20/2007	1
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-16	SHEET	1	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723075.9 N, 457958.1 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

						ary, auto nammer, Avvj n				ORIENTATION : Vertical
WATER	LEVELS	: 2.5 ft bo	gs on 4/5/	07 S	START : 4/5/2007	END : 4/8/2007		GER	: A.	
≥0≎				STANDARD		SOIL DESCRIPTION			၅	COMMENTS
N AN A	SAMPLE	LE INTERVAL (ft) PENETRATION TEST RESULTS SOIL NAME, USCS GROUP SYMBOL, COLOR,						SYMBOLIC LOG	DEDTIL OF CACING DOULING DATE	
DEPTH BELOW SURFACE AND ELEVATION (#)		RECOVE	ERY (ft)			IE, USCS GROUP SYM E CONTENT, RELATIVE	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND			
E F F F			#TYPE	6"-6"-6"		NCY, SOIL STRUCTURE			MB	INSTRUMENTATION
김오리				(N)					S	
42.7	0.0				Poorly Grade	d Sand With Organics	(SP)			00:22 Water level at 2 El holey, ground
-		1.0	SS-1	0-2-3	moist loose n	k to light brownish gray no HCl reaction, very fi	, (INTIOSTRO/I), 1		08:33 Water level at 2.5' below ground – surface
-	1.5			(5)	sand, trace no	onplastic fines, 30-35%	fine organics,			3-7/8" tricone bit
-	1.5				\trace roots			_/ ┨		-
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37.7	5.0				Sandy Lean C	Clay With Silt (CL-ML)		\dashv	aт	-
-		0.3	SS-2	4-4-2	\ 5.0-5.3' - greeı	nish gray, (5G 6/1), we		A		-
-		0.5	33-2	(6)	medium plastic	city, slow dilatancy, no ine silica sand, trace ro	HCl reaction,	/ -		-
-	6.5				30-33 % Very II	ine sinca sanu, trace re	1013	-/ -[_
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32.7				11-15-6	Silt And Lime:	e stone (ML) oderate yellow, (5Y 7/6) wet very stiff			_
l _		0.8	SS-3	(21)	¬ very fine grain √	ed, 10-15% sand, non	plastic, rapid		Щ	
1	11.5			. ,		ng HCl reaction, 50% l ne to coarse gravel-siz		/		
-					Olive brown, ili	ne to coarse graver-siz	eu, strong rock	-/ 1		
-								- 1		_
-								- 1		-
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15	15.0									
27.7		1.0	SS-4	39-50/6	Silt And Lime	stone (ML)		- 1		Set casing to 20'
-	16.0	1.0	33-4	(89/12")	15.0-16.0° - Sa	ame as 10.0-10.8'		1		
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-16	SHEET	2	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723075.9 N, 457958.1 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

						ary, auto nammer, Avvo rous,				ORIENTATION : Vertical
WATER	LEVELS	: 2.5 ft bo	gs on 4/5/	07 8	START : 4/5/2007	END : 4/8/2007	LOGG	ER:	Α.	
>00				STANDARD		SOIL DESCRIPTION		_	ا ي	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS			SYMBOLIC LOG			
BEI SP		RECOVE	ERY (ft)	120111200210	SOIL NAM	ME, USCS GROUP SYMBOL	딜	DEPTH OF CASING, DRILLING RATE,		
T Ă Ă				011 011 011	MOISTURE	E CONTENT, RELATIVE DE NCY, SOIL STRUCTURE, MII	NSITY OR NERALOGY	-	βI	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			#TYPE	6"-6"-6" (N)	00110101211	tor, cole orreorete, mil	112.012.001	-	SY	INOTIONE INTO IN
22.7	20.8	0.1	SS-5	50/3.5	_ Limestone Fra	agments		+	H	
-				(50/3.5")	\ 20.0-20.1' - da	ark vellowish orange, (10YF	R 6/6), weak	Æ		21.0': End soil sampling switch to rock coring
-					rock (R2), voic	ds to 1/16", limestone fragr	ments to	A		21.0 . End soil sampling switch to rock coming
I _					1/8"-1/2"	oring at 21 0 ft bag	/	1		_
1					See the next s	oring at 21.0 ft bgs sheet for the rock core log		-		
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PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-16 SHEET 3 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723075.9 N, 457958.1 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.5	ft bgs	s on 4/	5/07 START : 4/5/2007 END : 4/6	3/200	7 LOGGER : A. Teal	
≥∩≘	_ (6			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		SIL	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	I RU	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30Lic	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
LEVE THE	SORE	ROD	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
000	21.0	IL.	шш	21.0-21.7' - Fracture zone, limestone	0)	Limestone	
-	21.0		>10	fragments from gravel to cobble-sized	F	 21.0-23.2' - grayish orange, (10YR 	1 -
-				21.7-22.7' - Fracture zone	H	7/4), medium grained, strong HCl reaction, extremely weak to very	Fossils including echinoids,
-			>10	-	⊬	 weak (R0 to R1), highly fossiliferous 	gastropods and brachipods -
-	R1-NQ		0	22.9' - Fracture, 45 deg, rough, planar, open	₽	(molds/casts), voids (<1/16") over 70-75% of surface	1 -
-	5 ft	0		-	匚	- No Recovery 23.2-26.0'	
-	44%			-	団	_	1 -
			NR	-	\vdash	_	1 -
25 <u></u> 17.7					\vdash	<u> </u>	R1: 2 minutes
-				-	厈	-	-
-	26.0			26.0-26.9' - Fracture zone, limestone	Ħ	_ Limestone	1
-			>10	fragments from gravel to cobble-sized	世	- 26.0-30.0' - Same as 21.0-23.2'	1 -
-				-	⊬	except dusky yellow, (5Y 6/4)	-
-			>10	27.3-28.8' - Fracture zone, fragments up to - 1-1/2"	仠	-	1
-	R2-NQ			- 1/2	口	_	1 -
-	5 ft 80%	25	>10	-	世	-	1
-	0070			-	╁	-	1
30			4	29.4-29.7' - Fracture or mechanical break (4),	┢	_	1
12.7				horizontal and 15 deg, rough, undulating, <u> </u>	F	No Recovery 30.0-31.0'	R2: 2 minutes
-	31.0		NR			-	1
-	01.0			31.0-32.5' - Fracture zone, limestone	岸	Limestone	1
-			>10	fragments from gravel to cobble-sized		1	
-			. 40	-	⊬	olive gray mottling from 32.6-33.4',	11:06 Stopped drilling to
_			>10	32.5' - Fracture, 40 deg, rough, stepped,	Н	 fine grained, strong HCl reaction, weak to medium strong (R2 to R3), 	remix mud
	R3-NQ 5 ft	50	2	open -	口	predominately weak rock, medium strong from 32.3-33.8', voids (<1/16")	Driller's Remark: Lost circulation at 34.0-35.0'
	70%	30		33.75' - Fracture, 25 deg, rough, undulating,	」	over 80% of surface, fossiliferous	Circulation at 34.0-33.0
1 _			0	open			
35					\vdash	No Recovery 34.5-36.0'	
7.7			NR	_	F	_	R3: 5 minutes
-	36.0				Ħ]
_			>10	36.0-37.2' - Fracture zone, limestone fragments from gravel to cobble-sized	H	Limestone - 36.0-40.2' - Same as 31.0-34.5']
-					世	except light olive gray, (5Y 5/2), color	
-			1	37.25' - Mechanical break	\vdash	transition from above run complete by 37.0', voids <1/16" and abundant	
-	B4 NG			37.55' - 25 deg, smooth, undulating, very tight	\Box	larger cavities to 3/16" yielding a	-
-	R4-NQ 5 ft	47	>10	38.3-38.75' - Fracture zone, limestone	厂	rough surface -	-
-	5 ft 4'			fragments from gravel to cobble-sized 38.9' - 75 deg, rough, planar, very tight	世	-	-
-			0	-		_	-
40 2.7			>10,	40.0-40.7' - Fracture zone, limestone	111	<u></u>	R4: 4 minutes
-·· -			NR	fragments from gravel to cobble-sized	F	_ No Recovery 40.2-41.0'	-
	41.0				H		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-16	SHEET	4	OF	10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723075.9 N, 457958.1 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

				TENT . CIVIE 33 3/N 3 10023, ITIUU TOLATY, NQ LOOIS, HW C			ORIENTATION : Vertical
WATER	LEVELS : 2.5	ft bgs	s on 4	/5/07 START : 4/5/2007 END : 4/	8/20	7 LOGGER : A. Teal	
	_			DISCONTINUITIES	ניז	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		Ś	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
HH	N A K	<u>@</u>	AF		- 음	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
THT VAT	GTF	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BOI	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
P.S.E.	SEN S	O O	RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ПОП	014	ட	шш		(V)		
I _				41.0-42.1' - Fracture zone, fragments up to 1-1/2"	╨	Limestone - 41.0-42.1' - moderate olive brown,	_
			>10	1-1/2	П	(5Y 4/4), fine grained, strong HCl	
1 -					╁	reaction, extremely weak (R0), friable	1
-					世	No Recovery 42.1-46.0'	-
-	55.10				\Box	-	-
I _	R5-NQ 5 ft	0			┢		_
	22%	U]	
-			NR		╨	-	1
					世	<u>}</u>	-
45 -2.3				_	+	⊢	DE: 2 minutes
					╨	1	R5: 2 minutes
	46.0				П	1	
1 7				46.0-46.4' - limestone fragments, silt to fine	┰	Limestone]
-			>10	sand-sized particles	世	46.0-51.0' - Same as 41.0-42.1'	SC-1 collected 46.4-47.45' -
-					$oldsymbol{\sqcup}$	except very weak (R1), voids <1/16" and cavities to 3/16" yielding rough	-
-			1	47.45' Fracture 25 des amonth undulating	口	- appearance, trace black organic	-
				47.45' - Fracture, 35 deg, smooth, undulating, open	F	material 49.0-50.5'	
	R6-NQ			'	\vdash	1]
-	5 ft 100%	70	0	48.3, 48.5, 48.7, 49.0' - Mechanical break (4)	口	1	1
-	100 /0				╁	 	-
-			0		亡	}-	-
50				_	щ	<u>L</u>	
-7.3			0		H	1	R6: 2 minutes
	51.0		"		H	-]
-	01.0				╁	51.0-51.9' - light olive gray, (5Y 5/2),	-
-			0		口	 fine grained, moderate to strong HCl 	-
-			\vdash		╆	reaction, weak (R2), voids <1/16"	1 -
						over 35% of surface, cavities to 3/16" / over <5% of surface, fossiliferous	
						Silt (ML)]
	R7-NQ				111	51.9-53.5' - light olive gray, (5Y 5/2),	1
-	5 ft	18			111	 strong HCl reaction, carbonate 	-
-	50%		NA		$\ \ $	material No Recovery 53.5-56.0'	-
_						No Recovery 53.5-56.0	
55_						L	
-12.3				_			R7: 2 minutes
1 -	E6 0				111	<u> </u>	-
-	56.0				$\ \ $	Silt (ML)	-
_					411	- 56.0-58.7' - Same as 51.9-53.5'	-
						_]
			NA]
-			' ' '		111	Γ	1
-	R8-NQ				$\parallel \parallel$	F	-
-	5 ft	10			$\ \ $	<u> </u>	-
_	78%			58.75-59.0' - Fracture zone, limestone	Д	Limestone]
			3	fragments from gravel to cobble-sized	\vdash	58.7-59.9' - moderate olive brown,]
60				59.1' - Fracture, 80 deg, rough, planar, open	世	- (5Y 4/4), fine grained, moderate HCI reaction, weak (R2), voids <1/16"] 1
-17.3				59.25' - Fracture, 30 deg, rough, stepped, tight	┲	over 15% of surface, trace cavities to	R8: 3 minutes —
-			NR	59.4' - 35 deg, rough, undulating, tight	╁	9/16"x3/4" on surface	-
	61.0					No Recovery 59.9-61.0'	
					1		
					1	1	

Rev. 7



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-16

SHEET 5 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723075.9 N, 457958.1 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION: Vertical

CORING	INE I HOD A	ND E	JUIPIV	IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW c	asınç		ORIENTATION : Vertical
WATER	LEVELS : 2.5	ft bg	s on 4/	5/07 START : 4/5/2007 END : 4/6	8/200	7 LOGGER : A. Teal	
300				DISCONTINUITIES	(1)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		SIL	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	OLZE AND DEED OF COURT
ᆱᇬ	RUN H, A ÆR'	(%)	FRACTURES PER FOOT	DEDTH TYPE OPICHTATION POLICINICOS	1 3	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
PTH EVA	RE NGT CO\	Q D (%)	ACT R FC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	MBC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SS	SEES	S.	유립	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
						Silt (ML)	
-				-	1111	- 61.0-63.0' - Same as 51.9-53.5' except trace organics 61.0-61.3',	-
-			NA	-	1111	carbonate material	-
-				-	Ш	<u> </u>	-
-	R9-NQ			63.0' - 60 deg, rough, planar, tight	ш	Limestone	-
-	5 ft	43	1	63.4, 64.3' - Mechanical break (2)	F	- 63.0-65.8' - moderate olive brown,	SC-2 collected at 63.4-
-	96%			-	世	(5Y 4/4), fine grained, moderate HCl reaction, very weak (R1), voids	64.3'
-			0	64.4-65.2' - Mechanical break (>10)	₽	<1/16" over 15% of surface, trace	_
65				—	П	cavities to 9/16"x3/4" on surface	
-22.3			2	65.3' - Fracture, 15 deg, smooth, undulating,	\vdash	L	R9: 3 minutes
	66.0		NR.	open	F	No Recovery 65.8-66.0'	
]				65.7' - Fracture, 40 deg, rough, undulating, open	\vdash	Limestone	
]			1	66.4' - Fracture, 10 deg, rough, undulating,	oxdappi	66.0-70.4' - dusky yellow, (5Y 6/4),]
				open	口	fine grained, moderate HCl reaction, very weak to weak (R1 to R2), voids	
-			2	67' - Fracture, 10 deg, smooth, undulating, - tight	╁	<1/16" on 25% of surface increasing	
-	R10-NQ			67.8' - Fracture, 65 deg, rough, planar, tight	广	from 68.8', extremely weak (R0) zone from 67.2-67.5', 3/4"x1-3/16" cavity	1
-	5 ft	50	3	68.1, 68.3' - Fracture (2), 20 deg, rough, undulating, open	世	at 70.2', very fossiliferous below	-
-	88%			undulating, open -	H	_ 68.5', solution cavity at 68.5-69.0'	-
-			3	60 5 60 8' 40 dag rough undulating ones	口	}	-
70 <u> </u>				69.5, 69.8' - 40 deg, rough, undulating, open	╀	 _	D10: 2 minutes
-21.3			1	70.1' - Fracture, 20 deg, rough, undulating,	片	No Recovery 70.4-71.0'	R10: 3 minutes
	71.0		NR	open -	Ľ	l '	
_			2	71.25' - 10 deg, rough, undulating, open	oxdot	Limestone - 71.0-73.3' - Same as 66.0-70.4'	
				71.5' - 85 deg, rough, planar, tight	口	except moderate olive brown, (5Y	
				72.0' - Mechanical break, strong to very		4/4)	
]			>10	strong (R4-R5) 72.25' - Fracture, 20 deg, rough, undulating,		Ţ]
-	R11-NQ			open	世	†	
-	5 ft 98%	67	5	73.2' - Fracture zone, limestone fragments - from gravel to cobble-sized	╨	- 73.3-74.4' - light olive gray to moderate olive brown, (5Y 5/2 to 5Y	
-	30 /0		\vdash	73.4, 73.5, 73.7' - Mechanical break	口	4/4), fine grained, moderate to mild	
			0	73.95' - 25 deg, smooth, undulating, tight	+	HCl reaction, weak (R2), laminated	-
75 <u> </u>				74.5' - Mechanical break, medium strong (R3)	F	bedding, voids <1/16" over 10%-15% of surface, trace organics	R11: 4 minutes
-			>10	75' - 10 deg, smooth, undulating, tight	世	- 74.4-75.9' - dusky yellow, (5Y 6/4),	
-	76.0		NR)	75.4-75.9' - Fracture zone, limestone fragments from gravel to cobble-sized	╀	fine grained, moderate HCl reaction, very weak (R1), voids <1/16" over	
			0		口	<10% of surface, lower strength rock	_
				76.75' - Mechanical break	\vdash	from 75.5-75.9'	
			>10	77.0-77.35' - Fracture zone, limestone	F	No Recovery 75.9-76.0' Limestone	
				fragments from gravel to cobble-sized	片	76.0-77.2' - Same as 74.4-75.5'	
]	R12-NQ				\vdash	77.2-79.0' - light olive brown, (5Y 5/6), fine grained, moderate HCl]
	5 ft 60%	47	>10	79.75' 10 dog rough undulating tight	口	reaction, weak to medium strong (R2	1
-				78.75' - 10 deg, rough, undulating, tight 78.9-79.0' - Fracture zone, limestone	\vdash	to R3), voids <1/16" over 40% of	1
				fragments from gravel to cobble-sized	F	_ surface, cavities up to 3/4"x1-9/16" over 15% of surface, fossiliferous,	-
-37.3			NR	_	世	trace organics	R12: 2 minutes
-				-	\vdash	No Recovery 79.0-81.0'	-
	81.0				厂	 	-
			ш		_		



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-16 SHEET 6 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723075.9 N, 457958.1 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

			<u> </u>	TENT . CIVIE 33 3/N 3 10023, Thuu totally, NQ tools, HW C	aonig		ORIENTATION : Vertical
WATER	LEVELS: 2.5	ft bg	s on 4	/5/07 START : 4/5/2007 END : 4/	8/200	LOGGER : A. Teal	
	_			DISCONTINUITIES	ניז	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ιχ	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표 등 등	K.A.A.	(%	FRACTURES PER FOOT		- C	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
T H X	GTF SOVI	(%) Q	LE ST	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	(BO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
	SEN	a Q	-RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	3Y.M	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	0 1 4	-			- 0,	Limestone	
-			>10	81.1' - 5 deg, smooth, undulating, 1/16" clay infilling, dark brown clay infilling	上	- 81.0-83.5' - dusky yellow grading to	
l _				81.6-82.6' - Fracture zone, limestone	Щ	yellowish gray, (5Y 6/4 grading to 5Y	
				fragments from gravel to cobble-sized	Н	7/2), fine grained, moderate to mild	4/6/07 08:04 Water level at
-			>10		匚	 HCl reaction, weak to medium strong (R2 to R3), voids <1/16" over 25% of 	5.4' below ground surface -
-	R13-NQ		1	83.05' - 15 deg, smooth, undulating, open	₩	surface, cavities up to 3/16"x3/8"	1 -
-	5 ft	27		00.00 - 10 deg, smooth, undulating, open	ፗ	over <5% of surface	-
_	50%				\bot	No Recovery 83.5-86.0']
85			NR		\vdash		1
-42.3				_	\perp	-	R13: 5 minutes
-					╁┈	-	-
-	86.0			96 0 96 05' Fracture zone limeatone	┸	Limostono	-
-			>10	86.0-86.95' - Fracture zone, limestone fragments from gravel to cobble-sized	oxdot	Limestone - 86.0-89.5' - dusky yellow, (5Y 6/4),	
					\bot	fine grained, moderate to strong HCl	
				07.01.45 day may be 1.01.1		reaction, medium strong (R3), voids	1
-			4	87.3' - 45 deg, rough, planar, tight 87.5' - 80 deg, rough, planar, open	╁	 <1/16" over 35% of surface, cavities to 3/4"x3/4" and fossil molds on 15% 	1 1
-	R14-NO			87.55' - 10 deg, rough, undulating	口	of surface, very fossiliferous	1 -
-	5 ft	37	10	87.85' - 50 deg, rough, planar, tight	╁	 transitioning to moderately 	-
_	90%			88.2, 88.5' - 60 deg, rough, planar, tight	上	fossiliferous at 88.0']
			>10	88.7' - 20 deg, rough, undulating 89.1-89.4' - Fracture zone. limestone	Щ		
90			/10	fragments from gravel to cobble-sized	Ъ	89.5-90.5' - yellowish gray, (5Y 7/2),	1
-47.3			0	89.5' - 30 deg, smooth, undulating, open	口	 fine grained, moderate HCl reaction, weak (R2), voids <1/16" on 5-10% of 	R14: 6 minutes
-			NR	89.6' - rough, undulating, tight	╀┼	surface, trace cavities to 3/16",	-
-	91.0		INK	01.0.02.6! Fracture zono limostono	ፗ	 moderately fossiliferous (molds) 	-
1 -			>10	91.0-92.6' - Fracture zone, limestone fragments from gravel to cobble-sized	\bot	No Recovery 90.5-91.0'	1
						Limestone - 91.0-93.0' - dusky yellow, (5Y 6/4),	
					\vdash	fine grained, moderate HCl reaction,	1
_			>10		\perp	weak to medium strong (R2 to R3),	1
-	R15-NQ			92.8' - 25 deg, smooth, undulating, tight	╁┼	voids <1/16" on 30% of surface, cavities to 3/8"x3/4"	1
-	5 ft	0			世	No Recovery 93.0-96.0'	-
-	40%				╨	-	1
			NR		口	_	
95			INIX]
-52.3				_	\vdash	_	R15: 6 minutes
-	06.0				屽	-	1
-	96.0				+	Limestone	1 -
-			3	96.25, 96.6, 96.7' - 30 deg, smooth, planar,	\Box	- 96.0-97.9' - Same as 91.0-93.0'	
_				very tight	╨	except inclusion fragments (to]
				97.2-97.25' - 45 deg, rough, planar, high	\Box	1-3/16") of yellowish gray]
_			>10	angle fracture zone, very tight	1—	=	1
-	R16-NQ			97.9-98.6' - Fracture zone, limestone	世	97.9-101.0' - yellowish gray, (5Y 7/2),	1
-	5 ft	65	>10	fragments from gravel to cobble-sized	╨	_ fine grained, moderate to strong HCl	-
-	100%			98.8' - 60 deg, rough, planar, tight	\pm	reaction, weak (R2), voids <1/16" on 5% of surface, trace fossil molds to	1
_			4	98.95' - 25 deg, rough, undulating, open	\Box	_ 3/16"	
100				99.05, 99.3' - 5 deg, rough, undulating, tight 99.2' - 15 deg, rough, undulating, tight —	\vdash]
-57.3				99.2 - 15 deg, rough, undulating, tight — 99.9' - 10 deg, rough, undulating, tight	\blacksquare	_	R16: 7 minutes
-	404.0		1	100.2' - 60 deg, smooth, planar, tight	+	-	1
	101.0				\vdash		



121.0

PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-16

SHEET 7 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723075.9 N, 457958.1 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 2.5 ft bgs on 4/5/07 START: 4/5/2007 END: 4/8/2007 LOGGER: A. Teal DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS Limestone SC-3 collected at 101.0->10 101.0-103.1' - Same as 97.9-101.0' 102.0-102.2' - Fracture zone, limestone 2 fragments from gravel to cobble-sized 102.65' - 10 deg, rough, undulating, open 102.9' - 60 deg, rough, planar, open R17-NQ Silt (ML) 62 5 ft NA 103.1-104.2' - moderate olive brown, 94% (5Y 4/4), soft, strong HCI reaction, trace organics 0 Limestone 105 104.2-105.7' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, -62.3 R17: 6 minutes 1 105.4' - 60 deg, rough, planar, tight weak to medium strong (R2 to R3), NR 106.0 voids <1/16" on 30% of surface, 106.0-106.2' - Fracture zone, limestone trace fossil molds 6 fragments from gravel to cobble-sized No Recovery 105.7-106.0' 106.6' - 30 deg, rough, undulating, open Limestone 106.0-110.0' - Same as 104.2-105.7' 107.1-107.8' - 85 deg and vertical, planar, 9 high angle fracture zone, multiple planar except color grades to mottled dusky yellow and light olive gray (5Y 6/4 and 5Y 6/1) by 107.0' then transitions features open to moderately tight R18-NO 58 3 5 ft to only dusky yellow by 109.0' 108.5-110.0' - vertical, rough, planar, 15-20% 80% charcoal gray to black, same as 107.1-107.8' 6 110 -67.3 No Recovery 110.0-111.0' R18: 5 minutes NR 111 0 Driller's Remark: Boring 111 0-111 2' - Fracture zone, limestone Limestone 111.0-115.1' - dusky yellow grading to light olive gray by 112.4' grading to pale olive by 114.5', (5Y 6/4 to 5Y 5/2 >10 "cave-in" 15.0' from bottom fragments from gravel to cobble-sized (111.0')Advance HW casing from to 10Y 6/2), fine grained, moderate 3 112.35' - 60 deg, smooth, planar, tight 70.0-110.0' HCI reaction, medium strong (R3), 112.9' - 10 deg, rough, undulating, tight voids <1/16" on 35% of surface R19-NQ 10 33 5 ft 82% SC-4 collected at 113 8-114.5' 114.55-114.7' - Fracture zone, limestone 115<u>-</u>72.3 fragments from gravel to cobble-sized R19: 4 minutes No Recovery 115.1-116.0' 114.9' - 20 deg, smooth, undulating, open NR 116.0 116.0-116.3' - Fracture zone, rough, Limestone undulating, fragments 1/2"-1-1/2" 116.5, 117.0' - 20 deg, rough, undulating, 116.0-120.3' - Same as 114.5-115.1' >10 2 117.35' - 10 deg, rough, undulating, tight 118' - horizontal, smooth, undulating, open R20-NQ 52 1 118.25' - horizontal, smooth, undulating, 5 ft 86% black, open to 1/16" 118.25-118.5' - Mechanical break, limestone fragments from gravel to cobble-sized 119.3-119.8; 120.0-120.3' - 70 deg, rough, 1 120 -77.3 1 undulating, black, open to 1/16" R20: 6 minutes No Recovery 120.3-121.0' NR



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-16

SHEET 8 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723075.9 N, 457958.1 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 2.5	ft bgs	on 4/	5/07 START : 4/5/2007 END : 4/	8/200	7 LOGGER : A. Teal	
≥0 ≘	- (°)			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE	OVEF	(%) Q	FOG	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
EVEN	SECORE	R O L	FRAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	3×ME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
В 07 Ш	0311	ш.	ш.п.	121.1' - 5 deg, smooth, undulating, open	0)	Limestone	
-			3	121.5' - 20 deg, smooth, undulating, open	F	- 121.0-122.3' - Same as 111.0-115.1'	1
-				121.65' - 20 deg, rough, undulating, open	Ħ	except yellowish gray and pale olive mottling, (5Y 7/2 and 10Y 6/2)	1
-			>10	122.3-122.5' - Fracture zone, limestone fragments from gravel to cobble-sized	片	- 122.3-122.75' - dusky yellow, (5Y 6/4), fine grained, moderate to strong	-
-	R21-NQ			riaginents nom graver to copple-sized		HCl reaction, very weak (R1), voids	-
-	5 ft 35%	20			╨	 <1/16" on 25% of surface, cavities and fossil molds to 3/8" on 5% of 	1
-	3376		ND		厂	surface	1
125			NR		仜	- No Recovery 122.75-126.0'	1
-82.3				_	世	_	R21: 6 minutes
-	126.0				\Box	-	1
†	0.0			126.2-127.35' - Fracture zone, horizontal and	\vdash	Limestone	1
			>10	60 deg, 1/2"-2"	Ħ	- 126.0-126.2' - Same as 122.3-122.8' 126.2-130.2' - dusky yellow, (5Y 6/4),	1
					Ħ	fine grained, moderate HCl reaction,	1
			1	127.65-128.1' - Fracture zone, vertical,	⊭	 medium strong (R3), voids <1/16" on 10% of surface, trace cavities to 	1
	R22-NQ		_	rough, undulating, black, open to 1/16",	╨	3/16" and fossil molds, zone of light	SC-5 collected at 128.1-
	5 ft 84%	33	3	127.65' 45 deg 128.2, 128.9' - horizontal, rough, undulating,	\Box	 olive gray which has neither voids nor fossils from 127.7 -128.1' 	128.9'
			>10	open 129.05' - 10 deg, smooth, undulating, open	Ш		1
130			-10	129.35' - 50 deg, smooth, planar, open	上		
-87.3			_0_	129.6-130.0' - Fracture zone, fragments up to	Ь	No Recovery 130.2-131.0'	R22: 8 minutes
	131.0		NR		┢	_	
			4		H	Limestone - 131.0-133.9' - yellowish gray, (5Y	
_				131.7' - 70 deg, rough, planar, tight	F	7/2), fine grained, mild to moderate	
			4	131.7-132.4' - Fracture zone, 70 deg and vertical, rough, planar, tight to open	H	HCl reaction, medium strong (R3), voids <1/16" on 25%, cavities to	
-	D00 110				片	3/16" and fossil molds on <5% of	-
-	R23-NQ 5 ft	50	3			surface, moderately fossiliferous	-
-	58%			133.8' - 10 deg, smooth, undulating, open	₽	No Recovery 133.9-136.0'	-
-					F	-	
135 <u>-</u> -92.3			NR	_	口	_	R23: 5 minutes
-					士	_	-
-	136.0			136.0-136.5' - Fracture zone, rough,	+	Limestone	-
-			>10	undulating, fragments 1/16"-2"	\Box	 136.0-139.75' - grayish yellow with 	SC-6 collected at 136.5-
-					F	pale olive from 138.8-139.5', (5Y 8/4 with 10Y 6/2), fine grained, strong	137.4'
-			5		 	 HCl reaction, weak (R2), voids 	-
-	R24-NQ			137.75-138.4' - Fractures or mechanical break, 5 deg, smooth, planar, tight	世	<1/16" on 35% of surface, fossil molds to 3/16"x3/8" from	-
-	5 ft 75%	38	3		ᡛ	 138.4-139.8', moderately fossiliferous 	-
-	1370			138.75' - 10 deg, rough, undulating, open	F	1033111161003	-
140			3	139.5' - 15 deg, rough, undulating, open	厂	t	1
-97.3			VID.	139.75' - 25 deg, smooth, undulating, open —	口	No Recovery 139.75-141.0'	R24: 5 minutes
	141.0		NR		\perp	-	1
					1		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-16

SHEET 9 OF 10

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723075.9 N, 457958.1 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

	LEVELS : 2.5			/5/07 START : 4/5/2007 END : 4/		7 LOGGER : A. Teal	
3 □ €	(%)			DISCONTINUITIES	၅	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) Q D	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	R25-NQ 5 ft 56%	0	10 >10	141.2' - 10 deg, smooth, undulating, open 141.35' - 15 deg, smooth, undulating, open 141.5' - 30 deg, smooth, undulating, open 141.75' - 20 deg, smooth, undulating, open 141.76-142.4' - Fracture zone, black, irregular fragments to 1-1/2" 142.6-143.7' - Fracture (6), 20 deg and 30 deg, rough, undulating, open		Limestone - 141.0-141.8' - yellowish gray, (5Y 7/2), fine grained, strong HCI reaction, weak (R2), voids <1/16" on - 30% of surface, cavities and fossil molds up to 3/16" on 5% of surface 141.8-142.6' - yellowish gray, (5Y - 7/2), fine grained, mild HCI reaction, medium strong to strong (R3 to R4), voids <1/16" on 5% of surface - 142.6-143.8' - light olive gray, (5Y 5/2	- - - - -
145_ -102.3 -	146.0		NR	_		with 5Y 7/2), 10% yellowish gray mottling, fine grained, strong HCl reaction, strong (R4), voids <1/16" on 25% of surface, trace cavities and	R25: 5 minutes
-			>10	146.0-147.3' - Fracture zone, dark, limestone fragments from gravel to cobble-sized		fossil (molds) to 9/16" No Recovery 143.8-146.0' Limestone 146.0-147.5' - yellowish gray, (5Y 7/2	- Set casing to 150.0' due to
- - - 150 -107.3	R26-NQ 5 ft 30%	0	NR	- - - -		and 5Y 5/2), light olive gray mottling, fine grained, mild HCI reaction, strong (R4), trace voids <1/16", cavities 1/16"x1/16" and fossil molds No Recovery 147.5-151.0'	cave-in on last run; stop coring at 151.0' for the day 4/7/07
-107.3	151.0						R26: 10 minutes
_			>10	151.0-151.5' - Fracture zone, subangular fragments predominately 1"-1/2" 152' - 25 deg, smooth, undulating, open 152.3' - Mechanical break		Limestone 151.0-155.5' - yellowish gray, (5Y 7/2 with 5Y 5/2), light olive gray mottling from 152.5-153.8', mild to moderate HCl reaction, medium strong (R3),	- Water level at 5.3' below ground surface -
- - -	R27-NQ 5 ft 90%	48	>10	152.45-153.2' - Fracture zone, rough, undulating, dark, staining on vertical fracture 153.7-154.2' - Fracture zone, fragments		laminar bedding below 153.5'	- - -
155_ -112.3			>10	1/16"-1/2" 154.4, 154.7, 155.05' - Mechanical break — 155.25' - 15 deg, smooth, planar, open,			R27: 10 minutes
	156.0		NR >10	solution cavity 155.3' - 10 deg, smooth, planar, tight 155.4' - 15 deg, smooth, planar, tight		No Recovery 155.5-156.0' Limestone 156.0-159.0' - yellowish gray]
-			1	156.0-156.4' - Fracture zone, rough, undulating, small fragments 1/16"- 1-1/2"		transitions to dusky yellow below 158.0', (5Y 7/2 to 5Y 6/4), fine grained, mild HCl reaction, medium strong (R3), laminated bedding,	-
- - - 160	R28-NQ 5 ft 60%	47	>10	157.9' - 20 deg, smooth, undulating, open 158.7-158.9' - Fracture zone		voids <1/16" on 5% of surface, cavities and fossil molds to 3/16" on <5% of surface (predominantly on lighter colored laminations), increased voids and fossil abundance below 158.0'	- - -
-117.3 -	161.0		NR			No Recovery 159.0-161.0'	R28: 9 minutes
					1		1

Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	A-16	SHEET	10	OF	10	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723075.9 N, 457958.1 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.5	ft bg	s on 4	/5/07 START : 4/5/2007 END : 4/6	8/200	7 LOGGER : A. Teal	
≥0≎	્ર			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - 165 -122.3	R29-NC 5 ft 86%	37	1 6 >10 >10 1 NR	161.65' - Mechanical break 161.8' - Fracture or mechanical break, horizontal, smooth, planar, open 162.1' - 20 deg, rough, undulating, open, solution cavity 162.25' - Fracture or mechanical break, horizontal, smooth, planar, open 162.35' - Mechanical break 162.7' - 20 deg, rough, undulating, open 162.9-163.5' - Fracture zone 163.5-164.2' - Fracture zone, 45 deg and 75 deg 164.2-164.6' - Fracture zone		Limestone 161.0-162.9' - dusky yellow with moderate olive brown from 161.8-162.7', (5Y 6/4 with 5Y 4/4), fine grained, mild HCI reaction, medium strong (R3), thin bedding, voids <1/16" on 50% of surface, cavities up to 3/8"x3/4" and fossil molds on <5% of surface, evenly distributed thin (1/2"-1") bedding 162.9-165.3' - yellowish gray with zone of dusky yellow and light olive from 164.6-165.3', (5Y 7/2 with 5Y 6/4 and 5Y 5/2), fine grained, mild HCI reaction, medium strong (R3),	R29: 4 minutes
- - - - -	R30-NQ 5 ft 90%	77	1 2 >10 2	164.9,164.95, 165.05' - 10 deg, smooth, planar, tight 166.35, 167.7' - 40 deg, rough, planar, tight 167.8' - 55 deg, rough, planar, tight 167.95' - Mechanical break 168.75-169.2' - Fracture zone, dark, staining on vertical fractures		laminar bedding from 164.2–164.6', trace voids <1/16" No Recovery 165.3-166.0' Limestone 166.0-170.5' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, medium strong (R3), laminar bedding from 167.8-169.4', voids <1/16" on 20% of surface from 166.0-168.0', <5% below 168.0', cavities 3/8"x3/8" and fossil molds on 5% of surface from 166.4-168.0'	SC-7 collected at 167.95- 168.75' -
170 -127.3 -	171.0		1 NR	169.7' - Mechanical break 169.9' - 30 deg, smooth, undulating, tight 170.4' - horizontal, smooth, planar, open	Ħ	No Recovery 170.5-171.0'	R30: 6 minutes
- - - - - 175	R31-NQ 5 ft 100%	73	2 5 >10	171.45' - 5 deg, smooth, planar, tight 171.5' - 5 deg, smooth, planar, open 172.2' - 5 deg, smooth, undulating, open 172.4' - 85 deg, rough, planar, tight 172.55-173.9' - Fracture zone, 45 deg and 75 deg, smooth, planar, black staining, tight		Limestone 171.0-171.5' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCI reaction, medium strong to strong (R3 to R4), voids <1/16" on 5% of surface 171.5-172.2' - yellowish gray, (5Y 7/2), mild HCI reaction, strong (R4), laminated bedding at 5-10 deg. 172.2-176.0' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), mild HCI reaction, medium strong (R3),	SC-8 collected at 173.9-
-132.3	176.0		4	175.1, 175.2, 175.35' - 10 deg, smooth, undulating, open, brownish staining at 175.2'		laminated bedding 175.0-176.0', " voids <1/16" on <5% of surface Bottom of Boring at 176.0 ft bgs on 4/8/2007	R31: 6 minutes 15:07 End boring at 176.0', met recovery and RQD requirements
_				-			-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-17	SHEET	1	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723025.7 N, 458007.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

						ry, auto naminer, Avvo rous, c			ONLINIATION : Vertical
WATER	LEVELS	: 2.5 ft bo	gs on 4/10	0/07 5	START : 4/9/2007	END : 4/18/2007	LOGGEF	R : A.	Teal, N. Jarzyniecki, M. Faurote
				STANDARD		SOIL DESCRIPTION		ڻ ا	COMMENTS
	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				2	
DEPTH BELOW SURFACE AND ELEVATION (#)		RECOVE	ERY (ft)	120111200210	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR				DEPTH OF CASING, DRILLING RATE,
YAT VAI			#TYPE	6"-6"-6"		E CONTENT, RELATIVE DEN ICY, SOIL STRUCTURE, MIN		SYMBOLIC LOG	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			#ITPE	(N)	00.10.012.1			SYI	
42.3	0.0			, ,	Poorly Gradeo	d Sand With Organics (SP))	1. 1.	4/9/07, 17:20 no water encountered
-		1.2	SS-1	1-3-6		nish black to pale brown, (5		1	-
-		1.2	33-1	(9)	5YR 5/2), mois	st, loose, very fine to fine gr up to 30% fine organics and	ained, no I roots silica –		04/10/07 08:01: Begin drilling for the day
l -	1.5				sand	ip to 50 % fine organics and	1100t3, 3ilica /-		
I .									_
-							_	1	Water level: 2.5' below ground surface,
-							-	1	08:01 on 4/10/07
-							-	1	-
-							-	1	-
-							_		_
5	5.0								_
37.3					Silty Sand (SN	A)	'D E/4\\		
-		1.2	SS-2	1-1-1	5.0-5.9 - 111006	erate yellowish brown, (10Y ry fine to fine grained, no Ho	Cl reaction =]
-	6.5			(2)	_∖13% low plasti	c fines, silica sand			
-	0.5				Lean Clay Wit	h Sand (CL)		1	-
-					5.9-6.2' - greer	nish gray to dark yellowish o G 6/1 to 10YR 6/6 to 5P 6/2	orange to	1	-
-					soft. medium to	o high plasticity, no dilatand	z), wet, very	-	_
l _						5% very fine to fine grained			_
1									
-							_	1	
-							-	1	
- 1							-	1	-
10 <u></u> 32.3	10.0				Silty Limeston	ne Fragments With Sand		\vdash	_
-		1.0	SS-3	5-10-5	10.0-11.5' - wh	nite to yellowish gray, (N9, 5	5Y 9/1), wet, -		_
l -	11.0			(15)		e, strong HCl reaction, fine t		⊭	_
l _					gravel, 20% lo	w plastic fines, grained pred sand, all carbonate	dominantly / _		
					Ville to medium	i sand, all carbonate			Driller's Remark: Slight mud loss at 12.0'
-							-	1	below ground surface -
-							-	1	=
-							-	1	-
-							-	-	-
-							-		_
l _							_		
15	15.0								
27.3					Silt (ML)				
-		1.3	SS-4	34-39-42	15.0-16.3' - gra	ayish yellow, (5Y 8/4), mois ic, rapid dilatancy, moderat	t to wet,	1	-
-				(81)		ery fine to medium sand, tra		1	-
-	16.5	-			organics, trace	e black minerals, all carbona	ate /-	1	08:30 set casing to 20.0'
-								1	08:39 set casing to 20.0' -
I -							_		
-							-]
-							-	1	-
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20								\sqcup	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-17	SHEET	2	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723025.7 N, 458007.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER				0/07 S	START : 4/9/2007 END : 4/18/2007		R : A.	Teal, N. Jarzyniecki, M. Faurote
300				STANDARD	SOIL DESCRIPTION		ق	COMMENTS
AND N (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COIL NAME LICCO OPOLID OVARDOL COL	OD	C LO	DEDTILOF CACING POLLING DATE
H BE ACE ATIO		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COL MOISTURE CONTENT, RELATIVE DENSIT	Y OR	30Li	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERA	LOGY	SYMBOLIC LOG	INSTRUMENTATION
22.3	20.0	0.3	SS-5	50/3	☐ Sandy Silt (ML)	F		
-	20.2			(50/3")	20.0-20.2' - grayish orange, (10YR 7/4), moist nonplastic, very rapid dilatancy, mild to model	rate HCL /	1	1
-					reaction, 25-30% fine to medium sand, two fir gravel-sized limestone fragments, all carbona	ne 📗	1	1
					Begin Rock Coring at 20.3 ft bgs	ille .]]
l _					Begin Rock Coring at 20.3 ft bgs See the next sheet for the rock core log	-		_
_						-	1	_
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25 17.3							┨	-
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40						-	1	
10_							1	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-17 SHEET 3 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723025.7 N, 458007.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

				LENT . CIVIE 35 3/N 3 10023, ITINU TOTALLY, INQ TOOLS, FIVE			ORIENTATION . Vertical
WATER	LEVELS : 2.5	ft bg	s on 4/		18/20		i, M. Faurote COMMENTS
るらぼ	CORE RUN, LENGTH, AND RECOVERY (%)			DISCONTINUITIES	8	LITHOLOGY	COIVIIVIENTO
DEPTH BELOW SURFACE AND ELEVATION (ft)	Z Z Z		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
A TIC	JA FE	(%) _Q	ĮŠ.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
ER SH	ORE	Ø	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ĭ¥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
Δош	NQ-1	<u>~</u>		THISTAREOU, OCTA /ICE OT/MAINO, / MAD TICHTINEOU	S		
-	21.0 0.8 ft	0	NA		1111	- Silt (ML) 20.3-20.85' - Same as 15.0-16.3'	_
-	21.0 _75% <i>)</i>		NR.		Ш	except strong HCl reaction	-
-			0		╁	_ \No Recovery 20.85-21.0'	-
-			0		Ħ	Limestone 21.0-24.1' - grayish orange, (10YR	-
-					₽	7/4), medium to fine grained, mild	-
-	50.110		0		П	HCl reaction, extremely weak to very	_
1 -	R2-NQ 5 ft	0			╁	weak (R0 to R1), voids <1/16" on 90-95% of surface, trace rounded to	_
1 _	62%	Ü	0		F	subrounded white casts, at 22.55'	
					H	sandy clay lens, greenish gray, 0.1' thick, 22.56-22.9' trace linear white	Casing advanced to 25.0'
25					Н	bedding, moderately to very	
17.3			NR	_	Т	fossiliferous	_
-	26.0				╁	No Recovery 24.1-26.0'	7
-	20.0			26.0-27.0' - Fracture zone or mechanical	F	Limestone	-
-			1	break, 0-70 deg, rough, undulating, open to	世	26.0-29.4' - grayish orange, (10YR	-
-			-	3/16" 27.0-29.4' - Fracture zone, silt and rock	╨	7/4), fine grained, moderate HCl reaction, extremely weak to very	-
-			>10	fragments to 1-1/2"	口	weak (R0 to R1), voids <1/16" on	-
-	50.110				╁	25% of surface, zones of silt 27.0'-29.4', 6" thick	_
-	R3-NQ 5 ft	0	>10		F	- 27:0-29:4, 0 tiller	_
l _	90%				Ľ	1_	_
1 _			>10	00.4.00.51.5	Щ		
30			10	29.4-30.5' - Fracture zone, sand to cobble-sized limestone fragments	П	- 29.4-30.5' - grayish orange, (10YR - 7/4), fine grained, moderate HCl	
12.3			>10		Ή	reaction, medium strong (R3), few	_
-	31.0		NR		Ħ	voids <1/16" No Recovery 30.5-31.0'	_
-	01.0				Ľ	Limestone	1
-			>10		╨	31.0-34.2' - grayish orange with olive	-
-				31.9-34.2' - Fracture zone, 0-65 deg, rough,	世	gray mottling over 60-70% of surface, (10YR 7/4, 5Y 4/1), very fine	-
-			>10	undulating, lighter coloration (grayish orange) up to 1/8" wide along 65 deg fracture at	╁	to fine grained, mild HCl reaction,	-
-	DANO			33.0-33.3'	F	weak (R2), predominately olive gray	-
-	R4-NQ 5 ft	18	>10		╨	by 34.0', grayish orange material becoming associated with	_
-	64%		0		\blacksquare	casts/molds, moderately	_
-			П		П	fossiliferous, voids vary from 10-15% up to 50% in matrix	
35				_	\vdash	No Recovery 34.2-36.0'	
7.3			NR		Ë	1	
-	36.0				H	<u> </u>	1
-	- 5.0			36.0-36.5' - Fracture zone, 0-70 deg, rough,	\blacksquare	Limestone	
-			>10	undulating, grayish orange coloration on most surfaces, rock fragments to 2"	$^{\perp}$	- 36.0-38.0' - olive gray, (5Y 4/1), fine grained, moderate HCl reaction,	
-			$\vdash \vdash$	36.5-36.7' - Fracture, 65 deg, rough,	╁	voids <1/16" on 20% of surface, very	-
-			1	undulating, tight	亡	fossiliferous, few cavities to 3/16"	-
-	R5-NQ		\vdash	37.6' - Fracture, 60 deg, rough, planar, tight 38.0-38.8' - Fracture zone, smooth, planar to	\vdash	(molds) 38.0-38.8' - moderate yellowish	-
-	5 ft	27	>10	undulating, fragments <1"	\blacksquare	brown, (10YR 5/4), fine grained,	-
-	56%		\vdash	-	上	moderate HCl reaction, extremely	_
_					F	weak (R0), friable, trace organics No Recovery 38.8-41.0'	
40			NR	_	片		
2.3					\vdash		
						I .	



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-17 SHEET 4 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723025.7 N, 458007.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

CORING	NETHOD AL	ND E	JUIPIV	ENT : CME 55 S/N 316625, mud rotary, NQ tools, HW of	casing		ORIENTATION : Vertical
WATER	LEVELS : 2.5	ft bg	s on 4/		/18/20		
≥∩≘	_ (9			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
N A S	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEDTH OF CASING
불병은	PAT, FA	(%) Q	120	DEPTH, TYPE, ORIENTATION, ROUGHNESS,		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
₽₹₩	A POS	ΩD	P P F	PLANARITY, INFILLING MATERIAL AND	MB(AND ROCK MASS	SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND ELEVATION (ft)	잉필뿐	A O	E H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
_					1	_	-
-	41.0			44.0.44.41.5	╆	<i>,</i>	
l _			>10	41.0-44.4' - Fracture zone, 20-30 deg, rough to smooth, undulating, fragments	早	Limestone - 41.0-42.3' - pale yellowish brown,	
l _				predominately 1/2" up to 2"	╨	(10YR 6/2), fine grained, moderate	
			4.0		Ш	HCl reaction, very weak (R1), voids	
-			>10		\top	 <1/16" on 50% of surface, moderately fossiliferous, trace 	
-	R6-NQ				口	organics	
-	5 ft	0	>10		+	- 42.3-44.4' - Same as 41.0-43.0'	
-	68%		>10		╨	except extremely weak (R0), 42.3-42.5' seam of sandy lean clay	
-			/10		-1	No Recovery 44.4-46.0'	-
45				_	╌	_	_
-2.7			NR		片		
	46.0		L l		Щ		
-				46.0-47.7' - Fractures (8), 20 deg, rough,	\Box	Limestone	<u> </u>
-			5	undulating, to smooth and undulating, face angles parallel, open to 1/16"	1-1	 46.0-48.2' - pale yellowish brown, (10YR 6/2), fine grained, moderate 	-
-				angles parallel, open to 1710	仁	HCI reaction, extremely weak (R0),	-
-			4		₽	- friable, trace organics	-
-	R7-NQ		\vdash	47.9' - Fracture, horizontal, smooth,	┰	_	-
-	5 ft	0	>10	undulating, open to 3/16"	╌	48.2-48.6' - pale yellowish brown,	-
l -	68%			48.2, 48.4, 48.6' - Fracture (3), 0-20 deg, rough, undulating		(10YR 6/2), fine grained, moderate HCl reaction, very weak (R1), voids	_
l _			>10	48.6-49.4' - Fracture zone, rough, undulating,	\vdash	<1/16" on 40-50% of surface,	
50				rock fragments to 1"	Ш	laminations of organic material	
-7.7			NR	-	ℸ	── <1/16" 48.6-49.4' - Same as 46.0-48.2'	
-	51.0				╀	No Recovery 49.4-51.0'	-
-	31.0				世	Limestone	-
-			>10	51.3' - Fracture, 20 deg, smooth, undulating,	₩	- 51.0-52.5' - Same as 46.0-48.2'	-
-			\vdash	open to 3/16" 51.4-52.0' - Fracture zone, 0-90 deg, rough,	-	except laminations of organic material <1/16" from 51.0'-51.5'	-
l -			4	undulating, to smooth and undulating,	┦	=	_
l _				fragments <3/16"-1-1/2"	耳	52.5-55.5' - Same as 48.2-48.6' - except few voids <1/16", organics	<u> </u>
1	R8-NQ	25	,	52.1, 53.4, 53.6, 54.0, 54.9' - Mechanical break (5)	H	more abundant	
	5 ft 90%	35	1	52.2, 52.3, 52.5, 52.8' - Fracture (4), 20 deg,	Ш]
-				rough, undulating, to smooth and planar,	Ш	F	_
55			2	fractures non-parallel, open to 1/8" 53.1' - Fracture, 40 deg, smooth, undulating,	+	-	·
-12.7			1	open to 1/16"		-	_
-			NR	54.3, 54.5' - Fractures or mechanical break (2), 10-20 deg, smooth, undulating, open to	╂┴┤	No Recovery 55.5-56.0'	-
-	56.0		INK	(2), 10-20 deg, smooth, undulating, open to 3/16"	坦	Limestone	56.0.76.0' re logged by C
-			3	55.4' - Fracture, 20 deg, rough, planar, open	╆┼	- 56.0-57.5' - Same as 52.5-55.5'	56.0-76.0' re-logged by C. Dougherty
-			\square	to 1/16"]
			>10	56.1' - Fracture, horizontal, smooth, undulating, open to 1/16"	┟┼┤		Casing advanced to 60.0'
				56.3, 56.5' - Fractures (2), 20-40 deg,	Ш	57.5-60.2' - light olive gray, (5Y 5/2),]
-	R9-NQ		П	smooth, undulating, open to 3/16" 57.2' - Fracture, 0-20 deg, 20 deg on upper	1-1	 fine grained, mild HCl reaction, strong (R4), laminated bedding, 	_
-	5 ft 84%	38	2	surface, 0 deg on lower surface, open	Ħ	voids <1/16" on 0-30% of surface,	·
-	0470		$\vdash\vdash$	57.5-58.1' - Fracture zone, 0-65 deg, smooth,	╂╫	 voids concentrated in zone from 	-
-			>10	undulating, trace silt and/or clay sized infilling, black staining on 65 deg fracture	$-\Box$	58.4'-59.4', cavities to 3/4"x3/8" (fossil molds), trace organics, some	-
60 <u> </u>			>10,	faces, fragments from 1/2"-2"	$\pm \pm$	— laminated bedding inclined 10 deg	_
-1/./			/ 10/	· •	+		



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-17 SHEET 5 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723025.7 N, 458007.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

CORING	I WE I HOD AI	ND EC	ZUILIA	MENT: CME 55 S/N 316625, mud rotary, NQ tools, HW	casing	<u>y</u>		ORIENTATION : Vertical
WATER	LEVELS: 2.5	ft bg	s on 4	/10/07 START : 4/9/2007 END : 4	/18/20	007	LOGGER : A. Teal, N. Jarzynieck	i, M. Faurote
	_			DISCONTINUITIES	(1)	ı	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) 0	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	Γ	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
DEPT SURF ELEV	CORE LENG RECC	RQD	FRAC PER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMB	╽	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-	61.0		NR	58.75' - Fracture, 25 deg, rough, planar, tight 58.9-59.0' - Fracture, horizontal, 2 fragments,	1	╁	No Recovery 60.2-61.0'	-
_			2	open 59.2-59.5' - Fracture zone, 70 deg, black	\vdash	Ⅎ	Limestone 61.0-62.7' - Same as 57.5-60.2'	_
			-	staining on face, closed	\vdash	┨	except intervals of laminated	
			8	59.7' - Fracture, 35 deg, closed 59.8-60.2' - Fracture zone, 0-65 deg, rough,	\top	Ŧ	bedding, voids <1/16" and cavities up to 3/8" diameter from 61.5-62.7	
			°	undulating, dark staining	口	1	62.7-63.9' - light olive gray, (5Y 5/2),	
-	R10-NQ		>10	61.1-61.3 - Fracture, 80 deg, dark staining, tight	Ъ	╁	fine grained, moderate HCl reaction,	· ·
-	5 ft 58%	30	-10	61.5' - Fracture, 45 deg, smooth, planar, tight	\perp	1	medium strong (R3), voids <1/16" on 25% of surface, very fossiliferous,	_
-				62.05' - Fracture, 10 deg, smooth, undulating, tight	1	1	molds up to 3/8"diameter	-
65			ND	62.3' - Fracture, 30 deg, fracture not	H	╁	No Recovery 63.9-66.0'	-
-22.7			NR	completely through core 62.65' - Fracture, 15 deg, smooth, undulating,	╨	╀	-	_
_	66.0			tight	\top	7		_
-	00.0			62.8-63.0' - Fracture zone, smooth to rough, undulating, fragments 3/8"-1"	1	1	Limestone	-
-			>10	63.3' - Fracture, 10 deg, smooth, undulating,	1	╁	66.0-69.5' - moderate olive brown to light olive gray, (5Y 4/4 to 5Y 5/2),	SC-1 collected at 66.4- 67.6'
-				loose 63.3-63.9' - Fracture zone, 0-90 deg, rough,	F	7	fine grained, mild HCl reaction, weak	07.0
-			>10	undulating, dark staining, fragments	Ħ	‡	to medium strong (R2 to R3), voids <1/16" on 15% surface, cavities to	-
-	R11-NQ			<1/16"-2-1/2", staining on one 45 deg face 66.0-66.4' - Fracture zone, smooth,	\vdash	t	3/8" over <5%, moderately	-
-	5 ft 100%	50	>10	undulating, some dark staining, fragments to	╨	十	fossiliferous, trace organics	-
-	10070			3/8" 67.6-68.9' - Fracture zone, 0-90 deg, rough,	T	1		-
70			>10	undulating, fragments <1/16"-2", some	\pm	†	69.5-71.0' - moderate yellowish	-
-27.7				organic material on some fragment faces - 69.15' - Fracture, 75 deg, rough, planar, tight	Ъ	╁	brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, weak (R2),	_
-	71.0		>10	69.4-70.4' - Fracture zone, similar to	1	╁	laminated bedding, inclined 30 deg,	-
-	7 1.0			67.6-68.9'	1	‡	organics present along bedding, moderately fossiliferous at 70.5-71.0'	SC-2 collected at 71.0-
-			1		世	†	71.0-76.0' - Same as 69.5-71.0'	71.9'
-				71.9' - Fracture, horizontal, smooth,	╫	╁	except voids <1/16" on 5% of surface, laminated bedding with	-
-			1	undulating, tight 72.35' - Fracture, 50 deg, smooth, planar,	口	1	30-45 deg angles, more pronounced	-
-	R12-NQ			loose	世	†		-
-	5 ft 100%	100	0	72.8' - Mechanical break 73.1, 73.6, 75.5' - Mechanical break (3)	+	\pm		-
-	100%			, ,	+	╁		-
75 -			0		片	‡		-
75 -32.7				-	世	╁	-	_
-	70.0		0		+	+		-
-	76.0				口	1	76.0-78.6' - moderate yellowish	-
-			0	76 61 Machanical brest	廿	+	brown, (10YR 5/4), fine grained,	-
-				76.6' - Mechanical break 77.0' - Fracture, 55 deg, smooth, planar, tight	+	+	moderate HCl reaction, very weak (R1), thinly laminated (1/4"), inclined	-
-			3		+	7	5-10 deg, voids <1/16" on 15% of	-
-	R13-NQ		_	77.65' - Fracture, 20 deg, rough, undulating, loose	#	‡	surface and trace organics predominately along bedding, trace	-
-	5 ft	33	3	77.9' - Fracture, 30 deg, smooth, undulating,	世	╁	1/16"-1/8" gray clasts	-
-	52%			tight 78.3' - Fracture, 25 deg, smooth, undulating,	\mathbf{H}	+	No Recovery 78.6-81.0'	Casing advanced to 80.0'
-				tight	口	1		end of day 4/10/07 at -
80 <u> </u>			NR	78.4' - Fracture, horizontal, smooth, undulating, loose	士	╆	-	101.0'
-51.1				and during, 10000	T	T		
					\perp		<u></u>	
						_		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-17 SHEET 6 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723025.7 N, 458007.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

WATER	LEVELS : 2.5	ft bgs	s on 4	10/07 START : 4/9/2007 END : 4/	18/20	07 LOGGER : A. Teal, N. Jarzynieck	ki, M. Faurote
				DISCONTINUITIES	Ŋ	LITHOLOGY	COMMENTS
AND	ZNY ON≻		ES	DESCRIPTION] O	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) _Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EV.	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	√MB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ОΩШ	024	ď	ша		S	CHARACTERISTICS	
	81.0			78.5' - Fracture, 45 deg, smooth, undulating, loose	Ш	-	1
-			. 40	-	╨	Limestone	1
-			>10	81.5-81.9' - Fracture zone, rough, undulating,	F	- 81.0-81.5' - grayish orange, (10YR 7/4), fine grained, moderate HCl	1
-			4.0	fragments <3/16-1-1/2" 82.2' - Mechanical break	ш	reaction, very weak to weak (R1 to	1
-			>10	82.5-82.8' - Fracture zone, same as	世	 R2), voids <1/16" on 25% of surface 81.5-83.75' - very pale orange to 	1
-	R14-NQ		>10	81.5-81.9' 82.8' - Fracture, 60 deg, rough, planar, loose	╁	grayish orange, (10YR 8/2 to 10YR	1
-	5 ft 55%	20	- 10	83.1' - Fracture, 40 deg, rough, undulating,	Ħ	 7/2), fine grained, moderate HCl reaction, medium strong (R3), voids 	1
-				tight 83.35-83.75' - Fracture zone, same as		<1/16" on 25% of surface, cavities to	1
85			NR	81.5-81.9'	Ш	 3/8"x3/8" over 10% from 81.9-82.8', moderately fossiliferous 	1
-42.7			1414	_	╨	No Recovery 83.75-86.0'	
-	86.0			-	匚		1
-	00.0				世	Limestone	1
-			3	86.75' - Fracture, 45 deg, rough, planar, tight	\vdash	 86.0-90.9' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, 	1
-				86.95-87.3' - Fracture zone, 0-60 deg,	\vdash	medium strong (R3), voids <1/16" on	1
-			10	smooth, undulating, fragments 3/8"-1-1/2" 87.75, 88.2' - Fractures (2), 20-30 deg,		 25-30% of surface, trace cavities to 3/16" except 5% at 89.4-90.9', very 	1
-	R15-NQ			smooth, undulating, tight	世	fossiliferous from 89.4-90.9'	SC-3 collected at 88.2-
-	5 ft 98%	80	2		╨	=	89.35'
-				-	Ш	-	1
90			0	89.35' - Fracture, 20 deg, rough, undulating, loose, clay seam 1/32" thick	ш	-	1
-47.7					世	_	
-	91.0		2	90.5' - Fracture, 30 deg, smooth, undulating,	╁	-	1
-			(NR)	tight , clay seam 1/4" thick 90.6' - Fracture, 15 deg, smooth, undulating,	H	No Recovery 90.9-91.0' Limestone	1
-			>10	loose	Ħ	91.0-91.5' - moderate yellowish	1
				91.0-91.7' - Fracture zone, 0-90 deg, fragments <3/8"-1-1/2", clay films	世	brown, (10YR 5/4), fine grained, mild HCl reaction, medium strong to	1
			1	92.5' - Mechanical break	╨	strong (R3 to R4)	1
	R16-NQ		4.0	92.9' - Fracture, 60 deg, rough, planar, open to 1/16"	\Box	91.5-94.2' - moderate yellowish brown, (10YR 4/2), fine grained,	1
1 -	5 ft 64%	25	>10	93.15' - Fracture, 80 deg, rough, planar, tight	Ш	moderate HCl reaction, laminated	1
-			>10	93.25' - Fracture, 75 deg, smooth, planar, tight	\perp	organics 1/16" thick at 91.7' and 92.4' with trace laminated organics	1
95				93.5-94.2' - Fracture zone, 0-70 deg, smooth,	\Box	elsewhere, voids <1/16" on 25% of	1
-52.7			NR	undulating, fragments 3/8"-2-1/2"	\vdash	 surface,few larger cavities along apparent healed fracture planes 	7
1 -	96.0				Ħ	No Recovery 94.2-96.0'	1
			-10	96.0-98.0' - Fracture zone, smooth to rough, undulating, fragments 3/8"-3"	片	Limestone	1
			>10	unuulating, iragments 3/8"-3"	\vdash	 96.0-98.0' - grayish orange and light gray, (10YR 7/4 and N6), fine 	1
			>10		${\mathbb H}$	grained, mild to moderate HCl reaction, strong (R4), few voids	1
			/10		厂	<1/16" over 20% from 97.0-97.5'	1
	R17-NQ 5 ft	0			」	No Recovery 98.0-101.0'	1
1	5 π 40%	U			\perp		1
1			NR		\Box		1
100_			INE		广		1
-57.7					H		Casing advanced to 100.0'
				•			



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-17 SHEET 7 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723025.7 N, 458007.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

-				IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW c			ORIENTATION : Vertical
WATER	LEVELS : 2.5	ft bg	s on 4		18/20 T		i e
≷Q€	<u>(%</u>			DISCONTINUITIES	P00	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	J J	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A A C.B.	J.H.	(%) Q	<u>≒</u> 8	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
무류	SING	ο	SAC ER F	PLANARITY, INFILLING MATERIAL AND	Į ₩	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	222	<u>~</u>	E E	THICKNESS, SURFACE STAINING, AND TIGHTNESS	တ်	CHARACTERISTICS	
-	404.0			-	╨	-	-
-	101.0			101.0-101.35' - Fracture zone, to 90 deg,	世	Limestone	-
-			>10	fragments 3/8"-2-1/2"	╀	 101.0-106.0' - pale yellowish brown, 	-
-						(10YR 6/2), fine grained, moderate	-
l _			1	102.15' - Fracture, 60 deg, rough, planar to	╨	HCI reaction, medium strong (R3), voids <1/16" on 15% of surface.	Water level at 1.9' below ground surface -
			'	undulating, tight	ш	trace cavities to 3/8" predominately	SC-4 collected at 102.15-
1 -	R18-NQ				\vdash	fossil molds and casts, very	103.5'
-	5 ft 100%	82	1	103.5' - Fracture, 50 deg, smooth, undulating		– fossiliferous	-
-	10070			to planar, tight 104.0, 105.4' - Fractures (2), 15 deg, rough,	╀┴	-	-
-			1	undulating, tight	╨	-	-
105_ -62.7				_	世		_
"-			2		\vdash	-	
-	106.0			105.6' - Fracture, 70 deg, smooth, planar, tight	Ħ	400 0 444 01 0 404 0 400 01	_
1 _			3	ugnı 106.1-106.4' - Fracture, 60 deg, rough,	\vdash	106.0-111.0' - Same as 101.0-106.0' - except olive gray mottling (5Y 4/1), at	
				undulating, tight to open to 1/16"	口	107.0' laminated bedding from	
-				106.4-106.7' - Fracture, apparent healed fractures	Ъ	109.6-110.2' inclined 40 deg	SC-5 collected at 107.25-
-			2	106.5' - Fracture, 40 deg, rough, undulating,		<u> </u>	108.5'
-	R19-NQ			tight	╁	-	-
-	5 ft	77	1	106.8' - Fracture, horizontal, rough, undulating, tight	口	-	-
-	100%			107.0, 107.25, 108.5' - Fractures (3), 60 deg,	╂┯	-	-
-			>10	smooth, planar, tight		-	-
110				109.0-109.3' - Fracture zone, 0-80 deg, rough, undulating, fragments 3/16"-2"			
-67.7			3	109.8' - Fracture, 60 deg, rough, undulating,	╨	_	_
l _	111.0			open to 1/16", organic material on faces	厂		
				110.15' - Fracture, 45 deg, smooth, undulating	Н	111.0-116.0' - Same as 101.0-106'	SC-6 collected at 111.0-
-			0	110.25' - Fracture, 50 deg, rough, undulating,		except trace organics from 113.6-114.3', cavities to 3/8"x1-3/16"	112.1'
-				open to 1/16" 110.65' - Fracture, 60 deg, rough, undulating,	╀	from 113.6-114.3'	1
-			1	open to 1/8"	仜	-	-
-	R20-NQ			112.1' - Fracture, 75 deg, rough, undulating,	+	-	-
-	5 ft	100	0	tight	+-	_	-
-	100%			113.6, 114.45' - Mechanical break (2)	Ë	-	_
_			0		₽	_	_
115_					口		
-72.7					Н		
1 -	116.0		0		F]
1 -				·	世	116.0-119.5' - Same as 101.0-106.0'	
-			0	-	匚	-	<u> </u>
-				-	世	-	-
1 -			1	147 CL Fracture OF day agreet words C	╫	ŀ	-
1 -	D04 NO		<u> </u>	117.6' - Fracture, 25 deg, smooth, undulating, charcoal gray staining on 30%, tight	Ħ	-	-
1 -	R21-NQ 5 ft	50	7	118.0-118.2' - Fracture zone, 0-50 deg,	╀	-	
1 -	70%			rough, planar, open to 1/16" 118.2' - Fracture, 50 deg, rough, planar, tight	口	_	_
1 _			>10	118.2 - Fracture, 50 deg, rough, planar, tight 118.65' - Fracture, 30 deg, smooth,	┢		
120				undulating, tight	F	No Recovery 119.5-121.0'	
-77.7				_	H		
1							
							l .



PROJECT NUMBER: BORING NUMBER:

338884.FL A-17

SHEET 8 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723025.7 N, 458007.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING	METHOD A	,		IENT : CME 55 S/N 316625, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
	LEVELS : 2.5					D7 LOGGER : A. Teal, N. Jarzynieck	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-			NR	118.9' - Fracture, 10 deg, smooth, undulating,	\blacksquare	-	-
-	R22-NC	12	>10	loose 119.05' - Fracture, 25 deg, smooth, undulating, loose 119.2' - Fracture, 15 deg, smooth, undulating, loose 119.3-119.5' - Fracture zone, rough, undulating, to smooth and planar, fragments 3/8"-1" 121.0-122.2' - Fracture zone, 0-90 deg,		Limestone 121.0-122.1' - grayish orange, (10YR 7/4), fine grained, moderate HCl reaction, medium strong (R3), voids <1/16" on 40% of surface, trace cavities to 3/8" diameter predominately fossil casts/molds No Recovery 122.1-126.0'	- - - - -
- 125 -82.7	22%		NR	rough, undulating, fragments <3/16"-2" 121.3-121.9' - Fracture, vertical, rough, undulating, dark gray staining, open to 1/16" —		- - -	- - - -
-	126.0			126.0-126.6' - Fracture, 80 deg, rough,	H	Limestone	-
-	-		>10	undulating, open to 1/16" 126.3' - Fracture, 45 deg, rough, undulating, tight	Ē	 126.0-128.0' - moderate yellowish brown with light olive gray laminations 1/4" thick, (10YR 5/4 with 	- -
-	- - -		>10	126.6-128.0' - Fracture zone, 0-75 deg, smooth, planar, to rough and undulating, fragments 3/8"-3"	H	5Y 4/2), fine grained, moderate HCl reaction, medium strong (R3), voids <1/16" over 20% of surface trace	-
-	R23-NC 5 ft 86%	18	4	128.3' - Fracture, 35 deg, rough, undulating, tight	Ħ	 cavities to 3/16", moderately fossiliferous, trace organics 	- -
130_			2	128.4' - Fracture, 35 deg, rough, undulating, tight, intersects fracture at 128.3' 128.5' - Fracture, 15 deg, smooth, undulating,	Ħ	128.0-130.3' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction, medium strong (R3), voids over 20%	-
-87. 7	131.0		2 NR	open 128.5-128.9' - Fracture, 60-70 deg, smooth, undulating, tight		of surface, few cavities to 3/16" predominately fossil casts/molds, moderately fossiliferous	-
-			>10	129.25' - Fracture, 60 deg, rough, undulating, tight 129.4' - Fracture, 20 deg, rough, undulating,	H	No Recovery 130.3-131.0' Limestone 131.0-133.5' - Same as 128.0-33.5'	-
-	-		>10	tight to open to 3/8" 130.0, 130.1' - Fractures (2), 30 deg, smooth, undulating, open, intersecting 130.1'		except less cavities to 3/16" diameter -	-
-	R24-NC 5 ft 50%	25	0	131.3-131.6' - Fracture zone, up to 70 deg, rough, undulating, to smooth and undulating, fragments 3/8"-1"		- - No Recovery 133.5-136.0'	-
- 135 -92.7			NR	131.9-132.2' - Fracture zone, 0-90 deg, rough, undulating, fragments 3/8"-1" 132.2' - Fracture, 25 deg, smooth, undulating, open 132.7' - Fracture, 50 deg, rough, undulating,		- - -	- - -
-	136.0		>10	tight 136.0-136.8' - Fracture, 60 deg, smooth, planar, loose	Ħ	Limestone 136.0-139.0' - moderate yellowish	-
-					Ħ	brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, medium strong (R3), voids <1/16" on 20% of	-
-	DOE NO		2	137.5' - Fracture, 75 deg, smooth, planar, loose	H	surface, moderately fossiliferous, trace molds to 3/8"x3/16", possible	-
-	R25-NC - 5 ft 60%	38	0	137.65' - Fracture, 60 deg, smooth, planar, charcoal gray to black staining on 90-95% of surface, loose	H	 healed fractures at 136.4' and 136.7' 	-
140 -97.7	_		NR	_		No Recovery 139.0-141.0'	-
-91.1							



PROJECT NUMBER: BORING NUMBER:

338884.FL A-17

SHEET 9 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723025.7 N, 458007.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.5	ft bgs	s on 4	/10/07 START : 4/9/2007 END : 4/	18/20	07 LOGGER : A. Teal, N. Jarzynieck	ki, M. Faurote
≥∩≎	(9)			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
ANI (#)	N, AND ₹Y (%		SES	DESCRIPTION	CLO	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) _Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
LEV.	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ООШ	075	<u>~</u>	ша	THISTATE OF A THE TOTAL OF A THE THE THE THE	S	GIAIGATERIOTICO	
	141.0			_	Ħ		1
			. 40		\vdash	Limestone	1
-			>10	rough to smooth, undulating, dark staining,	dash	- 141.0-144.6' - Same as 136.0-139.0' except mainly light olive gray, (5Y	1
				fragments <3/8"-3"	${f lacksquare$	5/2), very fossiliferous below 142.0', molds to 3/16"x3/8" on 5% of surface	1
			>10	_	世	F moids to 3/16 x3/8 on 5% of surface	1
	R26-NQ			- 143.25' - Fracture, 45 deg, rough, planar,	⊣	_	1
-	5 ft 72%	38	1	tight	F	-	1
-			0	_	Ħ	-	1
145				-		No Recovery 144.6-146.0'	1
-102.7			NR	_	\vdash		1
-	146.0			-	口	<u> </u>	1
	. 10.0			-	\perp	Limestone	1
-			1	- 146.7' - Fracture, horizontal, rough,	⊣	 146.0-150.6' - Same as 136.0-139.0' except several healed fractures at 	1
-				undulating, open	F	147.0-148.0', inclined 55 deg	1
-			1	147.2' - Fracture, 55 deg, rough, undulating, tight	Ħ	-	1
-	R27-NQ				世	-	1
-	5 ft 92%	77	4	148.3-148.5' - Fractures (4), 30-70 deg, rough, undulating, 3 fragments to 1-1/2", tight	╙	_	SC-7 collected at 148.5-
-	0270			to 1/16" open	囯	-	149.45'
150			4	149.45' - Fracture, 30 deg, rough, undulating,	ш	-	1
-107.7			1	tight — — — — — — — — — — — — — — — — — — —	╁	_	
-	151.0		NR	rough, undulating, loose	H	L No Recovery 150.6-151.0'	1
-	101.0			150.6' - Fracture, 70 deg, rough, planar, tight	F	Limestone	1
-			1	-	Ħ	 151.0-155.0' - Same as 136.0-139.0' except cavities from 3/16" diameter 	1
_				151.85' - Fracture, 75 deg, rough, planar, tight	H	to 3/4"x1-3/16" on 15-20% of surface	1
-			2	152.2' - Fracture, 25 deg, rough, undulating,	⊬	 from 153.5-154.5' and 151.9-152.3', trace organics from 152.0-152.3' 	1
-	R28-NQ			loose, organics on lower faces 152.3' - Fracture, 25 deg, rough, undulating,	囯	_	1
-	5 ft 80%	63	1	tight to open to 3/8"	世	-	1
-	3373			153.2, 153.5' - Mechanical break (2) 153.8' - Fracture, 15 deg, rough, undulating,	\vdash	-	1
155			>10	loose	\sqcap	-	1
-112.7				154.5-155.0' - Fracture zone, 0-75 deg, — rough, undulating, fragments 3/8"-1"	Ħ	No Recovery 155.0-156.0'	
-	156.0		NR			-	1
-	100.0			156.0-156.5, 157.0-157.35' - Fracture zone	╙	_ Limestone	
-			>10	(2), 0-60 deg, rough, undulating, brown staining on some fracture planes, fragments	厂	 156.0-160.7' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction, 	
-				to 1-1/2"	口	medium strong to strong (R3 to R4),	
-			>10	-	\vdash	 trace voids <1/16" except from 158.5-160.5' where voids present 	
-	R29-NQ			-	\vdash	over 25% of surface, cavities to 9/16"	
-	5 ft 94%	60	3	-	广	 diameter throughout core and associated with healed fractures 	
-	J + /0			158.8' - Fracture, 80 deg, rough, undulating, tight	Ľ		
160			>10	158.95-159.5' - Fracture zone, 20-80 deg,	╁	-	-
160 <u>-</u> -117.7				rough, undulating, fragments to 3" —	\sqsubseteq		_



PROJECT NUMBER: BORING NUMBER: 338884.FL

A-17

SHEET 10 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723025.7 N, 458007.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS : 2.5	ft bgs	s on 4	/10/07 START : 4/9/2007 END : 4/	18/20	D7 LOGGER : A. Teal, N. Jarzynieck	ki, M. Faurote
≥∩≎	(%)			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ACE	TH.	(%) _Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,] SGE	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
LEV.	ORE ECC	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	≺ME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ООШ	075	<u>~</u>	1	THE INCIDENCE OF A FIRST THE PROPERTY OF THE P	S	GIAIGAGTERIOTIOG	
	161.0		NR	160.5' - Fracture, 30 deg, rough, undulating,		No Recovery 160.7-161.0'	1
				tight at center, open to 3/8"	Ш	Limestone	1
			1		\mathbb{H}	- 161.0-162.4' - moderate yellowish brown, (10YR 5/4), fine grained, mild	1
			. 40	161.9' - Fracture, 20 deg, rough, undulating, loose	Ш	to moderate HCl reaction, medium	1
			>10	162.0' - Fracture, 35 deg, rough, undulating,	Ш	strong (R3), laminated bedding at 161.0-161.5', trace organics at	1
	R30-NQ			loose 162.4-162.7' - Fracture zone, rough,	Ш	162.0', voids <1/16" on 15% of	1
	5 ft 84%	67	3	undulating, brown staining on some surfaces,	\vdash	 surface grouped along bedding, trace cavities to 3/4" diameter 	1
				fragments 3/16"-1-1/2" 163.0, 163.9' - Fractures (2), 45 deg, closed,	Н	162.4-165.2' - light olive gray with	1
165			3	healed		 moderate yellowish brown, (5Y 5/2 with 10YR 5/4), fine grained, mild 	1
-122.7			0	163.6' - Fracture, 60 deg, rough, planar, open — 164.7' - Fracture, 25 deg, rough, undulating,	Ш	HCl reaction, medium strong (R3), some cavities up to 1-9/16" oriented	7
1 7	166.0		NR	loose	\square	along healed fractures	1
1 7			_	164.7-164.9' - Fracture zone, rough, undulating, small fragments	Ш	No Recovery 165.2-166.0' Limestone	1
			2	166.3, 166.4' - Fractures (2), 20 deg, smooth,	\blacksquare	166.0-170.8' - moderate yellowish	1
				planar, tight	Н	brown and light olive gray, (10YR 5/4 and 5Y 5/2), fine grained, mild HCl	1
			3	167.55' - Fracture, 85 deg, smooth, planar,	H	reaction, medium strong (R3),	1
-	R32-NQ			tight 167.7' - Fracture, 20 deg, smooth, undulating,	Ħ	laminated bedding at 166.0-166.8' and 169.7-170.1' inclined 30-35 deg	1
	5 ft 96%	57	8	tight	Ш	with voids <1/16" on 25% of surface,	1
				167.85' - Fracture, 80 deg, smooth, planar, tight	Ш	trace cavities to 3/16"x1-3/4"	1
170			1	168.05' - Fracture, 40 deg, smooth,	Ш		1
-127.7			2	undulating, tight — 168.15' - Fracture, 25 deg, smooth,	Ш	_	Casing advanced to 110.0'
	171.0		NR.	undulating, tight	Ш	- No Recovery 170.8-171.0'	end rock coring 4/12/07
			0	168.4-168.6' - Fracture zone, same as 29.4-30.5'	\mathbb{H}	Limestone	04/17/07 13:10 resume
			0	168.85' - Fracture, 25 deg, rough, undulating,	H	171.0-175.7' - pale olive to light olive, (10Y 6/2 to 5Y5/2), mild to moderate	coring - R31 Not recorded in field
				loose 169.65, 170.1' - Fractures (2), 35 deg, rough,		HCl reaction, medium strong (R3),	13:35 casing advanced to
			3	undulating, loose	Ш	cavities to 1.2"x2.4"x3.6", fossiliferous (casts/molds) up to	115.0'
1 7	R33-NQ		_	170.6' - Fracture, 50 deg, rough, undulating, loose	\mathbb{H}	10-15% of surface	Corehole reamed from
1 7	5 ft 94%	88	2	172.25' - Fracture, 45 deg, rough, flat, angular, dissolution break with healed 45 deg	Ш		115-171' begin coring at - 171.0'
1 7				fractures	Ш		1
175			1	172.35, 172.8' - Fractures (2), 2-5 deg, rough 173.25' - Mechanical break, 35 deg, smooth —	\mathbb{H}		1
-132.7			0	173.25 - Mechanical break, 35 deg, shlootif — 174.0' - Fracture, 5-10 deg	\mathbb{H}		R33: 10 minutes
]	176.0		NR		H	No Recovery 175.7-176.0'	1
]				176 3 176 5 176 0 170 1 170 25 170 2	岸	Limestone	M. Faurote begins logging
1 7			3	176.3, 176.5, 176.8, 178.1, 178.25, 178.3, 178.55, 178.9-179' - Fractures (8), these	\mathbb{H}	176.0-178.9' - yellowish pale gray to pale olive, (5Y 7/2 to 10Y 6/2), fine to	at 176.0' -
1 7				fractures are related to breccia clast separations and high angle fractures that	$oxed{\mathbb{H}}$	medium grained, mild HCl reaction,	Heavy chatter at 176.0-
]			0	were partially healed	\blacksquare	 medium strong to strong (R3 to R4), cavities to 1" on 15% of surface 	177.0'
]	R34-NQ		40		\blacksquare	associated with healed fracture	1
	5 ft 98%	43	10		\mathbb{H}	 traces, poorly fossiliferous (casts/molds), trace recrystallization 	1
]			4.0	179-179.2, 179.3, 179.45, 179.8, 180.1,	Ħ		1
180			10	180.15' - Mechanical break (6)	Ħ		1
-137.7				_	\vdash		R34: 8 minutes



PROJECT NUMBER:

33884.FL BORING NUMBER:

A-17 SHEET 11 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723025.7 N, 458007.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

				IENT . CIVIE 35 3/N 3 10025, Midd Totally, NQ tools, HW C			ORIENTATION: Vertical
WATER	LEVELS : 2.5	ft bg	s on 4		18/20		
≥0€	(©			DISCONTINUITIES	ပ္က	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	OLZE AND DEDTILLOF GAOING
ᆱ끯읃	RUN H. A	(%) _Q	N N	DEDTH TYPE OBJECTATION POLICIALEO	1 ∺	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H A A	Sor	0	ACT R FC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	/BC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SUF		S O	FR/ PEF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
			2		\vdash	- 178.9-180.9' - pale olive, (10Y 6/2),	_
	181.0					very fine grained, mild HCl reaction,	
-			NR.		₽	medium strong to strong (R3 to R4),	1
-			2	181.25' - Fracture, 7 deg, smooth, planar, minor iron oxide staining	仜	- 15% voids due to fossil	-
-				181.95' - Fracture, 45 deg, rough, angular,	╀	(casts/molds), cavities to 1" long by	-
-			>10	solution expanded	╀	No Recovery 180.9-181.0'	_
				182.55' - Fracture zone, fragments to		Limestone	
1 -	R35-NQ			1"x1-1/2"	Н	181.0-184.25' - Same as	R35: 9 minutes
-	5 ft 84%	59	1	183.25' - Fracture, 45 deg, planar to slightly undulating, with some carbonate		_ 178.9-181.0'	SC-8 collected at 183.25-
-	0470			recrystallization	₩	-	184.2' –
_			1	<u> </u>	匝	_ 184.25-185.2' - light brown to	-
185				184.8' - Fracture, rough, undulating, with —	H	medium brown, (5YR 5/6 to 5YR	_
-142.7			0	carbonate recrystallization on fracture		4/4), fine grained, strong HCl reaction, medium strong (R3),	
-	186.0		NR	surface, break is at the base of a clast in	Ш	containing very fine to fine grained]
-	100.0			breccia -	Н	clasts with <10% fossil void space	-
-			>10	186.0-187.0' - Fracture zone, moderate to heavy iron oxide, multiple fracture		No Recovery 185.2-186.0'	-
-				orientations -	⊬	Limestone 186.0-186.9' - medium brown to dark	_
			1	187.25' - Fracture or mechanical break, very		brown, (5YR 4/4 to 5YR 3/4), heavily	
				angular surface	Н	iron-oxide stained	
-	R36-NQ			-	╁	- 186.9-187.6' - pale olive, (10Y 6/2),	1
-	5 ft	0		-	╙	very fine grained, moderate HCl reaction	-
-	32%			-	╀	No Recovery 187.6-191.0'	-
-			NR	_		- -	_
190					\vdash		
-147.7					ш		R36: 18 minutes
-	191.0			-	⊣	=	1
-	191.0			191.0-192.0' - Fracture zone, multiple		Limestone Fragments	-
-			>10	fractures, random orientations, fragments to	ш	- 191.0-192.0' - multiple rock	-
-				1"	H	fragments	_
						No Recovery 192.0-196.0'	
				_		_]
-	R37-NQ			-	口	-	1
-	5 ft	0		-	+	-	-
-	20%		NR	-		_	-
_				-	\vdash	<u>-</u>	_
195					口		
-152.7					\vdash		R37: 11 minutes
_	196.0			-	世	<u> </u>	1
-	180.0			-	Щ	-	-
-			2	196.3' - Fracture, 20 deg, rough, undulating -	Н	_	-
-			igsquare	400.051 5	\Box	<u>-</u>	_
				196.95' - Fracture, 40 deg, rough, undulating, <5% recrystallization on surface	\vdash		
_			3	197.3' - Fracture, 30 deg, rough, minor	Ш]
-	R38-NQ			recrystallization	\vdash	-	-
-	5 ft	67	2	197.65-197.75' - Fracture zone, fragments	亡	-	-
-	86%			<1", recrystallization on surfaces, fragments may be from cavity break down	oxdot	_	-
			1	198.5-198.8' - Fracture zone or bedding	\vdash		
200				plane, 1-3 deg, smooth, planar, minor]
-157.7			0	recrystallization, fragments <1"	\vdash		R38: 4 minutes



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-17 SHEET 12 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723025.7 N, 458007.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

				IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW o	asing		ORIENTATION: Vertical
WATER	LEVELS : 2.5	ft bg	s on 4	/10/07 START : 4/9/2007 END : 4/	18/20	DO7 LOGGER : A. Teal, N. Jarzynie	Ti
> 0 0	<u></u>			DISCONTINUITIES	ى ق	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	FOG	ROCK TYPE, COLOR,	
ᆱ병흔	ER, A	(%	I III D		┨ 🖁	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H A A	SE F SOV	Q D (%)	E S	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	1 8	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	S S S S S S S S S S S S S S S S S S S	ď	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	034			199.05' - Fracture, 1-5 deg, rough, undulating	+ "	- Limestone	_
	201.0		NR	199.00 - Fracture, 1-5 deg, rough, undulating	Ľ	196.0-198.4' - dusky yellow with	
-	201.0			201.1-201.2' - Fracture zone, intersecting	╨	moderate brown and dusky brown,	N. Jarzyniecki begins
-			>10	fractures, open <1/4"	╁╌	(5Y 6/4 with 5YR 6/4 and 5YR 2/2),	logging at 201.0'
-				201.85' - Mechanical break, 10 deg		very fine grained, moderate HCl	_
			4	202.15, 202.65' - Fractures (2), rough,	\vdash	reaction, medium strong to strong (R3 to R4), infill along bedding or	
			+	undulating, open to 1/2"	П	subsidence planes inclined 65-80	
-	R39-NQ			202.3, 204.65' - Bedding plane, 40 deg,	┨	deg, organic material as	-
-	5 ft	54	0	rough, undulating, open to 1/2" 202.95' - Bedding plane, 10 deg, smooth to	╂┷	discontinuous, lenticular to planar	SC-9 collected at 203.5-
-	76%			rough, undulating, open to 1/4"	\perp	accumulations, 196.9-198.4' cavities to 1"x1/2" on 35% of surface, trace	204.4' -
			2	204.1' - Mechanical break	Н	recrystallized infill of cavities, trace	204.0-205.0' hard drilling
205						healed fractures	
-162.7				204.8' - Fracture, 70-80 deg, smooth, — undulating, open, organic staining	Ш	198.4-198.8' - pale brown, (5YR 5/2),	_
1 -			NR	undulating, open, organic stailing	+	 very fine grained, mild to moderate HCl reaction, medium strong to 	-
-	206.0			000 000 4 000 05 000 01 5	1	strong (R3 to R4), laminated	_
l .			>10	206-206.4, 209.05-209.9' - Fracture zone (2), organic staining, intersecting fractures, open	╨	bedding, irregular discontinuous	_
			10	<1/4"		contact at high angle, and healed	
-				206.6' - Bedding plane, 30 deg, smooth,	1—	198.8-200.3' - yellowish gray, (5Y	Chatter throughout
-			2	undulating, tight	╂┷	7/2), very fine grained, moderate to strong HCl reaction, medium strong	-
-	D40 NO			207.55' - Bedding plane, <5 deg, smooth, undulating	$-\Box$	(R3), highly fossiliferous	-
l _	R40-NQ 5 ft	37	1	207.8' - Fracture, 40-45 deg, rough, stepped,	ᅪ	(casts/molds), 20% voids related to	_
	78%	0.	١.	open to 1/2"		fossil molds and casts	
				208.8' - Fracture, 65 deg, rough, undulating,	\vdash	No Recovery 200.3-201.0' Limestone	1
210			>10	organic staining, open		201.0-204.8' - yellowish gray to	-
-167.7				_	╁╌	— dusky yellowish, (5Y 8/1 to 5Y 6/4),	_
-			NR		₽	very fine grained, weak to medium strong (R2 to R3), voids <1/16" on	-
l -	211.0				╨	15% of surface and cavities to 1/2"	
			>10	211.0-211.5' - Fracture zone, rough,	Н	on 15% of surface, organics up to	Chatter throughout R41
			-10	undulating, some organic staining, open to 1/4"	Т	10% of surface except 201.7-201.9'	
-					╨	and 204.25-204.4' which have 50% and 30% laminar organics,	-
-			0		仜	fossiliferous	-
-				212.6' - Mechanical break	╁┯	No Recovery 204.8-206.0'	_
1 -	R41-NQ 5 ft	45	3	242.4.242.EL Dodding plans (2) 340.d	片	Limestone	_
1	60%	75		213.4, 213.5' - Bedding plane (2), <10 deg, smooth, undulating, open to 1/4"	μ	206.0-209.9' - light gray from 206.0-208.1' to dusky yellow below,	
1 -				213.9' - Bedding plane, 10 deg, rough,	\Box	(N7 to 5Y 6/4), very fine grained,	
				undulating, organic staining, open to 1/4"	F	medium strong (R3), trace voids to	-
215_ -172.7			NR	_	╨	<1/16" except from 208.0-209.0'	_
1					П	voids on 30-50% of surface, fossiliferous (casts/molds)	-
Ι.	216.0				\vdash	No Recovery 209.9-211.0'	_
1						Limestone	
1 -]		1	216.45, 218.6, 218.85, 219.35, 219.45,	╨	211.0-213.1' - dusky yellow with	- T
1 -				219.6, 219.7, 220.75' - Bedding plane (7), 5-10 deg, rough, undulating, open to 1/4"	世	 yellowish gray and light gray, (5Y 6/4 with 5Y 7/2 and N7), very fine 	-
1 -			0	217.4' - Bedding plane, 25 deg, rough,	╁	grained, weak to medium strong (R2	-
1 -				undulating, open to 1/4"	╀	to R3), voids <1/16" on up to 50% of	-
1 _	R42-NQ 5 ft	73	3		Д	surface, fossiliferous, with fragments that are poorly fossiliferous with	_
1	98%	13	"		\vdash	that are poorly fossiliferous with <15% voids to <1/16"	1
1 -				218.9' - Bedding plane, rough to smooth,	T	213.1-213.5' - yellowish gray, (5Y	-
			5	planar, organic staining, open to 1/4"	╨	7/2), very fine grained, trace voids	-
220_ -177.7				_	口	<1/16", poorly fossiliferous, organic laminations throughout	-
-111.1					\top	iaminations throughout	1
1							
	I				_	1	



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-17 SHEET 13 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723025.7 N, 458007.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

				IENT : CIVIE 55 5/N 5 10025, Mud Totally, NQ 10015, HW C			ORIENTATION : Vertical
WATER	LEVELS : 2.5	ft bg	s on 4/		18/20 		
≷Q₽	CORE RUN, LENGTH, AND RECOVERY (%)			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	Ä,Ä, ANI	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A A B B B B B B B B B B B B B B B B B B	J. H.	(%) 🛭	<u> </u>	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	딩	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FFF	ORE ING	OΩ	RAC FR F	PLANARITY, INFILLING MATERIAL AND	₩ WB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	CC LE RE	ď	F F	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	2.10. 0, 1201 11200210, 2.10.
-			1	220.3' - Mechanical break -	\vdash	- 213.5-214.0' - dusky yellow with pale	-
-	221.0		NR)	-	仜	olive, (5Y 6/4 with 10YR 6/2), weak to medium strong (R2 to R3), voids	10:50 chatter at 223.0-
_			1	221.35' - Fracture, 45 deg, rough, undulating,	F	 <1/16" on up to 50% of surface, 	224.0' –
I -				open to 1/8"	Ľ	fossiliferous	_
			. 10	221.9, 223.4' - Mechanical break		No Recovery 214.0-216.0' Limestone	
1 -			>10	222.35-222.5, 222.8-222.9, 224.0-225.3' - Fracture zone (3), rough, undulating, organic	Ш	216.0-220.9' - Same as 211.0-213.1']
-	R43-NQ			staining, open to <1/8"	Н	except dusky yellow, (5Y 6/4),	1
-	5 ft	48	1	222.7' - Fracture, 85 deg, smooth, undulating, -		medium strong (R3), voids to 1/8" on up to 70% of surface, highly	-
-	86%			organic staining, open to 1/2" 223.65' - Bedding plane, <5 deg, smooth,	\vdash	fossiliferous (casts) decreasing with	-
-			>10	planar, open to 1/8"		_ depth, clasts 1/2"-3" diameter,	-
225_					\vdash	laminated organics from 219.0-219.65'	_
-182.7			>10	225.3' - Fracture zone, rough, undulating,	片	_ No Recovery 220.9-221.0'	
	226.0		NR	organic staining, intersecting fractures, open	\vdash	Limestone]
-				to <1/8"	口	221.0-222.35' - dusky yellow with yellowish gray infill, (5Y 6/4 with 5Y] 1
-			2	226.55' - Bedding plane or mechanical break,	⊣	7/2), fine grained, voids <1/16"	-
-				30 deg, rough, undulating to stepped	Ė	15-50% of surface, very fossiliferous	-
-			3	226.95' - Bedding plane, 15 deg, smooth,	H	(casts/ molds)	-
-	D			undulating, open to 1/4" 227.4' - Bedding plane, 15 deg, rough,		222.35-223.7' - dusky yellow , very pale orange and pale olive, (5Y 6/4,	00.40 11 1- 1- 1- 007.0
_	R44-NQ 5 ft	48	>10	undulating, open to 1/4"	┢	10YR 8/2 and 10Y 6/2), trace voids	SC-10 collected at 227.9- 228.8' -
	64%	10		227.8' - Bedding plane, 15 deg, rough,		<1/16", poorly fossiliferous 223.7-225.3' - Same as 216.0-220.9' 	220.0
			>10	undulating, tight 227.9' - Bedding plane, 15 deg, rough,	\vdash	except weak to medium strong (R2 to]
230				undulating, open to 1/2"		R3)	1
-187.7			NR	228.8' - Fracture zone, intersecting fractures, —	H	── No Recovery 225.3-226.0' Limestone	-
-				open to 1/4"		226.0-229.2' - Same as 216.0-220.9'	-
-	231.0			231.0-231.3, 232.1-232.4, 232.75-233.3' -	世	 No Recovery 229.2-231.0' 	-
-			>10	Fracture zone (3), rough, undulating,	Ш	Limestone	-
I -				intersecting fractures, open to 1/4"	ҥ	231.0-232.1' - Same as 216.0-220.9' except medium strong (R3),	_
			>10	231.5' - Bedding plane, 10 deg, smooth, undulating, open to 1/4"	F	laminations from 231.8'-231.9'	
			> 10	231.55, 231.66' - Fractures (2), 60 deg,	╨	232.1-233.3' - pale olive, (10Y 6/2),	1
-	R45-NQ		>10	smooth, undulating, open to 1/4"	仜	 fine grained, very weak to weak (R1 to R2), voids <1/16" on 50% of 	1
-	5 ft 46%	10		231.75' - Mechanical break 232.5' - Fracture, 60 deg, smooth, undulating,	t	surface, very fossiliferous	
-	4070			open to 1/4"	F	No Recovery 233.3-236.0'	-
-			NR	-	世	-	-
235 <u>-</u> 192.7			' '	_	$oldsymbol{oldsymbol{\sqcup}}$	_	-
-182.7				-	口	_	_
	236.0			_	\vdash]
				000 05 007 01 5	片	Limestone]
-			>10	236.35-237.9' - Fracture zone, some organic staining, intersecting fractures, open to 1/4"	\vdash	 236.0-237.9' - Same as 232.1-233.3' except pale olive to dusky yellow and] 1
-				taining, intersecting nactures, open to 1/4	口	light gray, (10Y 6/2 to 5Y 6/4, and	1
-			>10	-	╁	- N7), very weak to medium strong (R1	-
-	R46-NQ			-	广	to R3), trace organics and voids <a> <1/16", poorly fossiliferous, light gray	-
-	5 ft	0		-	╀	 laminations at 236.75-237.1' and 	-
_	38%			_	口	237.8-237.85'	_
			NR		\vdash	No Recovery 237.9-241.0'	
240			``"`		F]
-197.7					片		
					1		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-17	SHEET	14	OF	14	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723025.7 N, 458007.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

00111110	, WETTIOD 7 II	10 0	2011 11	TENT . CIVIE 33 3/N 3 10023, ITIUU TOLATY, NQ LOOIS, HW C	asirig		ORIENTATION : Vertical
WATER	LEVELS : 2.5	ft bgs	s on 4/	/10/07 START : 4/9/2007 END : 4/	18/20	07 LOGGER : A. Teal, N. Jarzynieck	
>	ا ج			DISCONTINUITIES	_(J)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표공은	L, A CIN	(%	쑮		일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
±ĕ.ĕ.	# # F S S S S S S S S S S S S S S S S S	(%) Q	PS	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	IBO	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
		S S	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	λ×	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	034				0,		-
-	241.0			_	Ľ	_	1
-	241.0			241.0-241.65, 244.4-244.75' - Fracture zone	ш	Limestone	1 1
-			>10	(2), open to 1/4", intersecting fractures	\vdash	 241.0-241.65' - Same as 	1 -
-				241.9' 243.9' - Bedding plane or mechanical		236.0-237.9' except no laminations	1 -
I _			1	break (2), 10 deg, rough, undulating, tight	Н	241.65-243.6' - Same as - 216.0-220.9']
1			'	242.4' - Fracture, 60 deg, rough, undulating,	ш	210.0 220.0	1
-	R47-NQ			tight 243.1' - Bedding plane or mechanical break,	1—	_	1 1
-	5 ft	53	5	10 deg, rough, undulating, open to 1/4"		243.6-245.0' - pale olive, (10Y 6/2),	1 1
-	80%			243.4, 243.6' - Bedding plane (2), 10-15 deg,	╨	very fine grained, weak (R2), poorly	1 -1
-			>10	rough, undulating, open to 1/4"		_ fossiliferous	1 -
245_				243.8' - Bedding plane or mechanical break, 30 deg, rough, undulating, tight —	厂	_	
-202.7			ND	55 deg, rough, undulating, tight	\vdash	No Recovery 245.0-246.0'	
	246.0		NR	-	Ш	-] 1
-	240.0			246.0-246.4, 246.5-246.7, 247.6-247.7' -	Н	_ Limestone	14:38 end drilling
-			>10	Fracture zone (3), intersecting fractures,		- 246.0-247.7' - Same as 243.6-245.0'	Note: 4/19/07 grouted hole,
-				open to 1/8"	₽	_	used 59 bags quickcrete, 1
I _			10		口	_	bag hole plug
1					\vdash	No Recovery 247.7-251.0'	1
-	R48-NQ			-			1 1
-	5 ft	13		-	╙	-	1 1
-	34%			-	┢	_	1 -
l -			NR			-	1 -
250_					\vdash		
-207.7					ш		1
-	251.0			-	Н	_	1 1
-	201.0				Г	Bottom of Boring at 251.0 ft bgs on	1
-				-	1	- 4/18/2007	1
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l -				_		-	
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PROJECT NUMBER:	BORING NUMBER:					
338884.FI	A-18	SHEET	1	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722986.9 N, 458047.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: R. Woodard, P. Buchler

WATER	LEVELS	: 2.0 ft bo	s on 3/25	5/07	START : 2/24/2007 END : 3/8/2007	LOGGER	: R.	Gomez, C. LeBlanc
				STANDARD	SOIL DESCRIPTION		Ŋ	COMMENTS
AND Z (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS) LOC	
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOF MOISTURE CONTENT, RELATIVE DENSITY O		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
H THE			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALO		YMB	INSTRUMENTATION
42.3				(N)			S	
-						-		-
-						-		Water level is based on Ground Water
-						-		Monitoring at LNP site (FSAR Table - 2.4.12.08)
-						-		Soil relogged by J. Schaffer
-								Rock relogged by C. Dougherty Water levels in boring not recorded
-	3.5					-		_
-					Silty Sand (SM)	loone /	Ш	_
		0.4	SS-1	2-2-1 (3)	3.5-3.9' - grayish orange, (10YR 7/4), wet, very l no HCl reaction, fine silica sand, 25% nonplastic	c fines		
5 37.3	5.0			(0)				
37.3								_
_						_		_
-						_		_
-						_		-
-						_		-
-						-		-
_	8.5				Clayey Sand (SC)			-
-		0.9	SS-2	2-2-3	8.5-9.4' - light bluish gray, (5B 7/1), wet, loose, r reaction, fine silica sand, 40% medium plastic fi	no HCI -		-
10	10.0	0.0	002	(5)	reaction, fine sinca sand, 40 % medium plastic in	iles	,,,,	-
32.3	10.0					_		_
-								_
_								_
-						_		_
_	13.5				Clayey Sand (SC)		7777	_
-			00.0	3-3-5	13.5-14.1' - Same as 8.5-9.4'			-
		1.1	SS-3	(8)	Poorly Graded Sand (SP) 14.1-14.6' - white to very light gray, (N9 to N8), very light gray.	wet /		-
15 <u></u> 27.3	15.0				\loose, no HCl reaction, fine silica sand, trace			\vdash
-					\nonplastic fines, trace black minerals	/ -		-
-						-		-
-						-		1
1 -]
						1		
	18.5							
_				0-0-0	No Recovery 18.5-20.0'	_		
-		0.0	SS-4	(0)		_		
20	20.0							



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-18	SHEET	2	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722986.9 N, 458047.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: R. Woodard, P. Buchler

WATER	LEVELS	: 2.0 ft bo	s on 3/25	5/07 S	START : 2/24/2007 END : 3/8/2007 LOG	GER	: R.	Gomez, C. LeBlanc
				STANDARD	SOIL DESCRIPTION		g	COMMENTS
LOW AND N (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS			CO	DEPTH OF CACING TOWN
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
FPT FYA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		YMB	INSTRUMENTATION
22.3				(N)		\dashv	S	
-						-		-
-						-		-
-						-		-
-						-		-
-						1		-
	23.5							
				0.00	Fat Clay (CH) 23.5-24.2' - light to medium light gray, (N7 to N6), we	,]		
_		1.5	SS-5	0-0-0 (0)	very soft, high plasticity, no dilatancy, no HCl reaction	ı̈_/_		_
25_ 17.3	25.0			. ,	Sandy Lean Clay (CL) 24.2-25.0' - very light to light gray, (N8 to N7), wet,	_		_
17.3					very soft, medium plasticity, no to slow dilatancy, no HCl reaction, 41% fine silica sand	/-		-
-					(HC) reaction, 41% line sliica sand	┚┨		-
-						-		-
-						4		-
-						-		-
_	28.5					-		-
-	28.9	0.4	SS-6	50/5	Silt With Sand (ML)		Ш	-
-				\ (50/5") <i>/</i>	28.5-28.9' - grayish orange, (10YR 7/4), moist to wet, hard, nonplastic, very rapid dilatancy, mild to	· /1		_
30					moderate HCI reaction, 20% fine to medium sand, trace organics in laminar lenses, all carbonate			
12.3					li ace organics in familiar lenses, all carbonate	_		Change from 3-1/2" drag bit to 3-3/8" tricone roller bit at 30.0'
-						4		-
_						-		-
-						-		-
-						-		-
-	33.5					-		-
-	33.3				Sandy Silt (ML)		Ш	-
-		1.5	SS-7	17-29-65 (94)	33.5-35.0' - Same as 28.5-29.0' except moderate yellowish brown, (10YR 5/4), moist, rapid dilatancy,	1		_
35	35.0			(34)	25-30% fine to medium sand, all carbonate			_
7.3								
_						4		_
_						-		-
-						-		-
-						-		-
-	20.5					-		Grinding at 38.0'
-	38.5 38.7	0.2	SS-8	50/2.5	_ Limestone Fragments			
-				(50/2.5")	\\\\ 38.5-38.7' - moderate to strong HCl reaction, coarse \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	/		-
40					(2			-
1						I		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-18	SHEET	3	OF	11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722986.9 N, 458047.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: R. Woodard, P. Buchler

WATER	LEVELS	: 2.0 ft bo	gs on 3/2	5/07 S	START : 2/24/2007 END : 3/8/2007 LOGGEF	R : R	. Gomez, C. LeBlanc
				STANDARD	SOIL DESCRIPTION	U	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COLL NAME TIGOG ODOLID OVARDOL COLLOD	SYMBOLIC LOG	DEDTIL OF CACING DRILLING DATE
ACE ATIO		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	SOLIC SOLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
EPT! URF, LEV#			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	YME	INSTRUMENTATION
<u>о</u> мш				(N)		0)	Moderate grinding
-					-	1	-
-					-	ł	-
-					-	1	1
-					-	1	1
-					-	1	Driller's Remark: Clay, softer
_	43.5						1
-					Silt With Sand (ML) 43.5-44.1' - medium dark gray, (N4), moist to wet,	Ш	1
		0.6	SS-9	7-9-61 (70)	hard, nonplastic to low plasticity, rapid dilatancy,	T	1
45	45.0			(. 0)	moderate HCl reaction, 25% fine to medium silica sand, trace organics, all carbonate, organics in SS-9		
-2.7					appear to be grass		Set HW casing to 30.0'
_					-	-	1
-					-	ł	-
_					-	┨	-
-					-	ł	-
-	40.5				-	┨	1
-	48.5				Silt With Sand (ML)	H	d
-		1.3	SS-10	14-38-43	48.5-49.0' - Same as 43.5-44.1'	╢	1
50	50.0		00 .0	(81)	49.0-49.8' - dark yellowish brown, (10YR 4/2), wet, hard, nonplastic, rapid dilatancy, mild to moderate	Ш	4
-7.7	30.0				hard, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 43% fine to coarse sand, 3/8" thick	1	1
-					clayey seams, all carbonate	1	1
]
					_		
_					<u>-</u>		_
-					-	-	
-	53.5	0.4	SS-11	50/5	Sandy Silt (ML)	╁	
-	53.9	0.4	33-11	(50/5")	↑ 53.5-53.85' - Same as 48.5-49.8' except trace	╫	<u> </u>
					organics	\mathbf{I}	1
55 <u> </u>					-	ł	Trip out 3" casing
-					-	1	'
-					-	1	1
-					-	1	1
-					-	1	1
					-	1	1
	58.5 58.8					<u> </u>	
_	58.8	0.2	SS-12	50/4 (50/4") /	ή Γ-	Н	ή
_				(==, ,)	-	1]
60						┡	_
		1	l			_	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-18	SHEET	4	OF	11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722986.9 N, 458047.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: R. Woodard, P. Buchler

WATER	LEVELS	: 2.0 ft bo	gs on 3/2	5/07 5	START : 2/24/2007 END : 3/8/2007 LOGGER : R. Gomez, C. LeBlanc
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
SCE,		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTF JRFA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
-17.7				(N)	Silt With Sand (ML) Circulation loss at 60.0'
-17.7					\58.5-58.7' - moderate yellowish brown. (10YR 5/4).
-					wet, hard, nonplastic, rapid dilatancy, mild HCl reaction, 15% fine to medium sand, 10% organics in
-					laminar beds
_					
-					
-					
_	63.5 63.8	0.3	SS-13	50/4	Silt With Sand (ML)
-		<u> </u>	00 .0	(50/4")	│ 63.5-63.8' - moderate yellowish brown to dark │ - │ │ │
-					\ yellowish brown, (10YŘ 5/4 to 10YR 4/2), moist, hard, \ _ nonplastic, rapid dilatancy, moderate HCl reaction, \
65 <u> </u>					24% fine to medium sand, all carbonate
-					Driller's Remark: Hard drilling at 65.5'
-					
-					
_					
-					
_	68.5				
-	68.8	0.2	SS-14	50/3	Silt (ML)
-				(50/3")	\ 68.5`68.65' - Same as 63.5-63.8' except 10-15% -
70					lenticular shapes
-27. 7					
_					1 1
_					1 1
_					1 1
-					1
_					1 l
_	73.5				1
	73.5 73.7	0.0	SS-15	50/2 (50/2")	No Recovery 73.5-73.7'
				(50/2")	1
75 <u> </u>					_]
-32.7					
] [
] [
] [
	78.5				
				E0 E0 00	<u>_</u>
		1.2	SS-16	53-50-39 (89)	_
80	80.0				<u></u>



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-18	SHEET	5	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722986.9 N, 458047.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: R. Woodard, P. Buchler

WATER	LEVELS	: 2.0 ft b	gs on 3/25	5/07 S	START : 2/24/2007	
				STANDARD	SOIL DESCRIPTION 5 COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		
ACE ATIO		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND	
EPTI URF, LEV/			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
<u>-37.7</u>				(14)	Silty Sand With Gravel (SM)	\dashv
-					78.5-79.7 - moderate yellowish brown, (10YR 5/4), wet, very dense, mild to moderate HCl reaction, fine	-
-					to coarse carbonate sand, 20% nonplastic fines,	-
-					35-40% fine to coarse gravel-sized limestone	-
-					1 1	1
-					1	- 1
-	83.5				1	
-					Silty Sand With Gravel (SM) 83.5-84.8' - Same as 78.5-79.7' except black organics	
		1.3	SS-17	15-11-34 (45)	in laminar beds from 84.6-84.8'	
85	85.0			(10)		
-42.7]	
l _					<u> </u>	
_					<u> </u>	
_					- LIM assistant and a GO OL and NIM assistant	_
_	88.5			22 52/4	HW casing set to 30.0', set NW casing to 55.0'	_
_	89.3	0.6	SS-18	22-52/4 (74/10")	88.5-89.1' - Same as 83.5-84.8'	-
-	00.0			(' ' ' '	Begin Rock Coring at 88.5 ft bgs	
-					See the next sheet for the rock core log	-
-						-
90 <u> </u>						\dashv
-					1 1	-
-					1 1	-
-					1 1	-
-					1	
-					1	
]	
_					<u> </u>	_
95						
-52.7						4
_					1 1	_
_						_
-						-
-					1 1	-
-					1 1	-
-					1 1	-
-					1 1	-
100					1 1	┪
100					1	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-18 SHEET 6 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722986.9 N, 458047.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: R. Woodard, P. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, NW/HW casing

CORING	METHOD A	ND E	JUIPN	MENT: CME 55 S/N 316625, mud rotary, NQ tools, NW/F	IVV ca	sing	ORIENTATION : Vertical
WATER	LEVELS : 2.0	ft bg	s on 3	/25/07 START : 2/24/2007 END : 3/	8/200	7 LOGGER : R. Gomez, C. LeBland	<u> </u>
				DISCONTINUITIES	T	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		m	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE OOLOD	
HH HO	N. 4. 5	(9)	FRACTURES PER FOOT	BEOOK!! HOW	윽	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
F F F F	OVE STA	(%) 🛭	FS	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOI	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
925		S O	RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ιž	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
- 00 ш	88.5	ш	шш		0)		Care win DO NO advanced
l _	00.5		1	88.7' - Fracture, horizontal, rough, undulating	╨	Limestone - 88.5-90.0' - dusky yellow, (5Y 6/4),	Core run R0-NQ advanced 88.5-91.0' to set 5-feet -
	R0-NQ		·		ш	fine grained, moderate to strong HCI	stroke for remainder of
90	2.5 ft	47	1	00.01.5.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.	\vdash	reaction, weak to medium strong (R2	borehole
-47.7	60%			89.8' - Fracture, horizontal, rough, undulating, — break is along plan of 1-3/16" clam shell		— to R3), 80% coverage of 1/16" voids on surface, few larger 3/16" voids	SC-1 collected at 89.1- — 89.8'
-			NR	fossil	₩	near lower end of run, moderately	R0: 4 minutes
-	91.0				厂	 fossiliferous (casts), lignite disk 1/8" 	2/25/08 08:00 Begin
-			1		╁	thick, silty matrix when grains broken	inserting NQ rods
l _				91.7' - Fracture, 25 deg, rough, undulating,		down - No Recovery 90.0-91.0'	
				3/16" open, semi-tight	\vdash	Limestone	
I -			1		\perp	91.0-96.0' - Same as 88.7-89.0'] 1
-	R1-NQ			92.8' - Fracture, horizontal, smooth, undulating, open	╆	 except more abundant cavities (up to 9/16") from 93.5-94.5', cavities 	
-	- 5 ft 7			undulating, open	广	appear to be fossil molds, some	
-	100%			04.01 Fractures 20.50 des multiple	\vdash	small (1/16"x1/8") fragments of dark	Drillor's Remarks Lass of
l -			>10	94.0' - Fractures, 30-50 deg, multiple fractures	口	organic material from 94.5-96.0'	Driller's Remark: Loss of circulation between 94.0-
95_					\vdash		96.0'
-52.7				_	世		R1: 14 minutes
-	96.0		2	95.4' - Fractures (2), 45 deg, almost	╨	-	-
-	96.0			perpendicular, one is smooth and undulating with some dark staining, other is rough and	世	Limestone	-
-			>10	undulating with no staining	╁	96.0-97.3' - yellowish gray with pale	-
-	-		> 10	96.0-97.3' - Fractures, 0-90 deg, rough,	┴┴	olive (20%), (5Y 7/2 with 10 6/2), fine	-
l -			>10	undulating, slightly weathered, 3/16" relief, open	╨	grained, moderate to strong HCl - reaction, weak (R2), 50-60%	_
l _				Орен	Ш	coverage of 1/16" voids on surface,	
	R2-NQ				Н	areas with voids mix irregularly with	
-	5 ft 26%	0			Ľ	 areas without voids, moderately fossiliferous, few voids >1/16" 	1
-	20,0		NR		╨	No Recovery 97.3-101.0'	-
					仜	-	-
100 <u></u> -57.7				_	╁		R2: 7 minutes
", -					岸	-	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
l -	101.0			l	╨		
			>10	101.0-102.8' - Fractures, 0-45 deg, rough, undulating, up to 3/16" relief, open, one 2"	Т	Limestone - 101.0-102.0' - Same as 96.0-97.3'	
Ι -			10	fragment shows coring marks in two different	\vdash	except up to 20% voids, 6-7]
-			\10	directions (at 101.9'), fracture at 102.1' is		gastropod casts up to 3/16"	Driller's Remark: Low
-			>10	moderately tight and 30% rough and	╨	 102.0-102.3' - dusky yellow, (5Y 6/4), fine grained, moderate to strong HCl 	recovery possibly from
-	R3-NQ			undulating	口	reaction, weak (R2), 85% coverage	losing inner core from broken pieces during
-	5 ft	17			╀	of 1/16" voids on surface	drilling actions -
-	36%				\vdash	102.3-102.8' - light olive gray, (5Y	Drilling head appears loose
Ι -			NR		╨	5/2), fine grained, moderate to strong HCI reaction, 30% coverage of 1/16"	during coring causing an eccentric advancement.
105						voids on surface	breaking up rock
-62.7				_	\vdash	No Recovery 102.8-106.0'	R3: 11 minutes
-	106.0				⇇	<u> </u>	1
-	106.0				╨	-	
-			>10	106.3-107.0' - Fractures, 0-60 deg, rough,	厂	-	-
-			undulating, fragments range from 3/16" to 1-1/2", open	╀	-	-	
-			5	107.0-107.4' - Fracture, vertical, rough,	F	<u>-</u>	
			Ľ	undulating, tight	$oldsymbol{oldsymbol{arphi}}$		
	R4-NQ				П]
					1		
1					1		
							-



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-18	SHEET	7	OF	11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722986.9 N, 458047.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: R. Woodard, P. Buchler

CORING	METHOD A	ND E	QUIPM	IENT : CME 55 S/N 316625, mud rotary, NQ tools, NW/F	lW cas	sing	ORIENTATION : Vertical							
WATER	LEVELS : 2.0	ft bg:	s on 3/	25/07 START: 2/24/2007 END: 3/	8/2007	7 LOGGER : R. Gomez, C. LeBland								
≥ ∩ ⊕	_ ;;			DISCONTINUITIES] ي	LITHOLOGY	COMMENTS							
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.							
	5 ft 100%	35	2	107.4, 107.7, 107.8, 107.10' - Fractures (4),	Ш	Limestone								
110	100 %		2	0-20 deg, rough, undulating, open 108.3' - Fracture, 10 deg, rough, undulating, open up to 3/16"	Ħ	- 106.0-111.0' - yellowish gray, (5Y 7/2), fine grained, moderate to strong HCI reaction, weak (R2), 90%	-							
-67. 7	111.0		2	108.8' - Fracture, 60 deg, rough, undulating, — tight 109.2' - Fracture, 45 deg, rough, undulating, open up to 1/16"		 coverage of 1/16" voids on surface, <5% coverage of 3/16" fossil molds on surface, particularly in top half of section, some very small fragments 	R4: 10 minutes							
-			1	109.7' - Fracture, 10 deg, rough, undulating, open 110.6' - Fracture, 65 deg, rough, undulating,		of organic material below 110.0' 111.0-116.0' - Same as 106.0-111.0' except mild to moderate HCl	SC-2 collected at 111.55-							
-			3	tight 110.8' - Fracture, 10 deg, rough, undulating, open to 1/16"	H	reaction, moderately fossiliferous from 112.0-114.0', 1/16" voids-molds	112.35'							
-	R5-NQ 5 ft 100%	75	2	111.2' - Fracture, 45 deg, smooth, undulating, dark staining on 60% 112.5, 112.7, 112.8' - Fractures (3), 0-45 deg,		- - -	-							
115	115_72.7		0	rough, undulating, open 113.2, 113.9' - Fractures (2), horizontal, rough, undulating, 3/16" relief, open	Ħ	_								
-72.7			2	113.8' - Mechanical break 115.2' - Fracture, horizontal, rough, undulating, open		-	R5: Run time not recorded -							
-			2	115.7' - Mechanical break, rounded ends 116.4' - Fracture, 60 deg, rough, undulating, tight to 1/16" open		Limestone - 116.0-118.0' - Same as 111.0-116.0'	- -							
-	De NO									1	116.9' - Fracture, 5 deg, smooth, undulating, open 117.8' - Fracture or mechanical break, 5 deg,	H	_ 118.0-121.0' - light olive gray, (5Y	- -
-	R6-NQ 5 ft 100%	68	4	rough, undulating, tight to open 1/16" 118.1, 118.9' - Fractures (2), horizontal, smooth, undulating, dark staining, open		HCI reaction, weak (R2), fine grain, 50-60% coverage of 1/16" voids on	-							
120 -77.7			1	118.3, 118.5' - Fractures or mechanical break (2), 10 deg and 20 deg, rough, undulating, tight		- surface, few larger voids <1/16", voids are fossil casts								
-	121.0		3	119.7' - Fracture or mechanical break, 10 deg, rough, undulating, tight to open 1/16" 120.1-120.4' - Fractures, 0-45 deg, dark	目	_ _ Limestone	SC-3 collected at 121.0-							
-			1	staining at 120.4', open 121.9' - Fracture, horizontal, rough,		- 121.0-121.9' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, <30% coverage of <1/16"	121.9' -							
-	₽7₋NO		>10	undulating, rounded surface, open 122.0-122.4' - Fractures, 0-90 deg, rough, undulating, open		voids on surface, poorly fossiliferous 121.9-122.5' - yellowish gray, (5Y 7/2), fine grained, strong HCl	increased with loss of circulation, possibly a void or unconsolidated sands							
- - 125 -82.7	7.NQ 5 ft 40% 40% 40% 40% 40%	18	NR	122.7' - Fracture or mechanical break, 20 deg, rough, undulating, open to 1/16"		 reaction, very weak to weak (R1 to R2), 85% coverage of <1/16" voids on surface, remainder is larger 3/8" cavities, moderately fossiliferous, grades into below 122.5-123.0' - light olive gray, (5Y 	Lack of recovery may have occurred from 122.0-125.0' based upon a drop in the drilling head that stopped at 125.0' followed by hard drilling							
-	126.0			-		5/2), fine grained, mild to moderate HCI reaction, weak (R2), 90% coverage of 1/16" voids on surface, moderately foods.	Core barrel having trouble pulling out of casing Inner/outer core barrels							
-			4	126.3-126.5' - Fractures, 0-45 deg, open, fragments up to 1-1/2" 126.6' - Fracture, horizontal, rough,		moderately fossiliferous No Recovery 123.0-126.0'	lodged in borehole R7: Run time not recorded -							
-	R8-NQ		>10	undulating, relief 3/16" open	Ħ	- -	-							
			- 10		Ħ									



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-18 SHEET 8 OF 11

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722986.9 N, 458047.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: R. Woodard, P. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, NW/HW casing

WATER	LEVELS : 2.0	ft bgs	s on 3/	25/07 START : 2/24/2007 END : 3/	8/200	7 LOGGER : R. Gomez, C. LeBland	
≳ O ⊋	(%			DISCONTINUITIES	၂ ဗ္ဂ	LITHOLOGY	COMMENTS
BELO CE ANI TION (f	RUN, H, AND ERY (9	(%	JRES	DESCRIPTION		ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
_	5 ft 66%	40	NR	126.9' - Fracture or mechanical break, horizontal, rough, undulating, tight to 1/16"	H	Limestone - 126.0-126.9' - light olive gray, (5Y	After substantial downtime due to casing/core barrel
- 130			2	open 127.9' - Fracture, horizontal, rough,	Ħ	5/2), mild to moderate HCl reaction, weak (R2), 75% coverage of 1/16"	lock, the borehole has been reamed inside HW
-87.7			NR	undulating, open to 3/8" — 128.1-128.5' - Fracture zone, 0-90 deg, open, fragments up to 1-1/2"	Ħ	 voids on surface, <5% coverage of larger voids (up to 3/16") on surface, moderately fossiliferous 	casing with 3-7/8" tricone — bit to 126.0', HW casing spun to 126.0' (NQ is at
-	131.0		0	129.1' - Fracture, horizontal, rough, undulating, open, thin layer of carbonate	H	 126.9-128.5' - dusky yellow, (5Y 6/4), moderate to strong HCl reaction, 	126.0' also)
_			NR >10	derived silt face 129.8' - Fracture, horizontal, rough,		very weak to weak (R1 to R2), 90% coverage of 1/16" voids on surface,	C. LeBlanc begins logging Driller's Remark: Soft
-			>10	undulating, open 131.2-131.7' - Fracture zone, 0-70 deg,	H	poorly fossiliferous No Recovery 128.5-129.1'	drilling at 128.5' Driller's Remark: Soft
-	R9-NQ	40	NR	rough, undulating, open 132.1' - Mechanical break	E	Limestone 129.1-129.8' - light olive gray, (5Y	drilling below 130.0' R8: 9 minutes
_	5 ft 53%	40	>10	132.7' - Fracture, 60 deg, rough, undulating 133.6' - Fracture, horizontal, smooth,		5/2), moderate HCl reaction, weak (R2), 85% coverage of 1/16" voids	No recovery intervals at 131.2-131.5' and 132.7-
- 135			0	undulating, open, film of carbonate derived silt infill 133.9' - Mechanical break	H	on surface, few larger (up to 1/8") at 129.1-129.3' — No Recovery 129.8-131.0'	133.6' based on drilling rate Driller's Remark: Soft
-92.7			NR	133.9 - Mechanical Dreak	H	Limestone 131.0-131.2' - dusky yellow, (5Y 6/4),	drilling Driller's Remark: Soft
_	136.0		3	120 2 420 F 420 CL Frankling (2)		moderate HCl reaction, very weak to weak (R1 to R2), 90% coverage of	drilling R9: 7 minutes
_			NR	136.2, 136.5, 136.6' - Fractures (3), horizontal, rough, undulating, open	上	1/16" voids on surface No Recovery 131.2-131.5'	
-			2	137.4' - Fracture, horizontal, smooth, planar	H	Limestone 131.5-132.7' - Same as 131.0-131.2'	
_	R10-NQ 5 ft	10	3_	to stepped, open 137.9' - Fracture, 5 deg, rough, undulating,	Ħ	No Recovery 132.7-133.6' Limestone 133.6-134.7' - Same as 131.0-131.2'	
_	30%	10		dark staining, open up to 1/16" 138' - Fracture, 45 deg, smooth, undulating, dark staining, open up to 3/16"		except with fossil molds and casts up to 3/8" over <5% of surface	
140			NR	138.1, 138.9' - Fractures (2), horizontal, rough, undulating, open	抻	No Recovery 134.7-136.0' Limestone	
-97. 7 -					H	136.0-136.6' - Same as 131.0-131.2' except more abundant larger voids	R10: 6 minutes
_	141.0			141.0-141.8' - Fracture zone, 0-75 deg, black	Ħ	(1/16"-3/16"), moderately fossiliferous	
_			>10	staining on some surfaces, open	É	- No Recovery 136.6-137.4' Limestone	
-			0		F	137.4-138.2' - yellowish gray and light olive gray, (5Y 7/2 and 5Y 5/2), moderate to strong HCl reaction,	
_	R11-NQ 5 ft	13			F	medium strong to strong (R3 to R4), laminated layers, laminations are at	
_	30%	.0	NR		H	angle of 10 deg, some have 1/16" voids, otherwise small voids are	
145			IVIX		E	 limited to a few small areas, few fossil molds 	-
-102 .7					H	No Recovery 138.2-141.0' Limestone	R11: 3 minutes
-	146.0			146.0-146.9' - Fracture zone, 0-60 deg,	Ħ	141.0-141.2' - Same as 138.9-139.0' 141.2-141.8' - dusky yellow, (5Y 6/4), moderate to strong HCl reaction,	
_			>10	rough, undulating		weak (R2), 85% coverage of 1/16" voids on surface	
_			3	147.2, 147.4, 147.8' - Fractures (3), horizontal, rough, undulating, black staining,		-	
_	R12-NQ			open, faces don't match	巨	-	

APPENDIX 2BB-212 Rev. 7



PROJECT NUMBER:

33884.FL BORING NUMBER:

A-18 SHEET 9 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722986.9 N, 458047.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: R. Woodard, P. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, NW/HW casing

COMINC	METHODA	VD L	ZOII IV	IENT: CME 55 S/N 316625, mud rotary, NQ tools, NW/F	IVV Ca	sii ig	ORIENTATION : Vertical
WATER	LEVELS: 2.0	ft bg	s on 3	25/07 START : 2/24/2007 END : 3/	8/200	7 LOGGER : R. Gomez, C. LeBland	
				DISCONTINUITIES	(2)	LITHOLOGY	COMMENTS
≷9€	_(%)		· ·		LOG		
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	↓ □	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
1 H H H H	S F A	(%) 🛛	[<u>2</u> 8	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
E E E S	#\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	Ω Ω	AC_ R F	PLANARITY, INFILLING MATERIAL AND	₩	AND ROCK MASS	SMOOTHNESS, CAVING ROD
SCE	SEES	S.	FR.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
<u> </u>	5 ft	18	3	148.2' - Fracture or mechanical break, 25		141.8-142.5' - yellowish gray, (5Y	
I _	66%			deg, rough, undulating, tight to open 3/16"	Н	- 7/2), moderate HCl reaction, weak	
1			0	148.3' - Fracture, 25 deg, smooth, undulating,		(R2), 80% coverage of 1/16" voids	
450				open	1—1	on surface, fossil molds (3/16") from	
150_			ND	148.6' - Fracture or mechanical break, 45	₽₩	— 141.8-142.1', layer without voids from	
-107.7			NR	deg, rough, undulating, tight to 3/8" open	Ш	142.3-142.5'	R12: 13 minutes
-	1510					No Recovery 142.5-146.0'	
-	151.0				ш	- Limestone	
l _			1		\mathbb{H}	146.0-146.9' - yellowish gray, (5Y	
			'		Н	7/2), fine grained, moderate to strong	
-				151.8' - Fracture, 10 deg, rough, undulating,		- HCl reaction, weak (R2), 75%	·
I -			2	open		coverage of <1/16" voids on surface,	
1				152.1' - Fracture or mechanical break, 10	$\vdash \vdash$	larger voids (up to 9/16") over 10% of surface	1
1 -	R13-NQ			deg, rough, planar, tight to open up to 3/16" 152.8' - Fracture, horizontal, rough,	1 + 1	– surrace 146.9-149.3' - light olive gray, (5Y	
I -	5 ft	71	1	undulating, open up to 3/16"		5/2), mild to moderate HCl reaction,	·
I _	82%			153.3' - Fracture, horizontal, rough,	Ш	medium strong (R3), <5% coverage]
I -				undulating, dark staining on lower face, open	\square	of 1/16" voids on surface, most being	l '
I			2	154.1' - Mechanical break	╂╨┤	below 148.5', few larger <3/16" voids	·
155_			لـــِــا	154.6' - Fracture, horizontal, rough,	\Box	(fossil molds) below 148.5'	
-112.7			0	undulating, open to 3/16"		No Recovery 149.3-151.0'	R13: 12 minutes
-	4=0.0		NR	-	ш	Limestone	•
-	156.0				+	_ 151.0-155.1' - dusky yellow to light	
			2		Н	olive gray, (5Y 6/4 to 5Y 5/2), fine	
I -				450.75 450.05L 5/ (0) L : (:		grained, moderate HCl reaction,]
-				156.75, 156.85' - Fractures (2), horizontal,		weak (R2), 90% coverage of 1/16"	<u>-</u>
I -			>10	rough, undulating, open	Ш	voids on surface to 154.2', then only over 40% of surface, cavities (fossil	
			' '	157.2-157.9' - Fracture zone, horizontal, rough, undulating, every 0.05-0.1' is a	H	molds) up to 3/8" up to 5% of surface	1
1 -	R14-NQ			fracture, open to 3/16", rock fragments from		throughout interval	·
-	5 ft	50	4	157.6-157.8'	Ш	No Recovery 155.1-156.0'	
1	90%	-		158.2, 158.7, 158.9, 159.1' - Fractures (4),	\vdash	Limestone	1
1 -				horizontal, rough, undulating, olive brown	\mathbb{H}	156.0-158.1' - yellowish gray, (5Y]
-			3	staining on face at 158.7', open, faces do not		 7/2), fine grained, moderate HCl 	·
160				match		reaction, weak (R2), 60% coverage	
-117.7			1	159.2, 159.9, 160.0' - Fractures (3),	Ш	of 1/16" voids on surface, most are	R14: 14 minutes
-			NR	horizontal, rough, undulating, rounded at	+	present from 156.5-157.0' and	·
I -	161.0		INK	159.2', faces match poorly	╂╫	157.4-158.1'	
						158.1-158.9' - light olive gray, (5Y	1
-			0		\Box	- 5/2), fine grained, moderate HCl	
-			_	162.0, 162.3' - Fractures (2), horizontal and	╂┴┤	reaction, weak (R2), laminated with dusky yellow 5Y 6/4, laminations are	
I _			4	162.0, 162.3 - Fractures (2), norizontal and 10 deg, undulating, black staining on lower	\mathbb{H}	- irregular and uneven, <1/16" voids]
Ι -			+	face at 162.0', rough at 162.3', smooth at		present along laminations	l '
I -	R15-NQ		4	162.6', faces poorly match	Ш	158.9-160.5' - light olive gray, (5Y	·
l -	5 ft		\vdash	162.7' - Fracture, 5 deg, planar, coarse	H	- 5/2), fine grained, moderate HCl]
1	46%	_0		grained bedding plane	H	reaction, weak (R2), <1/16" voids,	1
I -				163.0' - Fracture, horizontal, rough, planar,	17	few fossil molds (up to 3/16")	·
I -			ND	open		No Recovery 160.5-161.0'	
165			NR	163.0-163.3' - Fractures, horizontal, rough,	Ш	Limestone	1
-122.7				dark staining on upper face at 163.2', planar	1	161.0-162.0' - Same as 158.9-160.5'	R15: 5 minutes
I -				to undulating, faces match poorly	+	except 20% coverage of <1/16" voids	·
I _	166.0			163.7' - Fracture or mechanical break,		on surface, larger voids (3/16"), fossil]
				horizontal, rough, undulating, tight to 3/16"		molds also visible	l
I -			3	open	ш	_ 162.0-163.3' - dusky yellow, (5Y 6/4),	·
I -				166.1, 166.4, 166.8' - Fractures (3),	H	fine grained, moderate to strong HCI reaction, weak (R2), 95% coverage	
			ا مر ا	horizontal, rough, undulating, faces match	Н	of <1/16" voids on surface, cavities	1
I -			>10	poorly, open up to 3/8"		(up to 3/16") on remaining 5%]
-	D		<u> </u>		\Box	No Recovery 163.3-166.0'	
	R16-NQ				Ш		
					П		
							1
							I



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-18 SHEET 10 OF 11

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1722986.9 N, 458047.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: R. Woodard, P. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, NW/HW casing

				12141 : CIVIC 33 3/14 3 10023, Mud Totally, 14Q 10013, 1447/			ORIENTATION: Vertical
WATER	LEVELS : 2.0	ft bg	s on 3		8/200	·	
>	<u> </u>			DISCONTINUITIES	O	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표공한	ER'A	(%	FRACTURES PER FOOT		<u>-</u>	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
±Ã.∀	GTE S	(%) Q	CT.	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING RATE AND
955		A Q	RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ПОП					0)		
l _	5 ft 62%	23	2	167.0-167.6' - Fracture zone, 0-90 deg, black staining on vertical faces, fragments from	Н	Limestone - 166.0-169.1' - light olive gray, (5Y	
]		0	3/16" to 3-1/2", faces match poorly	\Box	5/2), fine grained, moderate HCl	R16: 18 minutes
1	1			167.9' - Fracture zone, horizontal, rough,	1_	reaction, medium strong (R3), 10%	1
170 -127.7			NR	undulating, open to 3/16"	╂┷	 coverage of 1/16" voids on surface, 	-
-127.7				168.3' - Fracture, horizontal, rough,	上	few larger (up to 3/16") voids and	_
1	171.0			undulating, open		fossil molds, except from about	
1 -	17 1.0			168.5' - Fracture, horizontal, rough, undulating on upper face, smooth and planar	╁┷	 166.9-167.4', zone from 167.5-167.9' has no voids but is laminated with 	1
-			3	on lower, open, some 3/8" fragments	╼	darker zone from 167.7-167.9', brass	-
l -				169.0' - Mechanical break		- colored to dark colored staining on	_
1				171.1, 171.2' - Fractures (2), horizontal,	\vdash	broken surface across darker zone	SC-4 collected at 171.2-
-			3	smooth, planar, open up to 3/16"		No Recovery 169.1-171.0'	173.0'
-	R17-NC			172.0' - Fracture or mechanical break, 45	1	Limestone	-
I -	5 ft	34	2	deg, rough, undulating	┵	171.0-172.0' - light olive gray, (5Y	1 -
1	88%			172.2' - Fracture or mechanical break, horizontal, rough, undulating, open up to 3/8"	厂	5/2), fine grained, moderate HCl reaction, medium strong (R3), some	
1 -				172.3-172.7' - Mechanical break or fractures,	1	<3/16" fossil molds] 1
,	1		5	0-65 deg, open to 3/16"	╁	172.0-173.5' - yellowish gray, (5Y	-
175 -132.7			لــِــا	173.4, 173.6' - Fractures (2), horizontal,	\perp	7/2), moderate HCl reaction, weak to	D47: 46 minute -
-132.7			1	smooth, planar, open to 3/16"		medium strong (R2 to R3), 50%	R17: 16 minutes
	176.0		NR	174.1, 174.2, 174.3' - Fractures (3), 0-5 deg, smooth, planar, open up to 3/16"	\vdash	coverage of 1/16" voids on surface,	
-	170.0			174.6' - Fracture or mechanical break,		Larger (up to 3/8") voids up to 5%, moderately fossiliferous	1
-			3	horizontal, rough, undulating, open up to	╂┯	173.5-175.4' - Same as 171.0-172.0'	-
l -				1/16"	┵	No Recovery 175.4-176.0'	_
1				174.8, 175.1' - Fractures (2), horizontal,		Limestone	
1 -	1		8	rough, undulating on upper face and planar	1_	176.0-180.7' - Same as 172.0-173.5'	1
-	R18-NG			on lower face	╂┴	except fewer large voids and fossil	-
l -	5 ft	46	2	176.4, 176.6' - Fractures (2), horizontal, rough, undulating, open to 3/16"		molds, poorly fossiliferous	
1	94%		_	176.7' - Fracture, horizontal, smooth, planar,	\vdash		
1 -	1			open to 1/16"	1-		1
l	-		5	177.1, 177.15, 177.2, 177.4, 177.7, 177.75,	世	-	-
180 <u>-</u> -137.7				177.8, 177.9' - Fractures (8), horizontal,	+		
-137.7			2	smooth, planar to slighty undulating, open 1/16" to 3/16"	ᅪᆣ		R18: 19 minutes
	181.0		NR	1710 to 3710 178.3' - Fracture, horizontal, rough,	\Box	No Recovery 180.7-181.0']
1 -			· '' \	undulating, open, fragments up to 1/2"	1-	Limestone	1
-	-		>10	178.9-179.4' - Fractures (4), 0-45 deg, rough,	╀	− 181.0-182.0' - yellowish gray, (5Y	-
1 -				undulating, open, fragments up to 1"	\blacksquare	7/2), fine grained, moderate HCl	_
				179.8, 179.9' - Fractures (2), horizontal, rough, undulating, open to 3/16"	\vdash	reaction, weak to medium strong (R2	
1 -	1		0	180.3' - Fracture, horizontal, smooth, planar	╁	to R3), few voids <1/16", voids are present in thin bands about 20-50] 1
-	R19-NG			to stepped, open to 3/16"	口	deg from horizontal, few larger voids	-
-	5 ft	18	>10	180.4' - Fracture, horizontal, rough,	╀	- 182.0-183.7' - Same as 176.0-180.7'	-
1	54%			undulating, open, rounded faces	╨	No Recovery 183.7-186.0'	
1 -				181.0-182.0' - Fracture zone, 0-90 deg,	ш		1
1 405				rough, undulating, some slight dark staining at 181.6'	╁	-	1 1
185 <u>-</u> 142.7			NR	182.0-183.0' - Mechanical break –	┸		D10: 15 minutes
- 142./				183.0-183.7' - Fracture zone, 0-90 deg,	oxdot	_	R19: 15 minutes
	186.0			rough, undulating, fragments up to 1-1/2"	\vdash]
1 -				186.0-186.4' - Fractures, horizontal, multiple	1	Limestone	1
1 -	-		3	1" fragments, open	厂	 186.0-186.5' - dusky yellow, (5Y 6/4), 	-
1 -					\bot	fine grained, moderate HCl reaction,]
1					\vdash	weak (R2), 90% coverage of <1/16"	
-] _		1		Ш	 voids on surface, few cavities (up to 9/16")] 1
-	R20-NQ			187.8' - Fracture, horizontal, smooth, planar,	+	L 3/13 /	-
	4.5 ft	3/		open to 1/16"	丰		
	1						

APPENDIX 2BB-214 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-18 SHEET 11 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722986.9 N, 458047.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: R. Woodard, P. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, NW/HW casing

WATER_EMES_2	00111110			<u> </u>	TENT . CIVIE 33 S/N 3 10023, ITIUU TOLATY, NQ LOOIS, NVV/F		5.1.g	ORIENTATION : Vertical
DESCRIPTION	WATER	LEVELS : 2.0	ft bg	s on 3	/25/07 START : 2/24/2007 END : 3/	8/200	LOGGER : R. Gomez, C. LeBland	
190					DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
190	SQ (#)	9%		S	DESCRIPTION	1 0	DOCK TYPE OOLOD	
190	SEL ON ON	Z & Z	<u> </u>	F.E.	DEGONIF HON	길		
190	AACH	SE 문	%		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	걸		FLUID LOSS, CORING RATE AND
190	무유의	888 888	۵۵	AC R F	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	
190	교잉교	SHR	ď	FH	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	BROLO, TEOL REGGETO, ETO.
undulating, fragments up to 2" 190				>10	188.2-189.1' - Fracture zone, rough,	ш	186.5-189.1' - yellowish gray, (5Y	
190	-			>10		╁		-
190.5 190.5 190.7, 190.9, 191.5' - Fractures (3), horizontal, rough, undulating, black staining on face at 190.9', open up to 3/8" 191.7, 192.5' - Fractures (2), horizontal, rough, undulating, open to 3/16" below 187.3', moderately fossiliferous No Recovery 189.1-190.5' No Recovery 189.1-190.5' No Recovery 189.1-190.5' No Recovery 199.1-190.5' 191.7, 192.5' - Fractures (2), horizontal, rough, undulating, open to 3/16" below 187.3', moderately to strong HCI reaction, weak (R2), 40% coverage of <1/16' voids on surface in zone from 191.3-192.8' and undulating, open, fragments up to 2" long 195.152.7 195.5 195.6, 195.8, 196.0, 196.2, 196.4' - Fractures (3), horizontal, rough, undulating, smooth and undulating at 196.4', open to 3/8" 195.6, 195.8, 196.0, 196.2, 196.4' - Fractures (5), horizontal, rough, undulating, smooth and undulating at 196.4', open to 3/8" 196.3-199.5' - Fracture or mechanical break, rough, undulating, open 3/8" 197.8-199.5' - Fractures, open, fragments up to 1' 197.8-199.5' - Fractures, open, fragments up to 1' 197.8-199.5' - Fractures, open, fragments up to 1' 197.8-199.5' - Fractures, open, fragments, up to 1-1/2" 200.157.7 200.5 No Recovery 199.4.3-195.5' R22: 17 minutes R22: 17 minutes	I _			\ <u>- 10</u> /		╨	reaction, weak (R2), 40% coverage	_
-147.7 190.5	190			NR		Ш		
190.5. 190.5. 190.9. 191.5' - Fractures (3), horizontal, rough, undulating, black staining on face at 190.9', open up to 3/8' 3 191.7', 192.5' - Fractures (2), horizontal, rough, undulating, open to 3/16' 191.9' - Fracture, 45 deg, rough, undulating, open 192.7-194.3' - Fracture super long 195.5-194.3' - Indulating, open 192.7-194.3' - Fractures to strong HCl reaction, weak (R2), 40% coverage of <1/16' voids on surface in zone from 191.3-192.8' and 193.5-194.3', moderately forough, undulating, open, fragments up to 2' long 195.5-196.3' - dusky yellow (6Y 6/4) by 195.5' - Fracture or mechanical break, rough, undulating, open 3/8' 196.9' - Fracture or mechanical break, rough, undulating, open 3/8' 196.9' - Fracture or mechanical break, rough, undulating, open 3/8' 197.4-197.6' - Fractures, open, fragments up to 1' 197.8-199.5' - Fracture zone, rough, undulating, open 3/8' 197.8-199.5' - Fracture zone, rough, undul					_			R20: 14 minutes
190.7, 190.9, 191.5' - Fractures (3), horizontal, rough, undulating, open to 3/8" 191.7, 192.5' - Fractures (2), horizontal, rough, undulating, open to 3/16" 191.9' - Fracture, 45 deg, rough, undulating, open to 3/16" 191.9' - Fracture, 45 deg, rough, undulating, open 192.7-194.3' - Fracture zone, 0-45 deg, rough, undulating, open, fragments up to 2" 195.5	-	190.5				╨		_
horizontal, rough, undulating, oback staining of face at 190.9°, open up to 3/8" 191.7, 192.5' - Fractures (2), horizontal, rough, undulating, open to 3/16" 191.7, 192.5' - Fractures (2), horizontal, rough, undulating, open to 3/16" 191.7, 192.5' - Fracture (2), horizontal, rough, undulating, open to 3/16" 191.7, 192.5' - Fracture zone, 0-45 deg, rough, undulating, open 192.7-194.3' - Fracture zone, 0-45 deg, rough, undulating, open, fragments up to 2" 195.5 195.6, 195.8, 196.0, 196.2, 196.4' - Fractures (5), horizontal, rough, undulating, smooth and undulating, open 3/8" 195.5 195.6, 195.8, 196.0, 196.2, 196.4' - Fractures (5), horizontal, rough, undulating, smooth and undulating, open 3/8" 196.9' - Fracture or mechanical break, rough, undulating, open 3/8" 197.4-197.6' - Fractures, open, fragments up to 1" 197.8-199.5' - Fracture zone, rough, undulating, numerous fragments, up to 1-1/2" NR 190.5 190.5 190.5-194.3' - yellowish gray, (5Y 7/2), fine grained, moderate to strong HCI reaction, weak (R2), mod				2	190.7, 190.9, 191.5' - Fractures (3),	Н		R21: 52 minutes
on face at 190.9', open up to 3/8" 191.7, 192.5' - Fractures (22), horizontal, rough, undulating, open open open open open open open open				١٦				
191.7, 192.5' - Fractures (2), horizontal, rough, undulating, open to 3/16" 191.9' - Fracture, 45 deg, rough, undulating, open, fragments up to 2" 192.7-194.3' - Fracture zone, 0-45 deg, rough, undulating, open, fragments up to 2" 195.7-195.5 195.5 195.6, 195.8, 196.0, 196.2, 196.4' - Fractures (5), horizontal, rough, undulating, smooth and undulating at 196.4', open to 3/8" 195.6, 195.8, 196.0, 196.2, 196.4' - Fractures (5), horizontal, rough, undulating, smooth and undulating at 196.4', open to 3/8" 196.9' - Fracture or mechanical break, rough, undulating, open 3/8" 197.4-197.6' - Fracture zone, rough, undulating, open to 3/6" 198.0% 199.5' - Fracture zone, rough, undulating, smooth and undulating at 196.4', open to 3/6" 199.5-196.3' - dusky yellow, (5Y 6/4), fine grained, moderate to strong HCl reaction, weak (R2), thin irregular laminations, 20% coverage of <1/16" voids on surface, few larger voids 196.3' - purple of 3/6" 199.5-196.3' - Jusky yellow, (5Y 6/4), fine grained, moderate to strong HCl reaction, weak (R2), thin irregular laminations, 20% coverage of <1/16" voids on surface, few larger voids 196.3' - purple of 3/6" 199.5-196.3' - Jusky yellow, (5Y 6/4), fine grained, moderate to strong HCl reaction, weak (R2), thin irregular laminations, 20% coverage of <1/16" voids on surface, few larger voids 196.3' - purple of 3/6" surface voids 196.3' - purple of 3/6" surface voids 196.3' - purple of 3/6" surface voids 3/9.5' power 10% of surface voids on surface, cavities (up to 3/8") over 10% of surface voids on surface, cavities (up to 3/8") over 10% of surface voids on surface, cavities (up to 3/8") over 10% of surface voids on surface, cavities (up to 3/8") over 10% of surface voids on surface, cavities (up to 3/8") over 10% of surface voids on surface, cavities (up to 3/8") over 10% of surface voids on surface, cavities (up to 3/8") over 10% of surface voids on surface, cavities (up to 3/8") over 10% of surface voids on surface, cavities (up to 3/8") over 10% of surface voids on surface, cavities (up t	-					ш		
R21-NQ 5 ft 76% 177 >10 191.9' - Fracture, 45 deg, rough, undulating, open fragments up to 2" 195.7 194.3' - Fracture zone, 0-45 deg, rough, undulating, open, fragments up to 2" 195.5 195.7 195.5 195.6 195.8 196.0 196.2 196.4' - Fractures (5), horizontal, rough, undulating, smooth and undulating at 196.4', open to 3/8" 197.4-197.6' - Fracture sone, rough, undulating, open 3/8" 197.4-197.6' - Fractures, open, fragments up to 1" 197.4-197.6' - Fractures, open, fragments up to 1" 197.4-197.6' - Fracture zone, rough, undulating, numerous fragments, up to 1-1/2" 196.3 199.5' - Floature zone, rough, undulating, numerous fragments, up to 1-1/2" 196.3 199.5' - Floature zone, rough, undulating, numerous fragments, up to 1-1/2" 197.8-199.5' - Fracture zone, rough, undulating, numerous fragments, up to 1-1/2" 197.8-199.5' - Fracture zone, rough, undulating, numerous fragments, up to 1-1/2" 197.8-199.5' - Fracture zone, rough, undulating, numerous fragments, up to 1-1/2" 197.8-199.5' - Fracture zone, rough, undulating, open 3/8" 197.8-199.5' - Fractures, open, fragments up to 1" 197.8-199.5' - Fracture zone, rough, undulating, open 3/8" 195.5-196.3' - Jusky yellow, (5Y 6/4), fine grained, moderate to strong HCl reaction, weak (R2), thin irregular dark laminations, 20% coverage of <1/16" voids on surface, few larger voids 190.5' 1	_			3		╆┯		
195								
17 10 192.7-194.3' - Fracture zone, 0.45 deg, rough, undulating, open, fragments up to 2" 193.5-194.3', moderately fossiliferous in same zone, color grades to dusky yellow (SY 6/4) by 193.0', dark thin (1/16") irregular laminations visible at 192.5-192.7' No Recovery 194.3-195.5' 195.6, 195.8, 196.0, 196.2, 196.4' - Fractures (5), horizontal, rough, undulating, smooth and undulating at 196.4', open to 3/8" 196.9' - Fracture or mechanical break, rough, undulating, open 3/8" 197.4-197.6' - Fractures, open, fragments up to 1" 197.8-199.5' - Fracture zone, rough, undulating, numerous fragments, up to 1-1/2" 190.5	1 7					ш		
rough, undulating, open, fragments up to 2" long rough, undulating, open, fragments up to 2" long NR -152.7 195.5 195.6 195.6, 195.8, 196.0, 196.2, 196.4' - Fractures (5), horizontal, rough, undulating, smooth and undulating at 196.4', open to 3/8" R22-NQ -5 ti 20 > 10 sti 20 > 10 sti 20 + 10 sti 20 + 10 sti 200 -157.7 200.5 RR RR RR RR RR RR RR RR RR	-		17	>10		ऻ─		-
Section Sect	-	/6%				╀		-
195.7 195.5 NR -152.7 195.5 S 195.6, 195.8, 196.0, 196.2, 196.4' - Fractures (5), horizontal, rough, undulating, smooth and undulating at 196.4', open to 3/8"	1 _			>10		ш		_
NR 195 -152.7 195.5 No Recovery 194.3-195.5'						Н		
-152.7 195.5 195.6, 195.8, 196.0, 196.2, 196.4' - Fractures (5), horizontal, rough, undulating, smooth and undulating at 196.4', open to 3/8" 196.9' - Fracture or mechanical break, rough, undulating, open 3/8" 197.4-197.6' - Fractures, open, fragments up to 1" 197.8-199.5' - Fracture zone, rough, undulating, numerous fragments, up to 1-1/2" 200 -157.7 200.5 Limestone 195.5-196.3' - dusky yellow, (5Y 6/4), fine grained, moderate to strong HCI reaction, weak (R2), thin irregular dark laminations, 20% coverage of <1/16" voids on surface, few larger voids 196.3-199.5' - yellowish gray, (5Y 7/2), fine grained, strong HCI reaction, weak (R2), moderately fossiliferous, 60% coverage of <1/16" voids on surface, cavities (up to 3/8") over 10% of surface No Recovery 199.5-200.5' R22: 17 minutes					•	╁	laminations visible at 192.5-192.7'	-
195.5 195.6, 195.8, 196.0, 196.2, 196.4' - Fractures (5), horizontal, rough, undulating, smooth and undulating at 196.4', open to 3/8" 196.9' - Fracture or mechanical break, rough, undulating, open 3/8" 197.4-197.6' - Fractures, open, fragments up to 1" 197.8-199.5' - Fracture zone, rough, undulating, numerous fragments, up to 1-1/2" 200 -157.7 200.5 Limestone 195.5-196.3' - dusky yellow, (5Y 6/4), fine grained, moderate to strong HCl reaction, weak (R2), thin irregular dark laminations, 20% coverage of <1/16" voids on surface, few larger voids 196.3-199.5' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, weak (R2), moderately fossiliferous, 60% coverage of <1/16" voids on surface, cavities (up to 3/8") over 10% of surface. No Recovery 199.5-200.5' R22: 17 minutes				NR	_	垭	No Recovery 194.3-195.5'	_
5 (5), horizontal, rough, undulating, smooth and undulating at 196.4', open to 3/8" 2 196.9' - Fracture or mechanical break, rough, undulating, open 3/8" 197.4-197.6' - Fractures, open, fragments up to 1" 197.8-199.5' - Fracture zone, rough, undulating, numerous fragments, up to 1-1/2" 200 100 100 105 105 105 105 105	-132.7	195.5				_		_
5 (5), horizontal, rough, undulating, smooth and undulating at 196.4', open to 3/8" 196.9' - Fracture or mechanical break, rough, undulating, open 3/8" 196.9' - Fracture or mechanical break, rough, undulating, open 3/8" 197.4-197.6' - Fractures, open, fragments up to 1" 197.8-199.5' - Fracture zone, rough, undulating, numerous fragments, up to 1-1/2" 200 -157.7 200.5 Sit 20					195.6, 195.8, 196.0, 196.2, 196.4' - Fractures	\vdash		
reaction, weak (R2), thin irregular dark laminations, 20% coverage of R22-NQ 5 ft 80% >10 solution of the strength of the stre	-			5		\vdash		-
R22-NQ S ft 20 5 ft 80% 20 10 10 10 10 10 10 10	_				undulating at 196.4', open to 3/8"			-
R22-NQ 5 ft 80% 20 >10				ر ا		\vdash	reaction, weak (R2), thin irregular	
R22-NQ 5 ft 80% 20 >10 197.4-197.6' - Fractures, open, fragments up to 1" 197.8-199.5' - Fracture zone, rough, undulating, numerous fragments, up to 1-1/2" 5 ft 90% coverage of <1/16" voids on surface, cavities (up to 3/8") over 10% of surface No Recovery 199.5-200.5				-		Н		
- 5 ft 80% 20 >10 to 1" 196.3-199.5' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, weak (R2), moderately fossiliferous, 60% coverage of <1/16" voids on surface, cavities (up to 3/8") over 10% of surface No Recovery 199.5-200.5' R22: 17 minutes	-	R22-NO					_ ′	-
80% 197.8-199.5' - Fracture zone, rough, undulating, numerous fragments, up to 1-1/2" 7/2), fine grained, strong HCl reaction, weak (R2), moderately fossiliferous, 60% coverage of <1/16" voids on surface, cavities (up to 3/8") over 10% of surface No Recovery 199.5-200.5' R22: 17 minutes	_			>10		ш		-
undulating, numerous fragments, up to 1-1/2" reaction, weak (R2), moderately fossiliferous, 60% coverage of <1/16" voids on surface, cavities (up to 3/8") over 10% of surface NR NR NR NR Bottom of Boring at 200.5 ft bgs on						Н		
voids on surface, cavities (up to 3/8") over 10% of surface No Recovery 199.5-200.5' R22: 17 minutes Bottom of Boring at 200.5 ft bgs on							reaction, weak (R2), moderately	
200 -157.7 200.5 NR Over 10% of surface No Recovery 199.5-200.5' R22: 17 minutes	-			>10		ш		-
200	-					Н		-
-15/./ 200.5				ND	_			
Bottom of Boring at 200.5 ft bgs on	-157.7	200.5		INIX		Ш	No recovery 155.5-256.6	R22: 17 minutes
	-	200.5					Bottom of Boring at 200.5 ft bgs on	
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-18A	SHEET	1	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722992.2 N, 458049.3 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER LEVELS: 2.0 ft bgs on 3/25/07 START: 6/14/2007 END: 6/15/2007 LOGGER								
				STANDARD	SOIL DESCRIPTION		(J)	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS			SYMBOLIC LOG	
E SE		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COL MOISTURE CONTENT, RELATIVE DENSITY	OR, YOR	OLIC	DEPTH OF CASING, DRILLING RATE,
FYA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERA	LOGY	/MB	DRILLING FLUID LÓSS, TESTS, AND INSTRUMENTATION
				(N)			ŝ	
42.1								06/14/07 Drill 10.0' pilot hole, install 10.0' of SW (6") casing -
l .]							Blind drill to 25.0'
l .								
								Water level obtained from boring A-18
]							
-						1]
5]					1]
37.1]							
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-18A	SHEET	2	OF	6

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722992.2 N, 458049.3 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 2-15/16 tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 2.0 ft bo	gs on 3/25	5/07 S	START : 6/14/2007 END : 6/15/2007 LOGGE	R : [D. Whitaker
				STANDARD	SOIL DESCRIPTION	ن	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COLL NAME TIGOG OBOUR OVARDOL COLOR	SYMBOLICIOG	DEDTH OF CACING PRILLING DATE
ACE ATIO		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	=	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
FEN			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	N N	INSTRUMENTATION
<u>о</u> о ш				(N)		10	
-						┨	-
-						1	-
-						1	1
-						1	1
-						1	1
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l _							_
25	25.0						
17.1				20-24-23	Fat Clay With Sand (CH) 25.0-25.05' - light bluish gray, (5B 7/1), wet, very stiff,	-	_
-		1.3	SS-1	(47)	high plasticity, no dilatancy, no HCl reaction, 15% very fine to fine silica sand, (slough)	4	-
-	26.5				Silty Sand (SM)	╫	06/15/07 Install 5' more of SW casing
-					\ 25.05-26.35 - yellowish gray, (5Y 8/1), wet, dense, fine to coarse grained sand-sized, moderate HCl	┨	Begin split spoon sampling at 25.0'
-					reaction, 24% nonplastic fines, all carbonate	┨	09:00 Pull out split spoon 25.0-26.5'
-						1	-
-						1	1
-						1	1
30	30.0					1	1
12.1		0.5	SS-2	50/5.5 (50/5.5")	Silty Sand (SM)		09:15 Pull out 30.0-31.5' interval SPT; decide to start rock coring
				(50/5.5)	\orange, (10YR 7/4) /	Τ	decide to start rock coning
_					Begin Rock Coring at 30.5 ft bgs See the next sheet for the rock core log	1	
-					occurrent and the rook core log	-	-
-						-	-
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PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-18A

SHEET 3 OF 6

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722992.2 N, 458049.3 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, SW/HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.0	ft bas		25/07 START: 6/14/2007 END: 6/			
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	30.5				\vdash	No Recovery 30.5-35.5'	09:55 Begin rock coring
- - - - - - 35 7.1	R1-NQ 5 ft 0% 35.5	0	NR	_		- - - - -	Driller's Remark: Sand layer that washed out (30.5-35.5') - felt resistance during drilling R1: 4 minutes
-	35.5					Limestone	1
			2	36.2' - Fracture (2), 60 deg and 70 deg,	」	- 35.5-39.5' - pale olive, (10Y 6/2), very fine to fine grained, moderate to]
_			>10	rough, undulating, open (1/8"), intersecting	厂	strong HCl reaction, very weak (R1), 15% surface voids (<1/16")	
-	R2-NQ			37.12-37.45' - Fracture zone		35.5-38.5', 40% surface voids from 38.5-38.5', many cavities up to	SC-1 collected at 37.45-
-	5 ft 80%	60	0		E	3/16"x9/16", many fossil molds with minor silt infill, sporadic black	38.55'
-			>10	38.55-38.75' - Fracture zone		(organic) material up to 3/16", trace (few) fossil casts]
_			- 10	38.95' - Bedding plane or mechanical break, horizontal, rough, undulating, tight	\perp	<u>L</u> ` ´	D2: 0 minutes
40 2.1	40.5		NR	_	╁	No Recovery 39.5-40.5'	R2: 8 minutes —
-	40.5		0		臣	Limestone 40.5-42.9' - yellowish gray, (5Y 7/2),	_
-				41.65' - Bedding plane or mechanical break,	H	fine to medium grained, strong HCl reaction, weak (R2), extremely weak	Core run times not
_			>10	5 deg, rough, undulating, open (1/8") 42.1-42.53' - Fracture zone]	rock (R0) from 42.2-42.9', 40.5-42.2' 40% small surface voids (<1/16"),	recorded beyond run R2 NQ _
_	R3-NQ 5 ft	31	2	42.67' - Fracture, horizontal, rough, stepped, open (1/2"), intersecting	H	many small cavities up to 3/16" in diameter, few fossil molds and casts,	_
-	48%			open (1/2), intersecting	╁	moderately fossiliferous, 42.2-42.9' 5% surface voids and 1/16" infill into	-
-			NR		臣	void space, few fossil moldsNo Recovery 42.9-45.5'	-
45				_		<u> </u>]
-2.9	45.5				上	Limestone	-
-			2			- 45.5-50.4' - yellowish gray, (5Y 7/2), strong HCl reaction, extremely weak	-
-			2	46.4, 45.9, 46.95, 47.5, 48.3, 48.5, 49.1, 49.45, 50.15' - Mechanical break, <5 deg,	H	(R0), 25-40% surface voids (<1/16") variable over core, void infill, many]
-	R4-NQ		_	rough, planar, silt infilling, tight	#	cavities up to 3/16"x3/8", many black (organic) oblong and spherical fossils	-
-	5 ft 98%	63	2		Ħ	up to 3/16" in diameter, horizontal black laminations from 47.4-47.8'	-
			3			varying in size up to 3/16" thick, fine grained with local medium grained]
-					上	accumulations	_
50 -7.9	50.5		1	_	世	_	-
	50.5				†		



PROJECT NUMBER: BORING NUMBER:

338884.FL A-18A

SHEET 4 OF 6

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722992.2 N, 458049.3 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, SW/HW casing

WATER	LEVELS: 2.0	ft bgs	s on 3/	25/07 START : 6/14/2007 END : 6/	15/20	D7 LOGGER : D. Whitaker	
≥∩≘	_ (6			DISCONTINUITIES	၂	LITHOLOGY	COMMENTS
BELOV SE ANI ION (fi	tUN, H, AND ERY (%	(%	JRES OT	DESCRIPTION		ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
_			(NR) 0		Ħ	No Recovery 50.4-50.5' - Limestone	_
-				51.5, 53.8' - Mechanical break, 60 deg, tight	世	50.5-55.3' - pale yellowish brown, (10YR 4/2), moderate HCl reaction,	-
-			2	51.85' - Mechanical break, 50 deg, tight	Ħ	 extremely weak (R0), small surface voids (<1/16") 15-25% variable over]
-	R5-NQ 5 ft 96%	73	3	52.85, 53.85, 53.95, 54.5' - Mechanical break, horizontal, tight	Ħ	core length, many cavities up to 9/16"x3/16", trace black elongate shaped material (organics) up to	-
_			3		\vdash	9/16"x1/16", trace black lineations from 51.65-51.85', fine grained with local medium grained accumulations	_
55			1		Ħ		
-12. 9	55.5		NR.		\blacksquare	- No Recovery 55.3-55.5'	_
-			3	55.75, 55.9, 56.15, 56.63, 57.02, 57.4, 57.9, 58.4, 59.08' - Mechanical break, <10 deg,	Ħ	Limestone 55.5-60.5' - Same as 50.5-55.3' except 5-15% surface voids (<1/16"),	-
_			3	rough, planar, tight		many black lineations throughout, few cavities up to 1/8" diameter	-
_	R6-NQ 5 ft	82	3	57.6' - Mechanical break, 50 deg, rough,	囯	_]
_	100%	02		planar, tight	H	_	_
-			1		Ħ	-	-
60			0			-	
-17. <u>9</u> -	60.5				H	_ Limestone	-
-			3	61.0' - Bedding plane or mechanical break,	囯	60.5-61.1' - pale yellowish brown, (10YR 4/2), moderate HCl reaction,	-
_			2	horizontal, rough, undulating, tight 61.1' - Mechanical break, 40 deg, rough, undulating, tight	H	weak (R2), hard, moderate density, fossiliferous, small voids and fossil	_
-	R7-NQ	88	2	61.5, 61.9, 62.46, 63.05, 64.0, 64.6, 65.23' - Mechanical break, <10 deg, rough, planar to	E	molds (1/16"-1/8") over 10-15% of surface Limestone	-
_	5 ft 100%	00		undulating, tight	H	61.1-65.5' - pale yellowish brown, (10YR 4/2), moderate HCl reaction,	
-			2		H	 extremely weak to weak (R0 to R2), hard, localized zones of small voids 	-
65_ -22.9			1	_	H	(1/16"-1/8") up to 15% of surface, — very sparse black organic inclusions] -
	65.5		1		Ħ	Limestone - 65.5-70.5' - moderate yellowish	
-				66.5' - Fracture (2), 50 deg, rough, stepped,	H	brown, (10YR 5/4), moderate to strong HCl reaction, extremely weak	-
			3	tight, intersecting 66.9, 67.13, 67.8, 69.13, 70.2' - Bedding	Ħ	 to very weak (R0 to R1), some of the rock from 68.0-70.5' poorly 	
-	R8-NQ 5 ft 100%	86	1	plane or mechanical break, <5 deg, rough, planar to undulating, tight to open (up to 1/4")	Ħ	fossiliferous, up to 3/16" thick, sparse very thin (<1/16" thick) lineations, few cavities up to 1/16"x1/8", few black	-
	100 /0		1		H	blebs up to 3/16" diameter, mostly fine grained]
						-	SC-2 collected at 69.12- 70.23'
70 -27.9	70.5		2	_	\blacksquare	_	-
					1		



PROJECT NUMBER: BORING NUMBER:

338884.FL A-18A

SHEET 5 OF 6

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722992.2 N, 458049.3 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, SW/HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.0	ft bgs	s on 3/	/25/07 START : 6/14/2007 END : 6/	15/200	D7 LOGGER : D. Whitaker	
≥ ∩ ⊕	(9)			DISCONTINUITIES	Ö	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH BE	E RU STH, OVEF	D (%)	FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30Li	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPT SURF	SORE	RQ	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	0111	ш		70.25' - Fracture, 70 deg, rough, planar	0)	Limestone	11:40 20.0' More HW
-			2	71.1, 72.15, 72.25' - Fracture, 50 deg,	\vdash	- 70.5-74.75' - moderate yellowish	casing put in to 50.0'
-				smooth, undulating, open (up to 1/4")	Ħ	brown, (10YR 5/4), strong HCl reaction, weak (R2), 25% surface	-
-			2	71.2' - Bedding plane, horizontal, rough, planar, black staining, open (1/8")	Ħ	 voids (<1/16") from 70.5-73.0', 50% surface voids (<1/16") from 	1
-	R9-NQ			72.6' - Fracture (2), 60 deg and 5 deg, rough,	Ш	73.0-74.75', many cavities up to 3/8",	1
-	5 ft 85%	52	3	undulating, tight, intersecting 73.03' - Mechanical break or bedding plane,	Ш	 very fossiliferous, many molds, casts, trace black (organics) lineations 	1
-			6	rough, planar, tight to open (1/16")	Н	_	1
			>10	73.9, 74.0, 74.15, 74.3, 74.5, 74.6' - Bedding plane, <10 deg, rough, undulating to stepped,	Н	_	1
75				open (up to 3/4")	Ш	_ No Recovery 74.75-75.5'	1
-32.9	75.5		NR	74.6-74.75' - Fracture zone	囯	_]
			2	75.5-75.6' - part of core is fractured	Ш	Limestone - 75.5-78.85' - Same as 70.5-74.75']
				75.9, 76.6' - Fracture (2), 50 deg, rough, planar, open (up to 3/4")	Ш	except extremely weak (R0), black	
-			>10	76 05 77 21 Fracture 7000	Н	organic material up to 1"x1/8"	_
-	D.10.110			76.95-77.3' - Fracture zone	H	-	_
-	R10-NQ 5 ft	33	5		H	_	-
-	67%		э	78.05, 78.2, 78.3' - Bedding plane or mechanical break, horizontal, smooth,	H	_	-
-				undulating, tight to open (1/16") 78.45' - 20 deg and 70 deg, rough,	H	No Recovery 78.85-80.5'	-
-			NR	undulating, tight to open (1/8"), intersecting	Ш	-	-
-37.9			111	_	Н	_	-
-	80.5		>10	80.5-80.9' - Fracture zone	Н	Limestone	-
-				-	Ш	 80.5-80.9' - Same as 75.5-78.85' except pale olive, (10Y 6/2) 	-
-				-	Ш	No Recovery 80.9-85.5'	-
-				-	ш	-	1
-	R11-NQ			-	Ш	-	1
	5 ft 8%	0	NR	_	Ш	_	1
					Н	_]
					H	_]
85				_	H	_	
-42.9	85.5			_	H	<i>.</i>]
			1	_	H	Limestone - 85.5-88.1' - light olive gray to dusky	
-				86.15' - Mechanical break or bedding plane, 30 deg, rough, undulating, tight	H	yellow, (5Y 5/2 to 5Y 6/4), strong HCl reaction, weak (R2), 87.7-88.1'	-
-			1	86.9' - Mechanical break or bedding plane,	Ш	extremely weak rock (R0), 40-50%	SC-3 collected at 86.9-
-	R12-NQ			horizontal, rough, undulating, tight	Н	surface voids (<1/16") many cavities up to 3/8"x3/16", highly fossiliferous,	87.72'
-	5 ft	43	>10	87.72-88.1' - Fracture zone	Ш	 many (>5) molds, few casts, minor 	-
-	52%			-	囯	recrystallization No Recovery 88.1-90.5'	-
-			NR	-	団	-	-
90			INK	-	団	_	-
-47 9	90.5			_	Ш		
	30.0				H		
					Ш		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-18A

SHEET 6 OF 6

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722992.2 N, 458049.3 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, SW/HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.0	ft bgs	s on 3/	/25/07 START : 6/14/2007 END : 6/	15/20	07 LOGGER : D. Whitaker	
>∩≎	(%			DISCONTINUITIES	၅	LITHOLOGY	COMMENTS
ELO)	AND ₹ (3	_	ZES T	DESCRIPTION	CLC	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
_	016	LE.	>10	90.78' - Mechanical break or bedding plane, horizontal, rough, stepped, tight	8	Limestone 90.5-95.0' - Same as 85.5-88.1' except very fossiliferous with many	-
-	D40 NO		>10	91.3-92.4' - Fracture, 85 deg, rough, undulating, fragments along fracture plane 91.3, 91.8' - Bedding plane or mechanical break, 35 deg, rough, stepped, tight		cavities up to 1-3/4"x1-3/16", minor silt infill, secondary carbonate crystals within cavities and voids space present, minor black staining	-
-	R13-NQ 5 ft 90%	57	4	91.9' - Fracture, smooth, stepped, missing part of fracture 92.6, 92.7, 93.4, 94.25' - Bedding plane, <25		in some cavities	-
95			0	deg, rough, stepped, fragments in fractures, open (up to 1") 93.8' - Bedding plane or mechanical break, 30 deg, rough, undulating, tight		-	- -
-52.9	95.5		NR		厂	No Recovery 95.0-95.5'	l _
-			1	95.95' - Bedding plane or mechanical break, 10 deg, smooth, undulating, tight		Limestone - 95.5-97.35' - Same as 85.5-88.1' - except 15-25% surface voids	_
-	R14-NQ		1	96.6' - Bedding plane, smooth, undulating, open (3/4-2"), fragments in fracture, also 50 degree fracture smooth, undulating, black		(<1/16") - - No Recovery 97.35-100.5'	-
-	5 ft 37%	32		staining - - -		-	-
100			NR	-		-	-
-57.9	100.5			_			6/15/07 15:30, Total depth of boring 100.5'
-				-		Bottom of Boring at 100.5 ft bgs on 6/15/2007	or borning 100.5
-						-	-
-				-		-	-
-				-		-	-
-				_		- -	-
						- -	
-						- -	-
-						-	-
-				_		<u>-</u>	



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	Δ-19	SHEET	1	OF	14	

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723149.9 N, 457976.4 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical

					START - 2/02/2007 FAID - 2/02/2007 LOCCED - D. McComb
WATER	LEVELS	. ∠.∪ II D(gs on 3/20		TART : 3/23/2007
≥ 9€	SAMPLE	INTERVA	J (ft)	STANDARD PENETRATION	O O O O O O O O O O O O O O O O O O O
DEPTH BELOW SURFACE AND ELEVATION (ft)	. J, 11411 LL	RECOVE	. ,	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
TH E		TILOUVE	#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
SUR			#IYPE	(N)	Soliditation, solidinidational, minicipaled in solidinidation in s
43.1	0.0				Poorly Graded Sand With Silt And Gravel (SP-SM)
		4.5	00.4	3-3-3-3	\(\sqrt{0.0-0.5'} - \text{grayish yellow, (5Y 8/4), dry, loose, fine to coarse grained sand and gravel, 11% fines, limestone \(\sqrt{1.5} \)
-		1.5	SS-1	(6)	road base
-	2.0				Poorly Graded Sand (SP) 0.5-1.5' - dusky brown to pale yellowish brown, (5YR
-					│ 2/2 to 10YR 6/2), moist, loose, fine grained, trace │ │ │ │ │ │ │ │ Water level at 2.0' below ground surface
-				2-4-4-6	\tag{\nonplastic fines, up to 25% organics, wood fragments \frac{1}{1!}
-		1.2	SS-2	(8)	\\Silty Sand (SM)
-	4.0				\\\\\2.0-2.5' - grayish brown, (5YR 5/2), wet, loose, fine \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
-					Poorly Graded Sand With Silt (SP-SM)
5			000	3-3-4-4	2.5-3.2' - grayish orange, (10YR 5/6), wet, loose, fine
38.1		1.4	SS-3	(7)	Silty Sand (SM)
	6.0				4.0-5.4' - light gray, (N8), wet, loose, fine grained, 20-25% low plastic fines, trace fine sand-sized black
					minerals / Till
		1.6	SS-4	2-2-1-0	Silty Sand (SM) 6.0-7.2' - light gray to medium gray, (N7 to N6), wet,
		1.0	55-4	(3)	very loose, fine grained, 20% low plastic fines
	8.0				Lean Clay With Sand (CL) 7.2-7.6' - medium gray to dark gray, (N4 to N3), wet,
					soft, low to medium plasticity, slow dilatancy, 15% fine
		0.9	SS-5	2-3-7-12	\\grained sand, 5% wood and organics \\ \frac{\frac{1}{2}}{1} \\\ \frac{1}{2} \\ \frac{1}{2} \\\ \frac{1}{2} \
		0.9	33-3	(10)	∥ 8.0-8.4' - medium gray to dark gray, (N4 to N3), wet, ∥ ┃
10_	10.0				\stiff, high plasticity, no dilatancy, 15-20% fine grained - -
33.1					Silt With Sand (ML)
		0.9	SS-6	3-47-11-9	8.4-8.9' - grayish orange, (10YR 7/4), wet, stiff, nonplastic, rapid dilatancy, moderate HCl reaction,
		0.9	33-0	(58)	\\18% fine grained sand
	12.0				Silty Gravel With Sand (GM) 10.0-10.9' - grayish orange, (10YR 7/4), moist, very
					\\dense, moderate to strong HCl reaction, fine to \\/ \ \ \ \
_		0.9	SS-7	6-12-8-10	coarse gravel-sized up to 2", 25% fine to coarse grained sand, 15-20% low plastic fines
_		3.5	55 /	(20)	Silt With Sand (ML) 12.0-12.9' - grayish orange, (10YR 7/4), moist to wet,
	14.0				_\very stiff, nonplastic, rapid dilatancy, moderate HCl
					\reaction, 5-10% fine grained sand, 5% medium to \ - \ - \ \ - \ - \ - \ - \ -
15		0.7	SS-8	3-8-9-8	Limestone And Silt (ML)
28.1				(17)	14.0-14.7' - moderate olive brown, (5Y 4/4), moderate HCl reaction, coarse sand to coarse gravel-sized.
-	16.0				angular to subrounded limestone fragments, with silt
-					that is grayish yellow (5Y 8/4), wet, very stiff, 10-15%
-		1.3	SS-9	9-13-18-30	Sift (ML)
-				(31)	16.0-17.3' - yellowish gray, (5Y 7/2), wet, hard, \text{\nonplastic, rapid dilatancy, moderate HCl reaction, } -
-	18.0				6% fine grained sand
-					Limestone Fragments 18.0-18.2' - moderate to dark yellowish orange, (10YR /-
-		1.4	SS-10	12-18-25-13	\sigma_5/4 to 10YR 6/6), strong HCl reaction, fine to coarse \sigma\limits_gravel-sized, angular fragments up to 2"
-				(43)	Silt (ML)
20					\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\

APPENDIX 2BB-222 Rev. 7



PROJECT NUMBER: BORING NUMBER:

338884.FL A-19

SOIL BORING LOG

SHEET 2 OF 14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723149.9 N, 457976.4 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 2.0 ft bo	gs on 3/23	3/07 S	TART : 3/23/2007 END : 3/26/2007 LOGG	ER:	R. N	McComb
				STANDARD	SOIL DESCRIPTION		ڻ	COMMENTS
LOW N (#)	SAMPLE	SAMPLE INTERVAL (ft) PE		PENETRATION TEST RESULTS	OOIL NAME LIGOO OF CUE OVALED L. COLOT		의 [DEDTIL OF GAGING PRINCIPLE SATE
ACE ATIO		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		S	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		SYMBOLIC LOG	INSTRUMENTATION
23.1	20.0			(14)	Silt (ML)	\dashv		
-				12-19-17-17	20.0-21.4' - Same as 16.0-17.3' except 10-15% fine grained sand, trace medium to coarse grained sand	1		1
-		1.4	SS-11	(36)	gramou cana, nace mediam to course gramou cana			1
-	22.0					1		1
-					Sandy Silt (ML)	T	Ш	1
		1.7	SS-12	38-43-38-44	22.0-22.5' - grayish orange, (10YR 7/4), moist, hard, nonplastic, rapid dilatancy, moderate HCl reaction,	$/ \mathbb{I}$	Ш	
		1.7	33-12	(81)	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	$ \parallel $		
_	24.0				22.5-23.7' - Same as 22.0-22.5' except 10-15% fine	Д,		_
_					\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	/		_
25 18.1		1.4	SS-13	37-27-20-31	24.0-25.4' - Same as 22.5-23.7'	_		_
18.1				(47)		╬	Щ	-
-	26.0				Sandy Silt (ML)	-	\mathbf{H}	-
-					26.0-27.4' - Same as 22.0-22.5'	-11		-
-		1.4	SS-14	21-18-16-11 (34)				-
-				(01)		+	Ш	-
-	28.0				Sandy Silt (ML)	\dashv	Ш	-
-				4-3-2-17	28.0-29.7 - yellowish gray, (5Y 7/2), moist to wet, medium stiff, nonplastic, rapid dilatancy, moderate	-11		-
-		1.7	SS-15	(5)	HCl reaction, 32% fine to coarse grained sand	-11		1
30	30.0					4	Щ	1
13.1	00.0				Sandy Silt To Silt (ML)	力	Ш	7
-		1.4	SS-16	10-20-21-50/3	30.0-31.4' - yellowish gray, (5Y 7/2), wet, hard, nonplastic, rapid dilatancy, mild to moderate HCl	-11		1
_			00 10	(41)	reaction, 25-30% fine to coarse grained sand,	$\mathbb{1}$	Щ	1
	31.8 32.0				decreasing to 10-15% fine grained sand at 30.0-30.3', thin laminae, white calcareous stringers <1/16" thick,	/1		
	32.4	0.3	SS-17	50/5 (50/5")	oriented horizontal to 30 deg Sandy Silt With Limestone (ML)		Ш	
l _				(30/3)	32.0-32.3' - dark yellowish orange, (10YR 6/6), wet,			
_					hard, nonplastic, rapid dilatancy, moderate HCl reaction, 25-30% very fine to coarse grained sand,	11		_
-	34.0		00.15	F0/F	20% disc-shaped limestone fragments up to 1/10"		\Box	_
-	34.4	0.4	SS-18	50/5 (50/5")	Limestone And Sandy Silt (GM)	′Д∐	Щ	4
35 8.1					34.0-34.4' - Same as 32.0-32.3' except low plasticity, mild to moderate HCl reaction, 75% fine to coarse	\mathcal{H}		4
-	26.0				grained sand and fine to coarse gravel-sized; 25% silt	4		-
-	36.0 36.1	0.1	SS-19	50/1	↑ Limestone Fragments	7	\dashv	SPT discontinued at 36.0'
-				(50/1")	36.0-36.1' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, 3 coarse gravel-sized pieces	/-		\Surface casing set to 36.0'
-					recovered	1		-
-					Begin Rock Coring at 36.0 ft bgs See the next sheet for the rock core log	+		-
-					333 the float sheet for the rook core log	+		+
-						+		1
-						1		1
40						1		1
						1	T	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-19

SHEET 3 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723149.9 N, 457976.4 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.0	ft bgs	s on 3/	23/07 START : 3/23/2007 END : 3/	26/20	D7 LOGGER : R. McComb	
≥∩≘	(9)			DISCONTINUITIES	၂	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		SL	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	TH,	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,] Sel	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
LEV.	CORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	×ΜΕ	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ООШ	36.0	22	шФ	36.0-37.0' - Fracture zone, rough, undulating,	S	Limestone	
-	30.0		>10	rounded limestone fragments, some surface		- 36.0-36.5' - yellowish brown, (10YR	-
-				staining	Ш	6/2), fine grained, strong HCl reaction, very weak to weak (R1 to	-
-					₽₩	- R2)	-
_	DALIO				ш	36.5-37.0' - pale yellowish brown, (10YR 6/2), fine to very fine grained,	Driller's Remark: Soft at
_	R1-HQ 5 ft	0			坦	 mild HCl reaction, extremely weak 	40.0-41.0'
-	20%		NR		+	(R0), friable, voids over 80-90% of surface	_
-					H	- No Recovery 37.0-41.0'	_
40 3.1				_			D4: 7 minutes
3.1					世	=	R1: 7 minutes
-	41.0				Н	Limentone	-
-			4	41.1' - Fracture, horizontal, smooth, planar, open 3/8"	P	Limestone - 41.0-43.5' - yellowish gray, (5Y 7/2),	-
-				41.35' - Fracture, <5 deg, smooth,	Щ	fine grained, mild HCl reaction, extremely weak (R0), thin bedding,	-
_			2	undulating, open 3/4" 41.6-41.9' - Fracture zone, 0 to <5 deg,	世	 very friable, thinly laminated from 	_
-	DO LIO			rough, stepped	╂┼	41.3-41.55'	_
-	R2-HQ 5 ft	35	3	42.3' - Fracture, <5 deg, smooth, undulating, open 3/4"	\blacksquare	43.5-44.9' - yellowish gray, (5Y 7/2),	_
-	78%			42.7' - Fracture, horizontal, rough, planar.	+	- fine grained, no to mild HCl reaction,	_
-			3	open 3/4"-1-3/16" 43.0, 43.9' - Fractures (2), horizontal, rough,		weak to extremely weak (R2 to R0), trace organics, voids over 40-50% of	_
45 <u> </u>				undulating, open 3/16" at 43.0', open 3/8" at _	₽	 surface becoming larger with depth, 	R2: 2 minutes —
-1.5			NR	43.9' 44.4, 44.6' - Fractures (2), horizontal, rough,	Ш	trace organic material No Recovery 44.9-46.0'	KZ. Z Illillutes
-	46.0			undulating, open 3/16"-3/8" 44.7' - Fracture, <5 to 40 deg, rough,	口	Limestone	-
-			4	undulating	世	 46.0-50.4' - yellowish gray, (5Y 7/2), 	-
-				46.2' - Fracture, horizontal, smooth, planar, open 1/16"	╆╛	fine grained, no to mild HCl reaction, extremely weak (R0), trace organics,	-
-			3	46.4' - Fracture, horizontal, rough, undulating,	+	voids over 10-15% of surface	-
-	R3-HQ			open 3/16" 46.6' - Fracture, horizontal, smooth, planar,	\blacksquare	_	-
-	5 ft	20	3	tight	╬	-	-
-	88%			46.9, 47.15' - Fractures (2), horizontal, rough, undulating, open 1/16"-3/16"	世	-	-
			2	47.30' - Fracture, <5 deg, rough, undulating,	H	-	-
-6.9			3	tight 47.85' - Fracture, horizontal, smooth,	囯	<u> </u>	R3: No runtime recorded
-	F4.0		NR	undulating, open <1/16" 48.03, 48.55' - Fractures (2), horizontal,	囯	No Recovery 50.4-51.0'	-
-	51.0			smooth, planar, tight	団	Limestone	-
-			>10	48.85, 49.35' - Fractures (2), smooth, planar to undulating, tight	\Box	 51.0-53.3' - yellowish gray, (5Y 7/2), 	-
-				49.60' - Fracture, <5 deg, smooth, stepped,	Ħ	fine grained, mild HCl reaction, very weak to weak (R1 to R2), voids on	-
-			>10	tight 50.0' - Fracture, <5 to 30 deg, rough,	Ħ	 15-25% of surface, cavity up to 3/8" length at 52.3' 	-
-	R4-HQ		>10	stepped, open 3/8"	丗		-
-	5 ft 46%	0		50.2' - Fracture, rough, planar to undulating, open 3/8"		- No Recovery 53.3-56.0'	-
-	4070			50.4' - Fracture, horizontal, smooth, planar,	円	_	-
55 -			NR	open 51.0-51.7' - Fracture zone	囯	_	-
-11.9				51.7' - Fracture, 80 deg, rough, undulating, —	団		R4: 4 minutes
-	56.0			0.4' long, open	\blacksquare	-	-
	JU.U				$\dagger \exists$		
							1

APPENDIX 2BB-224 Rev. 7



PROJECT NUMBER: BORING NUMBER:

338884.FL A-19

SHEET 4 OF 14

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723149.9 N, 457976.4 E (NAD83)

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER LEVELS: 2.0 ft bgs on 3/23/07 START: 3/23/2007 END: 3/26/2007 LOGGER: R. McComb DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 52.9' - Fracture zone, <5 to 90 deg, rough, Limestone 1 undulating 56.0-60.9' - yellowish gray, (5Y 7/2), fine grained, mild HCI reaction, very 56.6' - Fracture zone, 80 to 90 deg, rough, undulating weak to weak (R1 to R2), voids variable from 1-2% to 20-25% of 1 surface R5-HQ 58.0' - Fracture, 30 deg, smooth, planar, SC-1 collected at 58.0-5 ft 87 0 59 3' open 98% 2 59.3' - Fracture, horizontal, smooth, planar, 60 open -16.9 59.9' - Fracture, horizontal, smooth, planar, R5: 4 minutes 1 open <1/16" 60.5' - Fracture, horizontal, smooth, stepped, 61.0 NR No Recovery 60.9-61.0' open 3/8" 61.3, 61.75' - Fractures (2), horizontal, Limestone 3 61.0-66.0' - Same as 56.0-60.9' smooth, planar, open 3/16" except cavities vary from 15-20% decreasing with depth, trace organics 2 as thin discontinuous laminae 62.8' - Fracture, horizontal, smooth, planar, R6-HO tight 0 90 5 ft 63.0' - Fracture, horizontal, smooth, stepped, 100% 1 64.4' - Fracture, 50 deg, smooth, stepped, SC-2 collected at 64.5-65 open 65.5 -21.9 R6: 4 minutes 1 65.5' - Fracture, horizontal, smooth, 66.0 undulating, open Limestone 66.1' - Fracture, horizontal, smooth, planar, 2 66.0-68.5' - Same as 61.0-66.0' open 66.8' - Fracture, <5 deg, smooth, stepped, open 3 67.03' - Fracture, <5 deg, smooth, undulating, tight R7-HQ 67.35' - Fracture, horizontal, smooth, planar, 5 ft 65 1 68.5-70.85' - yellowish gray, (5Y 7/2), very fine to fine grained, no to open 67.9' - Fracture, 0 to 50 deg, rough, stepped, open moderate HCI reaction, very weak to 2 68.45' - Fracture, 70 deg, smooth, planar, weak (R1 to R2), some strong 70 SC-3 collected at 69.7hydrochloric acid reaction in some -26.9 69.6, 69.7' - Fracture (2), 0 to 50 deg, rough, cavities, voids over 20-25% of 0 R7: No runtime recorded undulating, open surface, trace cavities to 3/8"x3/16" 71.0 NR No Recovery 70.85-71.0' Limestone 71.25' - Fracture, horizontal, smooth, 2 71.0-71.3' - Same as 68.5-70.85' undulating, tight to open 3/16" 71.3-73.5' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), very fine to 71.8' - Fracture, horizontal, smooth, stepped, tight, organic black covering 15-20% of 0 fine grained, mild to moderate HCI surface reaction, very weak to weak (R1 to R8-HO R2), laminated in zones with black 88 1 5 ft organic material, fossil plant 73.55' - Fracture, horizontal, smooth, planar, 100% impression along fracture and open bedding planes, voids <5%, trace 1 cavities 75 73.5-76.0' - Same as 68.5-70.85' 74.8' - Fracture, horizontal, smooth, SC-4 collected at 74.9--31.9 undulating, tight 75.7 2 R8: 9 minutes 76.0



PROJECT NUMBER: BORING NUMBER:

338884.FL

A-19

SHEET 5 OF 14

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723149.9 N, 457976.4 E (NAD83)

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing

DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams ELEVATION: 43.1 ft (NAVD88)

WATER LEVELS: 2.0 ft bgs on 3/23/07 START: 3/23/2007 END: 3/26/2007 LOGGER: R. McComb DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 75.6, 75.9' - Fractures (2), <5 deg, rough, Limestone >10 stepped 76.0-77.5' - yellowish gray, (5Y 7/2), very fine to fine grained, mild to 76.0-77.5' - Fracture zone moderate HCl reaction, very weak to >10 weak (R1 to R2), voids on 15-25% of surface, friable NR No Recovery 77.5-78.5' R9-HQ 5 ft 30 SC-5 collected at 78.5-1 Limestone 67% 78.5-80.35' - yellowish gray, (5Y 7/2), 79.65' 1 fine to very fine grained, no to mild HCl reaction, becoming very soft 79.65, 80.0' - Fractures (2), <5 deg, rough, 80 (clay like) at base, organic material in -36.9 NR stepped, open 3/8-3/4" R9: 3 minutes clayey to sandy limestone material No Recovery 80.35-81.0' 81.0 Limestone SC-6 collected at 81-82.75' 0 81.0-86.0' - yellowish gray, (5Y 7/2), very weak to weak (R1 to R2), voids over 30-40% of surface, rare cavities up to 3/16", friable at 83.5-85.6', with 1 interbedded clay to sand sized 82.7' - Fracture, 45 deg, rough, stepped, carbonate grains, some organic R10-H0 open, dark brown clay over 50% surface >10 material 46 5 ft 82.9-83.1' - Fracture zone, <5 deg, 100% undulating, thin brown clay lined <1/16", thick covering 100% surface >10 83.7-86.0' - Fracture, <5 deg, rough, stepped, 85 open, various fractures having different -41.9 R10: 7 minutes >10 86.0 86.0-89.0' - Same as 81.0-86.0' 86.1' - Fracture, 30 to 40 deg, smooth, except cavities up to 3/4" over 1-5% 3 planar, open of surface 86.4' - Fracture, horizontal, rough, stepped 86.95' - Fracture, 30 deg, rough, stepped, SC-7 collected at 87.3-0 tight 88.7 R11-HQ 10 48 5 ft 88.65' - Fracture, 60 deg, rough, planar 88.9-89.1' - Fracture zone, <5 deg, rough, 89.0-89.95' - yellowish gray with light olive brown mottling, (5Y 7/2 with 5Y >10 stepped, open 90 89.4' - Fracture zone, 0 to 60 deg, rough, 5/6), mild to moderate HCI reaction, undulating, tight -46.9 voids on 5-10% of surface, rare small R11: 9 minutes NR cavities, friable No Recovery 89.95-91.0' 91.0 Limestone 91.1' - Fracture, horizontal, smooth, planar, 2 91.0-91.3' - moderate olive brown to open olive gray, (5Y 4/4 to 5Y 3/2), fine to 91.3' - Fracture, 10 deg, smooth, planar, tight very fine grained, moderate HCI 1 reaction, extremely weak (R0), organics 92.8' - Fracture, 90 to 80 deg, rough, planar, 91.3-94.5' - Same as 86.0-89.0' R12-H0 tight 2 except thinly laminated at 91.3-91.4', 5 ft 93.5' - Fracture, horizontal, smooth, planar, 100% with organics open 93.9' - Fracture, horizontal, rough, planar, 2 open SC-8 collected at 94.6-95 94.6' - Fracture, 80 deg, rough, planar -51.9 95.4 95.1-95.65' - Fracture, horizontal, smooth, 10 R12: 9 minutes planar, open 96.0



PROJECT NUMBER: BORING NUMBER:

338884.FL A-19

19 SHEET 6 OF 14

ORIENTATION : Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723149.9 N, 457976.4 E (NAD83)

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS : 2.0	ft bg	s on 3/	23/07 START: 3/23/2007 END: 3/2	26/20	07 LOGGER : R. McComb	
₹ □₽	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H B	E RU STH, SVEF	(%) Q	FS	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
FRA	CECC	Ø	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ΥME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ООШ	075	22	шФ	Tributated, delta rice divintate, rate from the	S		
-			3	96.4' - Fracture, 0 to 90 deg, rough,		Limestone - 94.5-96.0' - yellowish gray, (5Y 7/2),	
-				undulating, open	Н	very fine grained, moderate to strong	1
l -			1	96.7' - Fracture, horizontal, smooth, planar 96.8' - Fracture, continuation of 96.4'	П	HCl reaction, very weak to medium strong (R1 to R3), voids over less]
l _			Ŀ	97.8' - Fracture, 30 deg, smooth, planar	Ш	than 10% of surface, trace organics]
l _	R13-HQ 5 ft	70	2	98.1' - Fracture, horizontal, smooth, planar,	Н	96.0-97.2' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, very	
_	96%	70		tight	Ħ	weak to weak (R1 to R2), laminated,	
			1	98.85' - Fracture, horizontal, rough, undulating, tight	Ш	voids over 25-30% of surface, – cavities over 10-15% of surface, near	00.0
100			'	99.35, 100.35' - Fractures (2), horizontal,	Н	base of interval, possible bioturbation	SC-9 collected at 99.35- 100.35'
-56.9			2	rough, undulating, open, silty infilling covering — 2-3%	ш	at 96.5'	R13: 9 minutes
_	101.0			100.65' - Fracture, horizontal, rough,	\boxplus	 97.2-99.1' - yellowish gray, (5Y 7/2), very fine grained, weak to medium 	1
-			NR.	undulating, open	\mathbb{H}	strong (R2 to R3), thinly laminated	SC-10 collected at 101.0-
-			0	-	Ħ	 with thin (<1") softer zone where voids are more prevalent, voids 	102.35'
-				-	ш	generally <5% of surface, rare	1
-			2	102.35' - Fracture, 30 deg, rough, undulating,	Н	cavities, rare fossils 99.1-100.8' - yellowish gray, (5Y 7/2),	1 1
-	l R14-HQ		\vdash	open 102.5' - Fracture, 60 deg, rough, planar, tight	口	very fine grained, moderate to mild	1 -
-	5 ft 86%	36	1	103.0' - Fracture, <5 deg, rough, stepped,	Ш	L HCl reaction, very weak to weak (R1 to R2), fossiliferous (casts/molds),	1 -
-	00%			open _	Н	increasing with depth, voids over	1 -
			>10	-	H	_ 20-25% of surface, cavities increasing with depth	1 -
105 <u> </u>			>10		Ш	No Recovery 100.8-101.0'	R14: No runtime recorded —
-			NR	-	Н	Limestone 101.0-103.5' - Same as 99.1-100.8'	-
-	106.0			400 41. Frankus kadasakal savak	田	 except fine grained, mild HCI 	1 -
-			3	106.1' - Fracture, horizontal, rough, undulating, open	団	reaction 103.5-105.3' - yellowish gray, (5Y	1 -
-			\vdash	106.6, 106.95' - Fractures (2), <5 deg, rough,	Н	7/2), fine grained, mild HCl reaction,	1 -
-			3	stepped, open 107.1' - Fracture, 70 deg, rough, planar, open	\vdash	very weak to weak (R1 to R2), some fossils (molds/casts), voids over	1 -
-	D45 HO			107.4' - Fracture, horizontal, rough,		- 25-30% of surface, cavities (up to	
-	R15-HQ 5 ft	64	2	undulating, open 107.6' - Fracture, 70 deg, rough, undulating,	Н	1/16"-1/8") over 5% No Recovery 105.3-106.0'	SC-11 collected at 108.35-
-	100%			tight	Ш	- Limestone	109.8'
_			1	108.2, 108.5, 109.0, 110.1' - Fractures (4), <5 deg, rough, undulating, open	Ш	106.0-114.7' - Same as 103.5-105.3'	
110_				— — — —	Н	_	
-66.9			2	140.451.5	\square	_	R15: No runtime recorded
_	111.0			110.45' - Fracture, 60 deg, rough, planar, tight	H	_]
I _			2	_	Н		
				111.7, 111.9' - Fractures (2), 80 deg, rough,	Щ	_	
I -			2	undulating, tight fracture, extends to 112.3'	Щ		1
				112.3' - Fracture, <5 deg, rough, undulating, open	Н		1
-	R16-HQ			112.45' - Fracture, 60 deg, rough, undulating,	$ \Box $		1
Ι -	5 ft 100%	78	0	tight -	H		SC-12 collected at 113.5-
-	,			-	Ш	<u> </u>	114.7'
115			1	- 114.65' - Fracture, <5 deg, smooth,	14	<u> </u>	1
-71.9				undulating, open	囯	_	R16: No runtime recorded —
-	116.0		2	115.02' - Fracture, 30 deg, rough, undulating, open	団	-	1
	110.0				Н		



PROJECT NUMBER: BORING NUMBER: 338884.FL

A-19

SHEET 7 OF 14

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723149.9 N, 457976.4 E (NAD83)

horizontal, smooth, planar, tight to open

136.0

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing

DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams ELEVATION: 43.1 ft (NAVD88)

WATER LEVELS: 2.0 ft bgs on 3/23/07 START: 3/23/2007 END: 3/26/2007 LOGGER: R. McComb DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 115.55' - Fracture, <5 deg, rough, undulating, Limestone 2 114.7-115.7' - yellowish gray, (5Y open SC-13 collected at 116.4-7/2), fine to medium grained, mild to 116.2, 116.4' - Fractures (2), horizontal, rough, undulating, open moderate HCI reaction, very weak to >10 weak (R1 to R2), 1/16" voids over 10-15% of surface, some cavities up 117.2-117.5' - Fracture zone, 0 to <5 deg, Driller's Remark: Possible smooth to rough, planar to stepped, open void from 117.5-120.0' to 3/8"-3/4" irregular shaped, R17-HQ Lost circulation at 118.0' irregular distribution, fossil 17 5 ft NR 50% casts/molds rare to absent 115.7-116.0' - Same as 103.5-105.3' except very fine grained, moderate HCI reaction, weak to medium strong 120 -76.9 (R2 to R3), <5% voids on surface R17: 5 minutes 116.0-117.5' - Same as 103.5-105.3' >10 except possible voids 121.0 No Recovery 117.5-120.0' 121.2' - Fracture, horizontal, rough, stepped, Limestone 2 120.0-121.0' - Same as 103.5-105.3' open 121.4' - Fracture, stepped except light olive brown, 15-20% cavities up to 3/8' 1 121.0-123.1' - Same as 103.5-105.3' except light olive gray to grayish 122.75' - Fracture, 75 deg, rough, stepped, R18-H0 tiaht olive, (5Y 5/2 to 10Y 4/2), 63 1 5 ft 123.10' - Fracture, 40 deg, rough, undulating. fossiliferous zone (cavities) at 122.8' 123.1-124.9' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very 100% tight SC-14 collected at 123.10-2 124.4, 124.92' - Fractures (2), horizontal, 124.4' fine grained, strong HCI reaction, 125 smooth, planar, tight weak to medium strong (R2 to R3), thinly laminated with <5% voids (up -81.9 R18: 10 minutes 1 125.45' - Fracture, <5 deg, rough, undulating, to 10-15%) 126.0 124.9-130.15' - light olive gray, (5Y 5/2), fine grained, moderate to mild 1 126.9' - Fracture, 60 deg, rough, undulating, HCI reaction, weak (R2) tight 0 Driller's Remark: Softer at R19-HQ 82 1 130.0' and below 5 ft 128.5' - Fracture, horizontal, rough, stepped, 88% SC-15 collected at 128.6-130.15' 0 130 -86.9 R19: 8 minutes No Recovery 130.15-130.75' NR Driller's Remark: Lost core from 130.15-130.75' 131.0 1 Limestone 130.9' - Fracture, horizontal, smooth, 130.75-131.8' - Same as undulating, open 3 124.9-130.15' 131.15' - Fracture, vertical, rough, planar, 131.8-133.35' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), no to tight 131.5' - Fracture, <5 deg, rough, undulating, 10 mild HCl reaction, very weak to weak open (R1 to R2), voids on 20-25% of 131.7' - Fracture, 40 deg, rough, undulating, R20-H0 surface, <10% cavities, trace fossils tight 28 6 5 ft 133.35-133.5' - yellowish gray, (5Y 7/2), strong HCl reaction, weak to 132.0-133.0' - Fracture zone 100% SC-16 collected at 133.75-133.15, 133.18, 133.22, 133.40, 133.70, medium strong (R2 to R3), <2% 134.84' 133.80' - Fracture zone, <5 deg, rough, 1 voids, trace cavities planar 135 133.5-133.85' - Same as -91.9 R20: 6 minutes 133.35-133.5' except very weak (R1), 135.22, 135.52, 135.6' - Fractures (3), 10 laminated bedding



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-19

SHEET 8 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723149.9 N, 457976.4 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

				IENT : CIVIE 330X 3/N 340233, IIIdd Total y, FIQ tools, FIV			ORIENTATION : Vertical
WATER	LEVELS : 2.0) ft bg: I	s on 3		26/200		
≥ □ ≎	(%			DISCONTINUITIES	ပ္ထု	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SS	SHR	R S	FE	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-			0			Limestone - 133.85-135.25' - Same as 133.35-133.5'	SC-17 collected at 136.0- 137.3' -
-			3	137.3, 137.5' - Fractures (2), horizontal,	H	135.25-137.3' - Same as - 131.85-133.35']
- -	R21-HQ 5 ft 64%	40	NR	rough, stepped, open 137.9' - Fracture, 50 deg, rough, stepped, open		137.3-137.9' - yellowish gray, (5Y 7/2), fine to very fine grained, mild HCl reaction, very weak to weak (R1 to R2), voids over 15-20% of surface, trace cavities up to 1-3/16", thinly	- - -
140_ -96.9			1	139.70' - Fracture, 50 deg, rough, stepped,	Ħ	 laminated No Recovery 137.9-139.7' Limestone 	R21: 6 minutes
-50.5	141.0		4	open 140.4' - Fracture, 15 deg, rough, stepped, tight	Ħ	 139.7-141.0' - light gray to very light gray, (N7 to N6), very fine grained, 	R21. 0 Hillidges
-			1	140.55' - Fracture, <5 deg, rough, stepped, tight 140.56' - Fracture, horizontal, rough,		 weak (R2), 2-3% voids over surface, cavities over 5-10%, voids and cavities more common with depth,]
-			>10	undulating, tight 140.72' - Fracture, 40 deg, rough, stepped, tight		cavities up to 1/16"-1/8" 141.0-142.05' - Same as 139.7-141.0' except voids up to]
-	R22-HQ 5 ft 100%	72	2	141.6' - Fracture, <5 deg, rough, stepped, tight 142.05-142.35' - Fracture zone, horizontal,	\parallel	10-15% of surface cavities up to 3/16", cavities interconnected 142.05-142.5' - yellowish gray to light]
_ _ 145			1	rough, stepped, open 142.5' - Fracture, horizontal, rough, undulating, tight	H	gray, (5Y 5/2 to N7), strong HCI reaction, weak to medium strong (R2 to R3)	SC-18 collected at 144.15- 145.05'
-101 <u>.9</u>	146.0		3	142.65' - Fracture, horizontal, rough, stepped, tight 143.65' - Fracture, 0 to 20 deg, rough, planar,		 142.5-142.6' - moderate olive brown, fine to very fine grained, extremely weak (R0) 	R22: 10 minutes
-	. 10.0		0	tight 143.95' - Fracture, 20 deg, rough, undulating, tight		142.6-143.5' - Same as 142.05-142.5' 143.5-144.65' - yellowish gray, (5Y	SC-19 collected at 146.0- 147.3'
-			1	144.25' - Fracture, horizontal, rough, stepped, open 145.05' - Fracture, horizontal, rough,		 5/2), strong HCl reaction, weak (R2), voids over 15% of surface 144.65-145.05' - yellowish gray, (5Y]
-	R23-HQ 5 ft 100%	1) 70	1	undulating, open 145.85, 145.90' - Fractures (2), 20 deg, rough, undulating, open		 5/2), very fine to fine grained, mild to moderate HCl reaction, voids rare to absent]
150	100 /0		1	147.3' - Fracture, 0 to 20 deg, rough, undulating, open 148.55' - Fracture, 50 deg, rough, undulating,		- 145.05-145.4' - light olive gray, (5Y 5/2), moderate to strong HCl reaction, weak (R2), voids over]
-106.9 -	151.0		2	tight 149.9' - Fracture, 60 deg, rough, planar, tight 150-150.5' - Fracture, 70 deg, rough,	H	30-40% of surface, cavities over 5-10% of surface, angular to round limestone clasts of very fine grained	R23: 5 minutes
-			2	undulating, tight 150.95' - Fracture, 0 to 90 deg, rough, undulating, tight		limestone 145.4-148.1' - light olive gray, (5Y 5/2), mild to moderate HCI reaction,]
-			0	151.0-151.4' - Fracture, 70 deg, rough, stepped, tight 151.95' - Fracture, 50 deg, rough, undulating,		 very weak (R1), voids on 5-15% of surface 148.1-151.0' - Same as 145.4-148.1']
-	R24-HC 5 ft 100%	 82	2	tight		 except weak (R2), trace cavities up to 3/8", voids over 15-25% of surface 151.0-153.35' - yellowish gray to light]
- - 155	100 /0		3	153.75' - Fracture, horizontal, rough, planar, open 154.15' - Fracture, horizontal, smooth,		 olive gray, (5Y 7/2 to 5Y 5/2), mild to moderate HCl reaction, medium strong to weak (R3 to R2), voids over 	SC 20 collected at 154.7
-111.9 -	9		0	undulating, open 154.30, 154.55' - Fractures (2), horizontal, smooth, undulating, tight	Ħ	5-15% of surface 153.35-154.7' - fine grained, no to mild HCI reaction, very weak (R1),	SC-20 collected at 154.7- 156' R24: 6 minutes -
-	156.0				Ħ	thinly laminated below 154.0'	-
					\bigsqcup		

APPENDIX 2BB-229 Rev. 7



PROJECT NUMBER: BORING NUMBER: 338884.FL

A-19

SHEET 9 OF 14

ORIENTATION : Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723149.9 N, 457976.4 E (NAD83)

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS: 2.0	ft bgs	s on 3/	23/07 START : 3/23/2007 END : 3/2	26/20	07 LOGGER : R. McComb	
≥o≎	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
ACE	L H. H.	(%) Q	7.00 1.00	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	OLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EV.	ORE	Ø	ZAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	072	œ	# 5	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś		
l -			0	_	\vdash	154.7-156.0' - Same as - 151.0-153.35'	
l _				_	\vdash	Limestone	
l _			₁	157.15' - Fracture, 20 deg, smooth, planar,	厂	156.0-158.03' - moderate olive - brown, (5Y 4/4), fine grained, very	
			'	tight, open <1/16", brown clay infilling <1/16" over 10%	Н	weak to weak (R1 to R2), voids on	
	R25-HQ		. 40	158.02-159.0' - Fracture zone, horizontal,	H	15-20% of surface with interlaminate	1
-	5 ft 100%	74	>10	rough to smooth, planar to undulating, open	世	 zones of finer grained limestone with <5% voids, rare cavities 	1
-				to tight -	╙	158.03-158.5' - yellowish gray, (5Y	1
160			2	159.4' - Fracture, horizontal, smooth, planar,	ш	 7/2), fine grained, mild to moderate HCl reaction, weak (R2), <3% voids, 	SC-21 collected at 159.5-
-116.9				tight	世	thinly laminated	160.3' — R25: 7 minutes
-	404.0		2	160.3' - Fracture, horizontal, rough, planar, - open	╁	 158.5-159.4' - yellowish gray, (5Y 7/2), strong HCl reaction, medium 	1\25. / Illillutes
-	161.0		\vdash	160.4' - Fracture, horizontal, rough,		strong (R3), <1% voids, thinly	1
-			5	undulating, tight 161.2, 161.25' - Fractures (2), 30 deg, rough,		laminated159.4-161.65' - light olive gray to light	1 -
-			-	stepped, open	₩	olive brown, (5Y 5/2 to 5Y 5/6), fine	1
-			3	161.55' - Fracture, 40 deg, rough, stepped,	仜	grained, very weak to weak (R1 to	1 -
-	R26-HQ		-	open 161.65' - Fracture, <5 deg, rough, undulating,	╀	R2), voids on 25-30% of surface, 3/8" voids up to 3-5%, very thinly	1 -
-	5 ft	8	>10	open -	F	_ laminated	-
-	100%			161.9' - Fracture, horizontal, smooth, planar, open		161.65-161.87' - light olive gray, (5Y 5/2), fine to very fine grained, weak	1
-			>10	162.6' - Fracture, horizontal, rough,	Н	(R2), voids over 5-10% of surface	_
165_				undulating, open 162.75' - Fracture zone, 30 to 90 deg, rough,	┌	161.87-162.2' - olive gray to medium olive brown, (5Y 3/2 to 5Y 4/4), fine	
-121.9			4	stepped, tight	口	to very fine grained, extremely weak	R26: 6 minutes
l _	166.0			162.9' - Fracture, <5 deg, rough, stepped,	Н	(R0), thinly laminated - 162.2-162.72' - Same as	
l _			>10	open 162.9-163.5' - Fracture zone, <5 to 90 deg,	F	159.4-161.65'	
			10	rough, undulating to stepped, open		162.72-166.0' - yellowish gray, (5Y	
				163.5-165.1' - Fracture zone, horizontal, smooth to rough, planar, open	Н	 5/2), fine grained, moderate to strong HCl reaction, weak (R2), voids over 	1
-			1	165.1' - Fracture, 0 to 50 deg, smooth,	Ш	5-10% of surface	1
-	R27-HQ			planar, open 165.3' - Fracture, 30 deg, smooth, stepped,	鱩	 166.0-166.95' - dusky yellow to light olive brown, (5Y 6/4 to 5Y 5/6), fine 	1
-	5 ft 100%	64	1	tight	╁	grained, moderate HCl reaction, very	SC-22 collected at 168.7-
-				165.5, 165.8' - Fractures (2), 0 to 90 deg, rough, stepped, open	F	 weak (R1), thin laminae of extremely weak rock (R0), voids over 5-10% of 	169.7'
170			3	166.0-167.0' - Fracture zone, 0 to 40 deg,	Ħ	surface	1 1
-126.9			$\vdash \vdash \vdash$	smooth to rough 167.15' - Fracture, 50 deg, rough, planar,	╨	— 166.95-168.5' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine to	R27: 8 minutes
-	171.0		10	tight	圧	very fine grained, laminated with very	
-	171.0		$\vdash \vdash \vdash$	167.85' - Mechanical break	世	 fine grained limestone with <1% voids, rest of rock up to 15-20% 	
-			2	168.70' - Fracture, horizontal, rough, undulating, tight	\vdash	voids, rest of rock up to 15-20% voids, rare cavities	-
-			$\vdash \vdash \vdash$	169.7' - Fracture, horizontal, rough,	F	168.5-169.9' - yellowish gray, (5Y	-
-			2	undulating, open 169.7-170.1' - Fracture zone, 0 to 90 deg,		7/2), fine grained, very weak to weak (R1 to R2), voids over 5-10% of	-
-	R28-HQ		$\vdash \vdash \vdash$	rough, undulating, tight	\vdash	_ surface ´	-
-	5 ft	74	2	170.1' - Fracture, <5 deg, rough, undulating, open	\Box	169.9-171.0' - yellowish gray, (5Y 7/2), fine grained, weak (R2), voids	-
-	100%		\square	170.65' - Fracture, 5 deg, rough, undulating,	団	over 15-25% of surface, 1/8"-3/16"	
-			5	tight	F	cavities over 5% of surface]
175_				171.55' - Fracture, horizontal, rough, stepped, tight	F	_	R28: 8 minutes
-131.9			₁	171.85' - Fracture, 60 deg, rough, undulating,	Ľ	_	<u> </u>
	176.0		_ '	tight	dash		



PROJECT NUMBER: BORING NUMBER:

338884.FL A-19

SHEET 10 OF 14

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723149.9 N, 457976.4 E (NAD83)

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER LEVELS: 2.0 ft bgs on 3/23/07 START: 3/23/2007 END: 3/26/2007 LOGGER: R. McComb DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 171.0-177.4' - yellowish gray to pale olive, (5Y 7/2 to 10Y 6/2), fine 172.20' - Fracture, 50 deg, rough, undulating, End drilling on 3/24/07 at 10 tight 176.0' at 17:00 hrs 172.70' - Fracture, horizontal, smooth, planar, grained, moderate to strong HCI Water level at 2.0' below infilling, tight, brown silty infilling over 5% reaction, weak (R2), generally <3-5% ground surface 7 173.1' - Fracture, horizontal, rough, voids, voids up to 10-15% of surface Begin coring at 176.0' on from 174.0-174.7', rare cavities up to 3/25/07, continuing to have undulating, tight 173.3' - Fracture, <5 deg, rough, undulating, 3/4" to 1-3/16" lost circulation R29-HQ 28 2 open Limestone 5 ft 177.4-178.5' - light olive gray, (5Y 5/2), mild to moderate HCl reaction, 174.05' - Fracture, horizontal, rough, 72% undulating, black stain over 5% >10 174.45' - Fracture, 10 deg, rough, planar, weak (R2), voids on 10% of surface, tight 3/4" to 1-3/16" cavities on 3-5% of 180 174.7' - Fracture, <5 deg, rough, stepped, surface, thin organic laminae at -136.9 R29: 8 minutes NR 177.8' inclined at 30-40 deg open 174.82' - Fracture, 10 deg, smooth, planar, dark brown clay over 80%, open 178.5-179.6' - yellowish gray, (5Y 181.0 7/2), fine grained, strong HCI 174.87' - Fracture, 10 deg, smooth, planar, reaction, weak (R2), voids over 2 dark brown clay over 80%, open 175.4-176.0' - Fracture, vertical, rough, 5-10% of surface, cavities over 5-10% of surface, typically 3/8" long, Driller's Remark: Soft at undulating to stepped, tight 176.3-176.8" - Fracture, 0 to 90 deg, rough, fossiliferous >10 183 0-184 0 No Recovery 179.6-181.0' undulating to stepped, open 177.15, 177.25, 177.3' - Fractures (3), 20 Limestone R30-H0 181.0-183.0' - yellowish gray, (5Y >10 5 ft 14 deg, smooth, planar, open 96% 7/2), fine grained, moderate to strong 177.5' - Fracture, <5 deg, rough, undulating, HCl reaction, weak (R2), voids on 3-5% of surface, some cavities up to 4 177.6' - Fracture, <5 deg, smooth, 3/4" to 1-3/16" long 185 undulating, open 177.75, 177.85' - Fractures (2), 20 deg, 183.0-183.5' - moderate olive brown, -141.9 R30: 8 minutes (5Y 4/4), fine grained, very weak 2 rough, planar, open (R1), voids on 5-10% of surface 186 0 NR 183.5-184.2' - yellow gray to light olive gray, (5Y 7/2 to 5Y 5/2), strong 178.3' - Fracture, 30 deg, rough, undulating, tight 3 178.85' - Fracture, 60 deg, rough, undulating. HCI reaction, weak (R2) 184.2-185.3' - yellowish gray, open 181.7' - Fracture, <5 deg, rough, stepped, moderate to strong HCl reaction, 2 SC-23 collected at 187.3weak (R2), voids over 28-30% of tiaht 188.6 surface, cavities over 5-10% of 181.8' - Fracture, vertical, smooth, R31-HQ undulating, tight surface fossiliferous 68 3 5 ft 185.3-185.8' - Same as 183.5-184.2' **No Recovery 185.8-186.0'** 181.95' - Fracture, <5 deg, rough, stepped, 100% tight 182.5-182.75' - Fracture zone, rough to Limestone 3 186.0-187.0' - yellowish gray, (5Y smooth, various fracture plane orientations 190 182.5' - Fracture, <5 deg, rough, undulating, 7/2), very fine grained, moderate to -146.9 R31: 7 minutes strong HCI reaction, weak (R2), open 1 182.75' - Fracture, <5 deg, rough, undulating, voids on 1-3% of surface 191.0 187.0-187.3' - Same as 186.0-187.0' open except voids increase to 15-20% with 183.0' - Fracture, <5 deg, rough, undulating, 3 some cavity infilling and staining on open SC-24 collected at 191.55-183.2' - Fracture, 30 deg, rough, undulating, vertical fractures 192.55 187.3-189.2' - yellowish gray, (5Y 7/2), strong HCl reaction, weak (R2), open 1 183.45-183.65' - Fracture zone 183.65-185.7' - Fracture, vertical, undulating voids over 1-3% of surface R32-HQ 189.2-190.0' - moderate olive brown, to planar, tight 4 5 ft 40 184.2' - Fracture, horizontal, rough, planar to (5Y 5/6), fine grained, no to mild HCI 100% reaction, extremely weak to very weak (R0 to R1), voids over 40-50% stepped 184.3' - Fracture, 50 deg, rough, stepped, >10 of surface, irregular cavities up to open 195 184.6, 185.1' - Fracture (2), 0 to 90 deg, 3/8"-3/4" -151<u>.9</u> R32: 9 minutes rough, undulating >10 186.0-186.9' - Fracture, vertical, rough, 196.0 stepped, tight



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-19

SHEET 11 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723149.9 N, 457976.4 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.0) ft bgs	s on 3	/23/07 START : 3/23/2007 END : 3/	26/20	07 LOGGER : R. McComb	
≥∩ ∵	(9)			DISCONTINUITIES	ڻ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A A CE	STA	(%) _Q	TUS:	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	٦ ا	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
THE	SING	Ø	SAC ER F	PLANARITY, INFILLING MATERIAL AND	/MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	225	œ	# #	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	
			1	186.25' - Fracture, horizontal, smooth, planar 186.8' - Fracture, <5 deg, rough, stepped,	$oldsymbol{oldsymbol{oldsymbol{eta}}}$	190.0-191.0' - light olive brown, (5Y - 5/6), fine grained, no to mild HCl	SC-25 collected at 196.0- 196.9'
_			ı i	tight	Щ	reaction, very weak (R1), voids on]
			0	187.3, 187.4, 187.55' - Fractures (3), 50 deg, rough, undulating, tight		25-30% of surface, small cavities on 1-3% of surface	
1 7			0	188.6' - Fracture, <5 deg, smooth,	\vdash	Limestone	1
1 7	R33-HQ			undulating, open		191.0-193.5' - yellowish gray, (5Y	1 1
-	5 ft 96%	75	0	188.7' - Fracture, <5 to 90 deg, rough, stepped, open	Ш	 7/2), fine to very fine grained, moderate to strong HCl reaction, 	1 1
-	00,0			189.35' - Fracture, horizontal, rough, planar,	╙	weak (R2), trace cavities up to	1 1
200			3	open, black organics over 95% 189.5' - Fracture, horizontal, rough,	口	 3/8"-3/4" in length, voids on 10-15% of surface 	1 1
-156.9				undulating, open	Ш	193.5-193.65' - light olive brown, (5Y	R33: 9 minutes
-	004.0		4	189.95, 190.0' - Fractures (2), horizontal,	╁	 5/6), moderate HCl reaction, very weak (R1), voids over 1-5% of 	1 -
-	201.0		NR.	191.1' - Fracture, 50 deg, rough, undulating,		surface, thinly laminated at base,	-
-			4	open	世	trace organics	-
-				191.25' - Fracture, <5 deg, rough, undulating, open	\vdash	193.65-195.0' - yellowish gray, (5Y 7/2), fine grained, strong HCl	1 -
-			4	191.5' - Fracture, 50 deg, rough, stepped,	仜	reaction, very weak (R1), voids over	1 -
-	D24 LIO			tight 192.55' - Fracture, 40 deg, rough, undulating,	╁┼	1-5% of surface 195.0-196.0' - dusky yellow, (5Y 6/4),	1 -
-	R34-HQ 5 ft	52	2	tight .	F	fine grained, moderate to strong HCl	1 -
_	98%			193.55, 193.65' - Fractures (2), <5 deg, rough, undulating, open		reaction, very weak (R1), voids on 1-5% of surface	-
1 4			2	193.8' - Fracture, 40 deg, smooth, undulating,	╨	196.0-196.9' - yellowish gray, (5Y	
205_				open 193.95-196.0' - Fracture zone, various —	oxdot	7/2), fine grained, mild to strong HCl reaction, very weak (R1), voids on	
-161.9			0	orientations, rough, open		15-20% of surface, cavities over 10%	R34: 10 minutes
	206.0			196.9' - Fracture, <5 deg, rough, stepped 199.74' - Fracture, horizontal, rough,	Н	196.9-197.8' - yellowish gray, (5Y - 7/2), fine grained, strong HCl	
			NR) 2	stepped, open		reaction, very weak to weak (R1 to	
				199.8' - Fracture, horizontal, rough,		R2), voids over 1-5% of surface,	SC-26 collected at 206.6-
			_	undulating, open 199.95, 200.03' - Fractures (2), horizontal,	\vdash	 cavities rare 197.8-199.4' - Same as 196.0-196.9' 	207.65'
1 7			4	rough, stepped, open	Ш	199.4-200.2' - yellowish gray to light	1 1
-	R35-HQ			200.20' - Fracture, 20 deg, smooth, undulating, open	世	 olive gray, (5Y 7/2 to 5Y 5/2), fine grained, strong HCl reaction, very 	1
-	5 ft 100%	42	4	200.5, 200.65' - Fractures (2), horizontal,	╁	weak (R1), voids over 5-10% of	1 1
-	10070			rough, stepped, open 201.05' - Fracture, <5 deg, rough, stepped,	Ħ	 surface, trace cavities 200.2-200.8' - yellowish gray, very 	1 1
210			10	open		fine grained, very weak to weak (R1	1 1
210 -166.9				201.3' - Fracture, 0 to 90 deg, rough, — undulating, open	\vdash	— to R2), voids on 1-3% of surface, cavities over 10-15% up to	R35: 9 minutes —
-	044.0		>10	201.4, 201.5' - Fractures (2), <5 deg, rough,	口	3/4"-1-3/16" length, abundant	-
-	211.0			undulating, open	士	- hair-line fractures	-
-			>10	pianai, ligit	+	No Recovery 200.8-201.0' Limestone	-
-				202.75-203.1' - Fracture zone, 50 to 60 deg,	F	_ 201.0-202.5' - Same as 200.2-200.8'	-
-			10	rough, planar, tight 203.85, 204.55' - Fractures (2), <5 deg,	世	202.5-203.0' - light olive gray, (5Y 5/2), fine grained, very weak (R1),	-
-	Doc Lio		>10	rough, undulating, tight	$oldsymbol{oldsymbol{\sqcup}}$	voids on 1-3% of surface, laminated	-
	R36-HQ 5 ft	14		204.8-205.5' - Fracture zone, 50 to 60 deg, rough, undulating, open	厂	organics in lower section	-
	46%			206.25, 206.6' - Fractures (2), <5 deg, rough,	\vdash	<u></u>	-
				undulating, tight 207.65, 207.85' - Fractures (2), <5 deg,	\vdash	<u>-</u>	
215			NR	smooth, planar, open, organic material over	Ħ	_	
-171 <u>.</u> 9				30% 207.94' - Fracture, horizontal, rough,	H	_	R36: 10 minutes
	216.0			undulating, open	\coprod		
				-			

APPENDIX 2BB-232 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-19

SHEET 12 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723149.9 N, 457976.4 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.0	ft bgs	on 3/	23/07 START: 3/23/2007 END: 3/3	26/20	D7 LOGGER : R. McComb	
≥∩≘	_ ()			DISCONTINUITIES	၂ ဖွ	LITHOLOGY	COMMENTS
BELO SE ANI TON (f	L'AND H, AND ERY (9	(%)	JRES OT	DESCRIPTION		ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
			4	207.98, 208.1' - Fractures (2), horizontal, smooth, planar, organic material over 40%	E	203.0-205.9' - yellowish gray to light olive yellow, (5Y 7/2 to 5Y 5/2), very	-
-				208.13' - Fracture, 40 deg, smooth, planar, open	H	fine grained, mild to moderate HCI reaction, weak (R2), voids over	_
1 -			>10	208.4-208.55' - Fracture, rock has	₽	- 40-50% of surface, cavities up to	-
				semi-circular fracture pattern, discontinuous,		1-3/16"-1-9/16" penetrating into core,	-
	R37-HQ 5 ft	0		unbroken fracture plane 208.55' - Fracture, 10 deg, smooth, planar,		some recrystallization infilling with very fine grained limestone in	-
	37%			tight	┢	cavities, trace fossil casts	_
			NR	208.80' - Fracture, horizontal 209.05' - Fracture, horizontal, smooth, planar,		No Recovery 205.9-206.0' Limestone	_
220_				open	世	206.0-207.65' - Same as	_
-176.9				209.20' - Fracture, <5 deg, rough, undulating, open	⊬	203.0-205.9' Limestone	R37: 8 minutes
	221.0			209.85-211.0' - Fracture zone, numerous	\blacksquare	207.65-209.75' - yellowish gray, (5Y	
7			>10	fractures of different orientations 211.0-212.05' - Fracture zone, numerous	上	5/2), very fine grained, very weak (R1), voids over 10-15% of surface,]
			-10	fractures of different orientations	\vdash	trace cavities (up to 3/8"x3/16")	
1 7			. 40	212.75, 212.9' - Fractures (2), 10 deg, rough, planar, tight		ellipsoidal in shape 209.75-212.0' - light olive gray, (5Y	1
1 1			>10	212.9-212.15' - Fracture zone, various		7/2), fine grained, mild HCl reaction,	1
1 1	R38-HQ			orientations 216.0-216.2' - Fracture zone, horizontal,	╨	very weak (R1), voids on 20-30% of surface	1
1 1	5 ft 76%	21	>10	rough, planar, open	ш	212.0-213.3' - very fine grained, mild	1 1
1 1			_	216.55' - Fracture, <5 deg, rough, undulating,		to moderate HCl reaction, voids on	1 1
225			2	open 216.75' - Fracture	╁	_ 15-20% of surface, 10-15% cavities up to 3/4" to 1-3/16" in length	-
-181.9				216.9' - Fracture, horizontal, smooth,	Ħ	No Recovery 213.3-216.0	R38: 8 minutes
1 -	226.0		NR	undulating, open 217.05-217.3' - Fracture zone, horizontal,	世	Limestone 216.0-216.8' - yellowish gray, (5Y	1
1 +	226.0			smooth, planar, open	╁	7/2), moderate HCl reaction, weak	-
			10	217.3' - Fracture, horizontal, rough, planar, open	oxdot	(R2), fossiliferous, laminated with black organic material,voids over	-
				217.57-217.8' - Fracture zone, rough, planar,	仜	- 20% of surface, cavities up to 3/8" on	-
-			>10	various orientations 221.0' - Fracture, horizontal, rough,	\vdash	_ 5% of surface 216.8-216.9' - yellowish gray, (5Y	-
-	R39-HQ			undulating, open	\vdash	 7/2), very fine grained, moderate HCl 	-
-	5 ft	0	>10	221.6-222.05' - Fracture zone, horizontal, rough, undulating, open	Ë	reaction, weak (R2) 216.9-217.85' - Same as	-
	56%			221.7-222.0' - Fracture zone	世	 216.8-216.9' except color is lighter 	-
				222.3' - Fracture, horizontal, rough, stepped, open	\vdash	No Recovery 217.85-221.0' Limestone	-
230 <u>-</u> -186.9			NR	222.5' - Fracture zone, 20 deg, rough, —	厂	— 221.0-222.3' - yellowish gray, (5Y	R39: 10 minutes
1 -				undulating, open 222.7-223.6' - Fracture zone	士	7/2), fine to very fine grained, very weak (R1), rounded to subrounded	-
	231.0			224.05, 224.3' - Fractures (2), 60 to 70 deg,	╁╴	 rock fragments, voids on 5-10% of 	-
-			>10	rough, undulating, open 224.65' - Fracture, <5 deg, rough, undulating,	F	surface, 3/4"-3/16" cavities on 10% of surface	-
-				open -	岸	 222.3-223.4' - yellowish gray, (5Y 	-
-			>10	226.4' - Fracture, <5 deg, rough, undulating, open	世	7/2), very fine grained, mild to moderate HCl reaction, very weak	-
-	D 40 110			226.4-226.65' - Fracture zone, rough,	\vdash	_ (R1)	-
	R40-HQ 5 ft	9	>10	undulating, gravel-sized limestone fragments, open	口	223.4-223.5' - Same as 221.0-222.3' 223.5-224.8' - pale gray, (5Y 6/2),	-
	64%			226.5' - Fracture, horizontal, rough,	士	fine grained, mild HCl reaction, very	_
			1	undulating, open 227.05-228.8' - Fracture zone, <5 deg, rough,	F	weak (R1), fossiliferous, voids on 20-25% of surface, cavities (<3/8")]
235_			ND	stepped, open	片	over 1-3% of surface	
-191.9			NR	231.0-232.0' - Fracture zone, various orientation, gravel-sized rock fragments,	片	No Recovery 224.8-226.0'	R40: 9 minutes
	236.0			black coating on fragments from 231.0-231.2'	\sqsubseteq		
				<u> </u>			

APPENDIX 2BB-233 Rev. 7



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-19

SHEET 13 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723149.9 N, 457976.4 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS : 2.0	ft bgs	s on 3/	23/07 START: 3/23/2007 END: 3/2	26/20	07 LOGGER : R. McComb	
> O =	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BI	E RU STH, OVEF	(%) Q	FOO	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SURF	COR	RQI	-RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMI	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
		_		232.4-232.8' - Fracture, vertical, rough,	<i>"</i>	Limestone	
-			>10	undulating, tight - 233.0-233.6' - Fracture zone, various	Н	 226.0-228.8' - yellowish gray, (5Y 7/2), fine grained, mild to moderate 	1
-			>10	orientations	F	HCl reaction, very weak (R1), voids	1
-				233.7' - Fracture, 0 to 90 deg, smooth, planar, open	F	 over 5-10% of surface, concentrated to 20-30% of surface in thin (1") 	1
-	R41-HQ			234.2' - Fracture, horizontal, rough,	Ħ	beds, trace organics, cavities up to	1
_	5 ft 30%	0		undulating, open 236.0-236.75' - Fracture zone, 0 to <5 deg,	岸	 3/4"-1-3/16" present at 226.0-226.7' No Recovery 228.8-231.0' 	1
			NR	rough, stepped to undulating, open, distinct fracture planes at 236.12', 236.4', 236.75'	片	Limestone 231.0-231.8' - light olive brown, (5Y]
240_				237.0-237.5' - Fracture zone, gravel-sized	H	5/6), fine grained, very weak (R1),	
-196.9				rock fragments	⊬	voids over 15-20% of surface Limestone	R41: 8 minutes
-	241.0			044 0 040 01	尸	231.8-233.5' - yellowish gray, (5Y 7/2), very fine grained, very weak	_
-			>10	241.0-243.0' - Fracture, 0-90 deg, rough, planar, open	\Box	 (R1), gravel-sized limestone 	
-				-	厂	fragments, trace voids 233.5-234.2' - yellowish gray, (5Y	-
-			>10	-	世	7/2), very fine to fine grained, moderate to mild HCl reaction, very	-
-	R42-HQ		-	-	士	weak (R1), trace to 10% voids	-
-	5 ft	0		-	\vdash	 increasing with depth, some organic staining at 234.1' 	-
-	40%			-	╁	No Recovery 234.2-236.0'	-
245			NR	-	F	Limestone 236.0-236.75' - yellowish gray, (5Y	1
-201.9					厈	7/2), fine grained, no to mild HCl reaction, very weak (R1), sandy	R42: 9 minutes
-	246.0			-	Ħ	texture with inclined fracture traces	1
-	2.0.0		. 10	246.0-247.0' - Fracture zone	Ħ	- 236.75-237.5' - Same as 233.5-234.2'	1
			>10		片	No Recovery 237.5-241.0' Limestone]
_			10	247.1' - Fracture, horizontal, smooth, planar,	H	241.0-243.0' - yellowish gray, (5Y	
_				open = - 247.4' - Fracture, 80 deg, rough, stepped, = -	Ľ	7/2), very fine to fine grained, no to - mild HCl reaction, limestone]
_	R43-HQ 5 ft	0	3	open 247.6' - Fracture, horizontal, rough,	⊬	fragments, voids and cavities present	
-	46%			undulating to stepped, open	尸	on some surfaces - No Recovery 243.0-246.0'	-
-			NR	248.05, 248.25, 248.35' - Fracture (3), horizontal, rough, undulating, open	H	Limestone 246.0-248.3' - fine to very fine	-
250_ -206.9					厂	 grained, mild HCl reaction, extremely 	R43: 9 minutes
-	054.0			-	口	weak to weak (R0 to R2), voids over 30-40% of surface to 247.8', 0-5% of	-
-	251.0			-	世	 surface on 247.8-248.3' No Recovery 248.3-251.0' 	-
-				-	世	No Recovery 251.0-256.0'	
-				-	\perp	-	1
-				-	\vdash	Ī	1
-	R44-HQ	0	NR	_	\vdash		1
	5 ft 0%	U	INIX		F]
					F	_]
255_				_	Ë		
-211.9				-	H	 -	R44: 6 minutes
	256.0				H		
						<u> </u>	

APPENDIX 2BB-234 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-19	SHEET	14	OF	14	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723149.9 N, 457976.4 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

	LEVELS : 2.0			/23/07 START : 3/23/2007 END : 3/2			Order Transit Volume
				DISCONTINUITIES	П	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		rES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING
TH BE	STH,	Q D (%)	TUR FOO	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	30Li	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SURF	SORI	RO	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	012			256.0-257.0, 261.0-261.5' - Fracture zone,	J.	Limestone	
-			>10	various orientations, gravel-sized rock - fragments	┢	 256.0-257.0' - yellowish gray, (5Y 7/2), fine grained, no to mild HCl 	-
-				- Inaginerius	H	reaction, extremely weak to very	-
-				-	F	 weak (R0 to R1), poorly fossiliferous, some organic staining 	
	R45-HQ 5 ft	0			F	No Recovery 257.0-261.0']
_	20%	U	NR	_	H	_	_
_			1411	_	Ħ	_	_
260 -216.9				_	H	_	
-210.9				-	Ħ	-	R45: 13 minutes
-	261.0		>10	-	H	Limestone	-
-			>10	-	片	- 261.0-261.5' - Same as 256.0-257.0'	
-				-	Н	No Recovery 261.5-266.0'	-
-				-	H	-	-
-	R46-HQ			-	F	-	-
-	5 ft 10%	0	NR	-	ш	-	-
-				-	ш	_	1
265				_	口		
-221.9				_	上	_	R46: 9 minutes
-	266.0				H	Detter of Design at 2000 0 ft has a	
-				-	-	Bottom of Boring at 266.0 ft bgs on - 3/26/2007	_
-				-	-	_	-
-				-	-	-	-
-				-	1	-	-
-				-	1	-	-
-				-	1	-	-
-				-	1	-	1
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PROJECT NUMBER: BORING NUMBER: 338884.FL

A-20

SHEET 1 OF 14

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723068.1 N, 458060.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 wing bit ORIENTATION: Vertical

WATER	LEVELS	: 1.61 ft l	ogs on 6/	14/07 S	START : 4/24/2007 END : 5/1/2007 LOGGE	R:	C.	Dougherty, R. McComb
				STANDARD	SOIL DESCRIPTION	J	g	COMMENTS
A AND	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		7	CLO	
A BE		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	ı	OLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	ı	SYMBOLIC LOG	INSTRUMENTATION
□ あ iii 42.3	0.0			(N)	Poorly Graded Sand With Organics (SP)	+	S	
-	0.0			0004	0.0-1.0' - light gray, (N6), moist, loose, very fine to fine	+		-
-		1.6	SS-1	2-2-3-4 (5)	grained, up to 30% fine organics, trace nonplastic fines, grades to silty sand below	+		-
-				(-)	Silty Sand (SM)	41		-
-	2.0				1.0-1.6' - grayish brown, (5YR 3/2), moist, loose, fine grained, 20% nonplastic fines, fines may be organics	+	11	-
-				0.004	Silty Sand (SM)	+		-
-		1.0	SS-2	3-6-8-4 (14)	2.0-3.0' - Same as 1.0-2.0' except moderate yellowish brown, (10YR 5/4), wet, medium dense, trace roots	┦¹		-
-	4.0			` ′	, , , , , , , , , , , , , , , , , , , ,	1		-
-	4.0				Poorly Graded Sand With Silt (SP-SM)	+	H	Water level is based on Ground Water
				4404	4.0-6.0' - pale yellowish brown, (10YR 6/2), wet, very	-1		Monitoring at LNP site (FSAR Table -
5 37.3		2.0	SS-3	1-1-0-1 (1)	loose, fine grained, 8% low plastic fines, grades to dusky brown (5YR 3/2)	Hį		2.4.12.08) Driller's Remark: Spoon fell through 3rd 6
-				, ,		H	H	inches -
-	6.0				Silty Sand (SM)	+		Driller's Remark: Spoon fell through entire 2'
-				0-0-0-0	6.0-6.4' - Same as 4.0-6.0' except 10% nonplastic	Ŧ		interval -
-		0.4	SS-4	(0)	fines	┨		-
-	8.0			, ,		┨		-
-	0.0				Lean Clay With Sand (CL)	+		-
-				1-2-6-15	8.0-8.8' - yellowish gray, (5Y 8/1), wet, medium stiff, moderate plasticity, 29% fine to coarse sand and fine	1		-
-		1.4	SS-5	(8)	to coarse gravel, lens of light bluish gray (5B 7/1), fat	Ή		1
10	10.0				clay (CH), no HCl reaction in CH.	Ŧ		-
32.3	10.0				Silt (ML) 8.8-9.4' - grayish orange, (10YR 7/4), wet, hard,	П	П	-
-				12-33-46-50/5"	nonplastic, rapid dilatancy, moderate HCl reaction, 5-10% very fine sand, all carbonate	1		1
-		1.6	SS-6	(79)	Silt (ML)	1		1
-	12:8				10.0-11.6' - grayish orange, (10YR 7/4), wet, hard, nonplastic, rapid dilatancy, moderate HCl reaction,	┦	Ш	1
-	12.0				√5-10% very fine sand, all carbonate	T	П	1
-		1.3	SS-7	22-46-50/4" (96/10")	Silt (ML) 12.0-13.3' - Same as 10.0-11.6'	1		1
-	13.4			(56/10)	12.0 10.0 04.10 40 10.0 11.0	4	Ш	1
1 -	14.0				•	1		1
-					Silt (ML)	\dagger	Ш	1
15				29-41-46-50	14.0-15.7' - Same as 12.0-13.3' except trace sand	1		1
27.3		1.7	SS-8	(87)	_	1		
	16.0					7	Щ	1
					Silt With Sand (ML)	\uparrow	\prod	1
		4 7	00.0	29-18-14-12	16.0-17.7' - grayish orange, (10YR 7/4), wet, hard, nonplastic, rapid dilatancy, moderate HCl reaction,	1		1
		1.7	SS-9	(32)	10-15% very fine to fine sand-sized, 5% medium to	1		1
1	18.0				coarse sand, all carbonate.	7	Щ	1
-					Silt With Sand (ML)	1	\prod	1
		2.0	00 40	21-41-40-19	18.0-20.0' - Same as 16.0-17.7' except moist	1		1
		2.0	SS-10	(81)				1
20								
					-	T		
						\perp		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-20 SHEET 2 OF 14

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723068.1 N, 458060.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 wing bit ORIENTATION: Vertical

					S/N 340233, mild rotary, auto hammer, Avv3 rods, 3-7/6 wing bit ORIENTATION . Ventical	_
WATER	LEVELS	: 1.61 π ι	ogs on 6/	14/07	START: 4/24/2007 END: 5/1/2007 LOGGER: C. Dougherty, R. McComb	\neg
< D =				STANDARD PENETRATION	SOIL DESCRIPTION COMMENTS	\dashv
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	
H H H H H		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND	
FF F			#TYPE	6"-6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
김징급				(N)	· ·	_
22.3	20.0				Silt With Sand (ML) 20.0-21.9' - Same as 18.0-20.0' except lenses of	
				30-37-33-50	coarse sand at 20.7 and 21.7', all carbonate	7
-		1.9	SS-11	(70)	1	- 1
-	00.0					-1
-	22.0				Silt With Sand (ML)	\dashv
-					22.0-23.7' - grayish orange, (10YR 7/4), moist, hard, -	4
-		1.7	SS-12	42-48-38-45	nonplastic, very rapid dilatancy, moderate HCl	4
_				(86)	reaction, 10% to 20% fine to medium sand, carbonate	_
	24.0					J
	24.5	0.5	SS-13	50/5" (50/5")	Sandy Silt To Silt With Sand (ML)	
25				(50/5")	24.0-24.4' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), moist to wet, hard,	1
17.3					\ nonplastic, rapid dilatancy, mild to moderate HCl \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	\dashv
-	00.0				reaction, up to 25-30% fine to medium sand-sized	-1
-	26.0				grains decreasing with depth to 10-15%, all carbonate	-1
-		1.4	SS-14	43-44-50/3"	26.0-27.3' - dark yellowish orange, (10YR 6/6), moist -	\dashv
_		1.4	33-14	(94/9")	to wet, hard, nonplastic, moderate HCl reaction, 20-25% fine to coarse sand, trace white carbonate	
_	27.4				clay in stringers <1/16" thick	_
	28.0				/	J
					Silt With Sand (ML)	
				16-30-32-33	28.0-29.8' - Same as 26.0-27.4' except 20% sand	1
-		1.8	SS-15	(62)	 	-1
	00.0					-1
30 <u> </u>	30.0				Silt With Sand (ML)	\dashv
-					30.0-31.6' - Same as 28.0-29.8'	\dashv
-		1.6	SS-16	11-14-28-50	4	
_				(42)	 	_
I _	32.0 32.2					J
	32.2	0.2	SS-17	50/2" (50/2")	Silt (ML) Silt (ML) Driller's Remark: Some drill chatter 32.0-32.1' - dark yellowish orange, (10YR 6/6), moist 34.0'	
				(30/2)	to wet, hard, nonplastic, rapid dilatancy, moderate HCl	1
1 -					\reaction, 10-15% fine to medium sand, 5-10% white	- 1
-	24.0				carbonate clay stringers <1/16" thick	-1
-	<u>34</u> .9	0.0	SS-18	50/0"	Organic Soil (OL) 32.1-32.2' - grayish brown, (5YR 3/2), moist to wet, Apparent top of rock at 34'	-
				(50/0")	firm, low to medium plasticity, no to mild HCl reaction, - End of soil boring on 4/24/07 at 16:30, will	\dashv
35 7.3					trace white stringers continue hole with rock coring 34.0-35.0' interval drilled through to set	\dashv
'.5 -					Begin Rock Coring at 35.0 ft bgs - stroke	A
_					See the next sheet for the rock core log	_1
						J
					1	1
-					1	-
-						-
-					-	-
-					-	-
-]]	
40						



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-20
SHEET 3 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723068.1 N, 458060.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS : 1.6	1 ft bo	gs on (6/14/07 START : 4/24/2007 END : 5/	/1/200	07	LOGGER : C. Dougherty, R. McC	Comb
				DISCONTINUITIES	Т	Т	LITHOLOGY	COMMENTS
AND (f)	-, N N N N N N N N N N N N N N N N N N N		S.	DESCRIPTION			ROCK TYPE, COLOR,	OUTE AND DEDTIL OF GARNING
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
THE AND	NG- COO!	Ω	RAC1	PLANARITY, INFILLING MATERIAL AND	MB		AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
		ď	F. F.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S		CHARACTERISTICS	,
7.3	35.0		1	0541-5-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-1-	$oldsymbol{\perp}$	Ł	Limestone 35.0-39.7' - light olive gray, (5Y 5/2),	Rock coring begins at 35' below ground surface, -
			'	35.4' - Fracture, horizontal, rough, undulating	口	1	moderate to strong HCl reaction	continuing after soil boring
			_	36.2' - Fracture, 20 deg, rough, undulating,	Ъ	Ⅎ	medium strong (R3), small voids (1/16") over 20% of surface, few	from surface to 34'
-			1	thin (1/16") infill of carbonate derived silt	╊	-[cavities up to 3/8", moderately	Water level at 07:35 hrs on - 4/25/07
-	R1-HQ			37.2' - Mechanical break, horizontal, rough,	Ħ	#	fossiliferous	1
-	5 ft 94%	77	3	undulating, open up to 3/4"	世	ⅎ		1
-				37.5' - Fracture, 50 deg, rough, undulating, black staining on faces, open 1/4-1/2", fossil	╨	╌		1
-			0	cast on surface	口	7		1 7
-			0	37.85' - Fracture, 10 deg, rough, undulating, fossil casts on surface, tight	世	╁.		R1: 9 minutes
40	40.0		NR	1000ii odoto ori odridoc, tigrit	╁	十	No Popovoni 20 7 40 0'	
2.3	+U.U		INIX	_	m	\top	No Recovery 39.7-40.0'	1 -
-					1111	╟	40.0-43.2' - dusky yellow, (5Y 6/4),	-
-					$\parallel \parallel \parallel$	1	wet, high dilatancy, fine sand up to 15%, very weakly indurated	
-			NA		$\parallel \parallel \parallel$	1	40.8-41.2'	-
-	R2-HQ				1111	╟		-
-	5 ft	0			+	╟		-
-	64%				-	╟		-
-					-	╟	No Recovery 43.2-45.0'	-
-			NR		-	╟		R2: 5 minutes
-					-	╟		TVZ. 5 minutes
45 -2.7	45.0				₩	4	Limestone	
			4	45.1, 45.2, 45.4' - Fractures or mechanical break (3), horizontal, rough, undulating, open	岸	‡	45.0-49.2' - light olive gray, (5Y 5/2),	Layers up to few inches
-				1/4" to 1/2"		╁	fine grained, moderate HCl reaction, extremely weak (R0), trace organics	thick of apparently non
-			4	45.9' - Mechanical break 46.15' - Mechanical break	╨	+	from 48.0-49.0'	indurated material at 48.0- 48.9'
-				46.4' - Fracture, 15 deg, rough, undulating,	╨	‡		40.9
_	R3-HQ 5 ft	22	3	1/16" of carbonate derived silt infilling 46.6' - Fracture, horizontal, rough, undulating,	上	╁		_
-	84%	_		1/16" of carbonate derived silt infilling	\vdash	4]
_			1	46.7' - Mechanical break 47.2' - Mechanical break	片	‡]
_				47.2 - Mechanical break 47.7' - Mechanical break	片	1		
_				47.95' - Mechanical break 48.4' - Mechanical break	$oldsymbol{oldsymbol{oldsymbol{arPsi}}}$	1	No Recovery 49.2-50.0'	R3: 4 minutes
	50.0		NR	च्छ.भ - Mechanical Dreak —	耳	L	_	
-7.7			2		上	1	Limestone 50.0-51.7' - light olive gray, (5Y 5/2),	
				50.5' - Fracture, 10-70 deg, rough, undulating, multiple fragments up to 1",	\vdash	+	fine grained, moderate HCl reaction,]
			0	undulating, multiple fragments up to 1", 1/2-3" open	H	1	very weak (R1), trace organics, small] 1
-				50.95' - Fracture, horizontal, rough,		1	voids (1/16") over 20% of surface, few larger (3/16"x3/8") cavities] 1
-	R4-HQ	00		undulating, open up to 1"	╨	+	(molds/casts)	1
-	5 ft 34%	22			${\mathbb H}$	7	No Recovery 51.7-55.0'	1
-			NR		世	#		1
-					╁	十		1
-					F	7		R4: 7 minutes
55 -	55.0				#	#		
	00.0				††	\dagger		
					\perp	\perp		

Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-20
SHEET 4 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723068.1 N, 458060.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION: Vertical

				MENT . CIVIE 550X 5/N 540255, Thud Totally, Fig tools, Fiv			ORIENTATION : Vertical
WATER	LEVELS : 1.6	1 ft b	gs on	6/14/07 START : 4/24/2007 END : 5/	1/200	7 LOGGER : C. Dougherty, R. McC	Comb
300	<u></u>			DISCONTINUITIES	ני	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
필일이	N <u>- </u>	(9)	FRACTURES PER FOOT		윽	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
# H H	FEE	(%) _Q	[F. E	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	l S	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
민류년	N.S.	Ø	A R	PLANARITY, INFILLING MATERIAL AND	Į≅	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
E S E	222	\simeq	12.2	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	
-12.7					Ш	Limestone	SC-1 collected at 55.0-
-			1	-	╁	- 55.0-57.7' - Same as 50.0-51.7'	55.8'
I -				55.8' - Mechanical break	-	- 53.7.50 41	-
1			4			57.7-59.4' - moderate yellowish	
1 -			1	56.5' - Mechanical break, for special core	Н	brown, (10YR 5/4), fine grained, moderate HCl reaction, very weak to	
-	R5-HQ			-	₩	weak (R1 to R2), small (1/16") voids	1
I -	5 ft	60	3			over about 30% of surface, few	
	94%			57.5, 57.7' - Fractures (2), horizontal, rough,		larger (up to 3/16") voids and fossil	
				undulating, organic material on faces, open up to 1/2"	╨	molds	
-			3	57.7-58.0' - Fracture, vertical, rough,	\vdash	=	1
-				undulating, tight		_	1
1			>10	58.3' - Mechanical break			R5: 5 minutes
60	60.0		NR	58.8-59.5' - Fracture, vertical, rough,	1111	Silty Sand (SM)	1 1
-17.7	00.0		INL	undulating, tight —		59.4-59.7' - moderate yellowish brown, (10YR 5/4), fine grained,	1
			3	58.8-59.3' - Fracture, 75 deg, rough,		moderate HCl reaction, carbonate	
			-	undulating, open to 1/4" 60.1' - Fracture, horizontal, smooth,	ш	derived	
-				undulating, open to 1/4"	Н	No Recovery 59.7-60.0'	SC-2 collected at 60.9-
-			1	60.35' - Mechanical break		Limestone	61.95'
-				60.9' - Fracture, 45 deg, rough, undulating,	ш	60.0-60.5' - Same as 55.0-57.7'	1
l _	R6-HQ	57	1	tight	Н	except no organics	
	5 ft 84%	31	'	61.95' - Fracture, 5 deg, smooth, undulating,		60.5-62.0' - yellowish gray, (5Y 7/2),	
-				open up to 1/4" 62.4' - Fracture, horizontal, rough, undulating,	╙	 fine grained, moderate HCl reaction, very weak to weak (R1 to R2), small 	1
-			2	carbonate derived silt infill about 0.1" thick	╁	(1/16") voids over up to 15% of	-
l _				63.0, 63.6' - Fractures (2), horizontal, rough,	7.17	surface	
1			>10	undulating, open up to 1/2"	Hili	62.0-62.8' - yellowish gray, (5Y 7/2),	R6: 5 minutes
65	65.0		NR	-	100	fine grained, moderate to strong HCl	1 7
-22.7	05.0			-	117	reaction, extremely weak (R0) 62.8-63.4' - yellowish gray, (5Y 7/2),	+
			>10	65.3-65.7' - Fracture zone, fragments up to 2"		\ \(\text{ine grained, mild HCl reaction,} \)	_
				65.7-66.15' - Mechanical break, vertical,	Н	medium strong (R3), small (<1/16")	
				rough, undulating, tight	Н	voids over about 10% of surface	
-			3	66.15' - Mechanical break, 15 deg, rough,		- 63.4-63.9' - Same as 62.0-62.8'	1
-	D7.110			undulating, open up to 1/2"	₩	Sand With Silt (SP-SM)	CC 2 collected at 60.1
l _	R7-HQ 5 ft	58	1	66.5-66.95' - Mechanical break, 25 deg, rough, undulating	H	63.9-64.2' - yellowish gray, (5Y 7/2),	SC-3 collected at 68.1- 69.4'
1	90%	00	l '	66.95' - Fracture, smooth, undulating, open		fine grained, carbonate derived No Recovery 64.2-65.0'	05.4
1 -				up to 1/2"	\vdash	Limestone	1 1
1 -			1	67.4' - Fracture, horizontal, rough, undulating,		65.0-66.9' - pale yellowish brown,	1 -
-			<u> </u>	open up to 1/2" 68.1' - Mechanical break		(10YR 6/2), fine grained, moderate	D7: 9 minutes
Ι -			0	00.1 - Medianicai Dieak	\vdash	HCl reaction, medium strong (R3),	R7: 8 minutes
70	70.0		NR		Ш	small (<1/16") voids cover about 25% of surface, few larger voids or]
-27.7				_	1—	cavities except in zones from	
-			0	-	╫	65.7-65.9' and 66.7-66.9' (about 10%	1 -
-					ш	coverage, voids up to 1/16"	1
			1		\vdash	diameter), moderately fossiliferous,	
_			'		Ш	trace organics	1
1 -	R8-HQ			71.9' - Mechanical break	口	 66.9-67.4' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, 	1
-	5 ft	92	1	72.5' Machanical brook harizantal amaath	\vdash	extremely weak (R0). trace organics	-
Ι -	100%			72.5' - Mechanical break, horizontal, smooth, undulating, along bedding plane, tight,		_ 67.4-69.5' - yellowish gray, (5Y 7/2),	
			[,]	organic material on faces	Ш	fine grained, moderate HCl reaction,]
1 -			1	73.2' - Fracture, horizontal, smooth,	1—	very fossiliferous, voids (fossil	1 1
-				undulating, coating of carbonate derived silt		_ molds) up to 3/8" over about 30% of	R8: 7 minutes
I -			1	on faces	П	core surface No Recovery 69.5-70.0'	No. / Illillutes
75	75.0				\vdash	140 /1600 very 00.0-70.0	
					Γ		



PROJECT NUMBER: BORING NUMBER: 338884.FL A-20 SHEET 5 OF 14

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723068.1 N, 458060.9 E (NAD83)

DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams ELEVATION: 42.3 ft (NAVD88)

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION: Vertical WATER LEVELS: 1.61 ft bgs on 6/14/07 START: 4/24/2007 END: 5/1/2007 LOGGER: C. Dougherty, R. McComb DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT DESCRIPTION ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -32.7 74.6' - Fracture, horizontal, smooth, Limestone 2 undulating, coating of carbonate derived silt 70.0-72.5' - yellowish gray with some light olive gray mottling, (5Y 7/2 with 5Y 5/2), fine grained, mild to on faces 75.0-75.3' - Fracture zone, multiple fragments, possible mechanical break moderate HCI reaction, medium 2 strong to strong (R3 to R4), small (<1/16") voids cover about 20% of 75.3-75.5' - Fracture, 70 deg, rough, undulating, possible mechanical break R9-HQ surface, but not uniformly, few larger 5 ft 48 1 76.3-76.5' - Fracture zone, multiple fragments (3/16") voids, trace organics 84% 72.5-75.0' - moderate yellowish 76.9' - Fracture, horizontal, rough, undulating, brown, (10YR 5/4), fine grained, >10 77.4-77.8' - Fracture, 65 deg, rough, moderate to strong HCI reaction, undulating, coating of carbonate derived silt very weak (R1), trace organics, voids >10 R9: 8 minutes 78.2-79.2' - Fracture zone up to 3/8" x 1-3/16" at 72.6 and 74.0', NR trace clasts (3/16") of gray limestone. 80 80.0 Slightly harder zones from 73.6-74.2' -37 7 80.0-80.7' - Fracture zone, multiple and 74.7-75.0', with small (<1/16") >10 fragments, up to 1-1/2" voids covering about 25% of surface 75.0-78.2' - dusky yellow to moderate yellowish brown, (5Y 6/4 to 10YR 5/4), fine grained, weak to very weak (R2 to R1), small (<1/16") voids cover about 35% of core surface, few SC-4 collected at 80.7->10 81 8' 81.8-82.7' - Fracture zone (2), multiple R10-H0 fragments, up to 2" 1 43 5 ft larger (3/16") voids 90% 78.2-79.2' - light olive gray, (5Y 5/2), moderate HCl reaction, extremely 82.9-83.4' - Fracture, vertical, tight 0 weak (R0), mixed with carbonate derived fine sand and silt R10: 6 minutes 0 No Recovery 79.2-80.0' NR Limestone 85 85.0 80.0-82.8' - moderate yellowish -42 7 brown, (10YR 5/4), fine grained, 3 85.5' - Fracture, horizontal, rough, undulating, moderate HCl reaction, weak (R2). coating of carbonate derived silt small (<1/16") voids cover about 50% 85.7' - Fracture, 45 deg, rough, undulating, of corè surface. 0 open up to 1/2" 82.8-84.5' - moderate olive brown, (5Y 4/4), moderate HCl reaction, 86.0' - Fracture, horizontal, rough, undulating, R11-HQ open up to 1/2' weak (R2), fine grained, small 70 1 5 ft 87.4' - Mechanical break 87.8' - Mechanical break (<1/16") voids cover about 25% of 100% core surface, few larger (3/16") SC-5 collected at 87 8voids, trace organics No Recovery 84.5-85.0' 89 1' Ω Limestone R11: 8 minutes 85.0-90.0' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, 89.1-90.0' - Fracture zone, multiple >10 fragments up to 3" 90.0 medium strong (R3), very -47.7 fossiliferous, trace organics, small 90.3-91.3' - Fracture zone, multiple >10 (<1/16) voids cover about 25% of fragments up to 2", most are 1/2-3/4", some surface, larger (3/8") cavities cover fragments with organic material and coating 30% of surface from 85.5 to 86.4 but >10 of brown silt and fine sand <5% elsewhere, most larger voids 91 75-93 1' - Fracture zone are fossil molds R12-H0 90.0-93.1' - Same as 85.0-90.0' 10 >10 5 ft except weak to medium strong (R2 to 62% R3), moderately fossiliferous, few >10 larger cavities, zone of light olive gray (5Y 7/2) from 91.3-91.75 No Recovery 93.1-95.0' NR R12: 7 minutes 95 95.0



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-20 SHEET 6 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723068.1 N, 458060.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 1.6	1 ft bo	gs on 6	5/14/07 START: 4/24/2007 END: 5/	1/200	7 LOGGER : C. Dougherty, R. McC	Comb
≥∩≘	_ (9			DISCONTINUITIES	Ğ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-52.7 -	034	α_	>10	95-95.9' - Fracture zone	S.	Limestone - 95.0-95.5' - light olive gray, (5Y 5/2),	-
-	R13-HQ		2	95.9-96.3' - Fracture, vertical, rough, undulating, open up to 1/4" 96.6' - Fracture, horizontal, rough, undulating, multiple fragments		fine grained, mild HCI reaction, medium strong (R3), includes small (<3/16") clasts of yellowish gray (5Y 7/2) material, small (<1/16") voids cover 10% of surface	- -
-	5 ft 98%	58	2	97.5' - Mechanical break 98.1, 98.5' - Fractures (2), 65 deg, rough, undulating, tight		 95.5-99.5' - yellowish gray, (5Y 7/2), very fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), small (1/16"), voids over <5% 	-
	100.0		2 NR	99.1-99.7' - Fracture, 60 deg, rough, undulating, tight 99.2' - Fracture, 60 deg, rough, undulating, —		of surface, concentrated in 1" wide zones, fossil casts and molds moderately abundant, laminated bedding from 97.7-99.5'	R13: 10 minutes
-57.7 - -			3	tight 100.2' - Fracture, horizontal, smooth, undulating, open to 1/2", black staining on surface (70%)		99.5-99.9' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), laminated bedding, few small (<1/16") voids	-
-	R14-HQ 5 ft 94%	53	1	100.7-100.9' - Fracture zone 101.35' - Mechanical break 102.5' - Mechanical break		No Recovery 99.9-100.0' Limestone 100.0-100.9' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, very weak (R1), trace	SC-6 collected at 101.35- 102.5'
-		,	1	103.0-104.0' - Fracture, 70 deg, rough, undulating 104.0-104.7' - Fracture, vertical, rough, undulating		organics 100.9-104.7' - light olive gray, (5Y 5/2), fine grained, medium strong (R3), small (1/16") voids over 30% of	R14: 6 minutes
10 <u>5</u> -62.7	105.0		NR 1			surface, larger cavities (3/16" to 1-3/16") over <5%, moderately fossiliferous, a cavity about 1-3/16"x2" is present at about 103.3'	_
-	R15-HQ 5 ft	93	1	105.9' - Mechanical break 106.6' - Fracture, 45 deg, rough, undulating, open up to 1/8" 107.0-107.3' - Fracture zone, multiple		No Recovery 104.7-105.0' Limestone 105.0-110.0' - Same as 100.9-104.7' - except larger cavity (3/16"x1-9/16") at 108.1 and 109.0'	-
-	100%	93	2	fragments, up to 1-1/2" 107.85' - Fracture, 45 deg, rough, undulating, open up to 1/8" 108.15' - Fracture, 20 deg, rough, undulating,		-	- SC-7 collected at 108.85-
110 -67.7	110.0		0	tight 108.6' - Fracture, 40 deg, rough, undulating, tight —		- - 110.0-114.8' - Same as 100.9-104.7'	110.0' - R15: 8 minutes - SC-8 collected at 113.65-
-			1			 except fewer fossils and fewer cavities larger than 3/16" 	114.5'
-	R16-HQ 5 ft 96%	82	2	111.8-112.1' - Fracture, 45 deg, rough, undulating, dark staining on 5% of surface, open <1/8" 112.1-112.6' - Fracture, 65 deg, open up to			-
-			0	1/4" 112.5-112.7' - Fracture, 45 deg, tight 113.25-113.45' - Fracture, 55 deg, tight 113.65, 114.5' - Mechanical break (2)		-	R16: 8 minutes
115	115.0						



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-20
SHEET 7 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723068.1 N, 458060.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

				IENT : CIVIE 330X 3/N 340233, Illud Totally, Fig tools, Fiv			ORIENTATION : Vertical
WATER	LEVELS : 1.6	31 ft b	gs on		1/200		
30₽	<u> </u>			DISCONTINUITIES	l lo	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
HHH	E F F F	(%) Q	등 8	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	1 ਤੋ	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
F.F.S	NG CO	Oρ	PR-	PLANARITÝ, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
SC	SER	A O	문문	THICKNESS, SURFACE STAINING, AND TIGHTNESS	λ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-72.7			NR/		III	No Recovery 114.8-115.0'	
-			NA 0	115.5-116.3' - Fracture zone	1.11	Silty Sand (SM)	1 1
-			-		 	L \ 115.0-115.5' - light olive gray, (5Y 5/2), fine grained, strong HCl	1 -
-			1	116.25-116.5' - Fracture, 65 deg, rough,	╀	reaction, carbonate derived	-
_				undulating, open	厂	Limestone]
	R17-HQ				\vdash	115.5-118.2' - yellowish gray, (5Y	
-	5 ft 78%	37	1	117.5' - Mechanical break	Ľ	7/2), moderate HCl reaction, medium	1
-	7070			117.7' - Mechanical break	Н.	 strong (R3), fine grained, moderately fossiliferous, (casts and molds),] -
-			NA		-	small (<1/16") voids cover about 20%	
_						L ∖of core surface, several large	l
			NR			(3/8"x3/4") voids below 117.5'	R17: 7 minutes
120	120.0		' ' '		$\Pi\Pi$	Silty Sand (SM) → 118.2-118.9' - Same as 115.0-115.5'	
-77.7	120.0			_		No Recovery 118.9-120.0'	1 -
-			1		╁	Limestone	1
-				120.8' - Fracture, horizontal, rough,	亡	 120.0-124.6' - light olive gray, (5Y 	1 -
-			0	undulating, open up to 1/2"	╨	5/2), fine grained, moderate HCl	_
					Н	reaction, weak (R2), moderately fossiliferous, particularly from	
	R18-HQ					120.0-121.0, small (1/16") voids over	
-	5 ft 96%	85	2	122.4' - Mechanical break	╨	25% of surface, larger (3/8"x3/4")	1
-	90 /0			122.65' - Fracture, horizontal, smooth, planar, open up to 1/4", coating of carbonate derived	仜	- voids (fossil molds) 5-10% of surface	SC-9 collected at 122.8-
-			1	sandy silt	╆┯	from 120.0-121.0'	123.9'
_				122.8' - Fracture, 45 deg, rough, undulating.	Ľ	_	
			1	open up to 1/8", coating of carbonate derived	\vdash		
125	125.0			sandy silt 123.9' - Fracture, 30 deg, rough, undulating,		124.6-124.8' - Same as 120.0-124.6'	1
-82.7	.20.0		NR.	open up to 1/2"	Ή	except medium strong (R3), 3/16"	
-			2	124.2' - Fracture, horizontal, rough,		 fossil molds/casts on 5% of surface, small (<1/16") voids on 10% of 	1
-				undulating, open up to 1/4" 125.1-125.4, 125.2-125.4' - Fractures (2), 60	\vdash	siriali (< 1/16) voids on 10% of	-
_			3	deg, rough, undulating, tight	┢	No Recovery 124.8-125.0'	_
				126.45, 126.6' - Fractures (2), horizontal,		Limestone	
	R19-HQ			smooth, undulating, coating of carbonate	H	125.0-129.3' - light olive gray, (5Y 5/2), moderate HCl reaction, medium	
	5 ft 86%	68	1	derived silt on faces, open up to 1/8" 126.9' - Mechanical break	\Box	strong to strong (R3 to R4),] 1
-	0070			127.7' - Fracture, horizontal, smooth,	╆	laminated bedding with areas of few	SC10 collected at 127.7-
-			2	undulating, coating of carbonate derived silt	⊏	small voids and light gray (N7) color	128.6'
-			<u> </u>	on faces	╀┷	to 126.5, zone of larger (3/8") cavities from 127.4-127.8	D10: 7 minutos
1 _			0	128.6' - Fracture, 45 deg, rough, undulating, open up to 1/8"		- No Recovery 129.3-130.0'	R19: 7 minutes
130	130.0		NR	128.7' - Fracture, horizontal, smooth,	\vdash		
-87.7				undulating, open up to 1/4"		Limestone	
-			2	130.4' - Mechanical break	╨	- 130.0-133.0' - Same as 124.6-124.8'	-
-				131.0' - Fracture, horizontal, rough,	仜	except very fossiliferous below 131.0'	-
-			1	undulating, open to 1/4"	+	-	-
				131.65' - Fracture or mechanical break, 35	╚	_]
	R20-HQ		_10	deg, rough, undulating 131.8-132.8' - Fracture zone, multiple	$oxed{\Box}$		
	5 ft 94%	40	>10	fragments	\vdash		1
-	0.,3			131.1, 133.6' - Fractures (2), horizontal,	仁	133.0-134.2' - light olive gray, (5Y	-
-			3	smooth, planar, coating of carbonate derived	╅	 5/2), moderate HCl reaction, very 	-
-			<u> </u>	silt, open to 1/4"	仜	weak (R1), small (1/16" voids) over	DOO: 7 minutes
			4	133.9' - Fracture, 15 deg, rough, undulating,	╀	50% surface, larger (up to 3/8") over - <5% of surface	R20: 7 minutes
135	135.0		NR	coating of silt, open	Ľ	5,0 of Gariago	
					L		
					_		

APPENDIX 2BB-242 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-20

SHEET 8 OF 14

ROCK CORE LOG

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723068.1 N, 458060.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing

				1EIVI : CIVIE 330X 3/14 340233, Hidd Total y, Fig 10013, Fi			ORIENTATION: Vertical
WATER	LEVELS : 1.6	31 ft b	gs on		/1/200		
>	<u> </u>			DISCONTINUITIES	ניז	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
필일이	N - K	(9)	FRACTURES PER FOOT		- 일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
FXF	A TES	(%) Q	[DEPTH, TYPE, ORIENTATION, ROUGHNESS,	301	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
<u> </u>	OR ECCE	Ø	ZA.	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ĮΣ	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
	038	ď	<u> </u>	THICKINESS, SORFACE STAINING, AND HIGHTINESS	Ś	CHARACTERISTICS	
-92.7				134.2, 134.5, 134.6' - Fractures (3), smooth,	ш	Limestone	
-			4	planar, along bedding planes, coating of silt	╆	- 134.2-134.7' - yellowish gray and	
-				135.2, 135.4, 135.6, 138.8' - Fractures (4), horizontal, smooth, planar, no stains, open	-	light olive gray, (5Y 7/2 and 5Y 5/2), fine grained, mild to moderate HCl	-
l .			>10	1/8-1/4"	╨	reaction, thinly laminated bedding.	_
			10	136.1-137.0' - Fracture zone, horizontal,	Н	Yellowish gray areas are very weak	
-	R21-HQ			smooth to rough, open up to 1/4"	+-	rock (R1) with small (<1/16") voids	1
-	5 ft	40	0	137.0, 137.4, 138.45' - Mechanical break (3)		 over 30% of area. Olive gray areas 	-
l _	98%			(-)	┰	have no small voids, medium strong	_
			١.			rock (R3). Cavities up to	SC-11 collected at 137.4-
-			1		世	 3/8"x1-3/16" are along bedding planes. 	138.45' -
-				138.7-139.2' - Fracture, 60 deg, rough,	╁	No Recovery 134.7-135.0'	R21: 8 minutes
l -			1	undulating, tight 139.3' - Fracture, horizontal, rough,	\bot	- Limestone	R21. 6 Illillutes
140	140.0		ND	undulating, coating of carbonate-derived silt,		135.0-139.2' - Same as 133.0-134.2'	
-97.7			NR	open up to 1/2"	1	except with thinly laminated bedding	1 -
-			0		+++	from 135.0-136.1' and predominantly	Driller's Remark: Loss of
I -						the stronger light olive gray rock 139.2-139.9' - light olive gray, (5Y	circulation at 141'
				444.0.440.71.5		139.2-139.9 - light olive gray, (51 5/2), fine grained, moderate HCl	Griddianor at 141
-			>10	141.3-142.7' - Fracture zone, fragments up to	1—	reaction, very weak (R1), small	1
-	R22-HQ			2	╀	(<1/16") voids over about 25%	-
l -	5 ft	25	>10		Ш	surface larger (3/16") voids over 5%	_
	80%		'		\vdash	of surface	
_					╨	No Recovery 139.9-140.0'	1
-			>10		一	- Silt (ML)	-
-					╆	140.0-140.5' - light olive gray, (5Y	l
			ND		\vdash	5/2), carbonate derived	R22: 9 minutes
145	145.0		NR		Ш	 Limestone 140.5-141.1' - yellowish gray and 	1
-102.7	143.0			_	╁	medium light gray, (5Y 7/2 and N6),	-
-			3		╨	 fine grained, strong HCl reaction, 	-
l _					皿	medium strong to strong (R3 to R4),	
				146.0' - Fracture, horizontal, rough,	\vdash	very fossiliferous.	
-			3	undulating	╁	 141.1-144.0' - yellowish gray, (5Y 7/2), fine grained, strong HCl 	-
-	500.110			146.1' - Fracture, 10 deg, rough, planar,		reaction, weak (R2), very	-
I .	R23-HQ 5 ft	42	1	black staining on surface 146.15' - Fracture, 65 deg, rough, undulating,		- fossiliferous	SC-12 collected at 147.1-
	64%	72		dark staining on surface	\vdash	No Recovery 144.0-145.0'	148.2'
1 -			0	146.5, 146.63' - Fractures (2), smooth,		Limestone	-
1 -				planar, dark staining on surface	-	_ 145.0-146.0' - yellowish gray, (5Y	-
I -			ND	147.05' - Fracture, horizontal, rough,	\bot	7/2), strong HCl reaction, weak to	
1			NR	undulating, possible mechanical break		medium strong (R2 to R3), few small (1/16") voids, poorly fossiliferous	R23: 6 minutes
150	150.0				1—	146.0-147.05' - yellowish gray, (5Y	1
150_ -107.7	150.0			-	+	7/2), moderate HCl reaction, weak to	-
'-''-			2	150.35' - Fracture, horizontal, rough, planar,	$-\Box$	_ medium strong (R2 to R3),	-
1				open up to 1/4"		moderately fossiliferous, small	
1 -				150.85 - Fracture, 15 deg, rough, planar,	+	(<1/16") voids cover about 10% of]
I -			2	tight	世	core, few larger (3/16") voids, laminated bedding at about 146.5'	-
I -			<u> </u>	151.3-152.1' - Fracture, 60-40 deg, rough,	+	147.05-148.2' - light olive gray, (5Y	-
1	R24-HQ 5 ft	70	1	undulating, open up to 1/8" 151.6' - Fracture, horizontal, rough,	\bot	_ 5/2), fine grained, moderate HCl	
1	94%	70		undulating, open up to 1/8"		reaction, small (1/16") voids over]
1 -	0.73			152.95' - Fracture, 45 deg, rough, undulating,	1	- 40% of surface	-
-			0	tight	+	No Recovery 148.2-150.0'	-
Ι.					Щ	Limestone - 150.0-151.8' - Same as]
			>10	154.0-154.7' - Fracture zone, multiple		147.05-148.2' except gradual contact	R24: 8 minutes
155	155.0			fragments up to 1-1/2"	1	at bottom	1
155	155.0		NR		十二		

APPENDIX 2BB-243 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-20 SHEET 9 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723068.1 N, 458060.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

CORING	INETHOD A	ND EC	JUIPIV	IENT : CME 550X S/N 340253, mud rotary, HQ tools, H\	v casır	19	ORIENTATION : Vertical
WATER	LEVELS: 1.6	1 ft b	gs on (6/14/07 START: 4/24/2007 END: 5	/1/2007	LOGGER : C. Dougherty, R. McC	Comb
300	<u>-</u>			DISCONTINUITIES	(J)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표공은	A'S' E'A'A	(%	FRACTURES PER FOOT		일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YFA VAN	RE FIGURE	(%) Q	CTI	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	B _B	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	H H H H	S. O.	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	<u>₹</u>	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-112.7	014			1	1 "	Limestone	-
			5	155.1, 155.4, 155.5, 155.6' - Fractures (4), smooth, planar, staining present on faces at	┲	- 151.8-154.0' - light olive gray, (5Y	-
I _				155.4' and 155.5'	₽	5/2), fine grained, mild HCl reaction,	SC-13 collected at 155.6-
				155.2-155.45' - Fracture, 45 deg, rough,		medium strong to strong (R3 to R4),	156.5'
			2	undulating	\Box	fossiliferous (casts and molds), small (<1/16") voids cover 15% of surface,	1
-	R25-HQ			156.65, 156.7' - Fractures (2), horizontal, smooth, undulating, open up to 1/2"	╂┼╂	few clasts (<3/16") of lighter colored	-
-	5 ft	58	1	Smooth, undulating, open up to 1/2		 material, laminated bedding from 	-
_	92%			157.9-158.1' - Fracture, 45 deg, rough,	╁┼┼	153.5 -154.0	_
			>10	undulating, dark staining on faces (50% of	耳	154.0-154.7' - light olive gray, (5Y - 5/2), moderate HCl reaction, weak	
			10	area)	Н	(R2), small (1/16") voids over 20% of	
_			1	158.3-158.9' - Fracture zone, most fractures	\Box	surface	R25: 7 minutes
400				appear to be horizontal 159.5' - Fracture, horizontal, smooth, planar	╂┼┼	No Recovery 154.7-155.0'	End of drilling for 4/25/07
160 <u> </u>	160.0		NR		┸	Limestone 155.0-155.5' - Same as 154.0-154.7'	End of drilling for 4/25/07, 160' at 15:45.
			1	160.0-160.3' - Fracture zone, multiple fragments up to 1-1/2"	Щ	except with irregular uneven thinly	Resume coring at about
			الل	- 3	╁┼┤	laminated bedding	07:35, 4/26/07
				161.1' - Fracture, horizontal, smooth, planar,	П	155.5-158.0' - light olive gray, (5Y 5/2), moderate HCl reaction, medium	Core barrel was clogged.
_			2	open up to 1/8"	14	strong (R3), poorly fossiliferous,	Barrel was cleared and run - completed.
-	R26-HQ		1	161.4' - Fracture, horizontal, open up to 1" 162.0' - Mechanical break	丗	gradual contact below, few small	Rock fragments at top of
-	5 ft	27	<u> </u>	162.0 - Mechanical Dreak	╂┯╂	(<1/16") voids	run are probably pieces -
l _	42%				╨	158.0-158.9' - moderate olive brown, (5Y 4/4), fine grained, mild HCl	from first attempt; bit
					Ш	reaction, weak (R2), small (<1/16")	marks in 2 directions are on some fragments –
			NR		Н	voids cover about 50% of surface	End of R26-HQ fits
-					口	158.9-159.6' - yellowish gray, (5Y	together with start of R27-
					╂┼╂	7/2), fine grained, mild HCl reaction, medium strong to strong (R3 to R4),	HQ -
165 <u> </u>	165.0			_	╼	— few small (<1/16") voids, group of	R26: 4 minutes
-122.1			2	165.2' - Fracture, 15 deg, rough, undulating,	┸	healed vertical fractures from	_
			-	open to up to 1/4"	П	158.9-159.3'	
				165.5' - Fracture, horizontal, rough, undulating, open up to 1/2"	Н	No Recovery 159.6-160.0' Limestone]
-			4	166.1' - Fracture, horizontal, rough,	ш	160.0-161.5' - moderate yellowish	1
-	R27-HQ			undulating, open up to 1/2"	╂┼┼	brown, (5Y 4/4), fine grained, mild	-
-	5 ft	38	2	166.55-167.2' - Fracture zone, horizontal,	┸	HCl reaction, medium strong (R3), small (<1/16") voids cover about 25%	-
_	84%			smooth, planar, spaced at about 0.05' 167.7' - Fracture, horizontal, smooth to planar	$\mu\mu$	of core surface, thin (1/2") zones	
			3	on one side, rough to undulating on the other,	H	have no small voids	
]			3	open to about 3/4"	H	161.5-162.1' - moderate yellowish	R27: 6 minutes
-			0	168.3' - Fracture, horizontal, rough, undulating, dark staining on 40% of surface,	╂┷╂	- brown, (10YR 5/4), fine grained, mild HCl reaction, strong (R4), small	1
,			NR	open to 1/4"	団	(<1/16") voids, few fossil molds and	End of core at 169.2' fits
170 <u> </u>	170.0			168.3-168.7' - Fracture, 75 deg, rough, –	╂┯╂	— casts	together with start of core —
			0	undulating, open <1/4"	口	No Recovery 162.1-165.0'	at 170.0'
			Ľ	168.9' - Mechanical break	\coprod	Limestone 165.0-168.0' - Same as 161.5-162.1'	
]					Ш	except except larger voids and fossil]
-			0		1-1	molds/casts (3/16") over 5% of area	1
-	R28-HQ			172 1' Franturo harizantal zaceh	世	from 165.0-166.3', laminated bedding at 166.0-167.5'	SC-14 collected at 172.0-
-	5 ft	85	2	172.1' - Fracture, horizontal, rough, undulating on one face, smooth to planar on	$+\Box$	168.0-169.2' - light olive gray, (5Y	172.85'
-	100%			the other, open up to 1/2"	╁┼┼	5/2), moderate HCl reaction, weak	
			3	172.95' - Fracture, horizontal, rough,	口	(R2), small (1/16") voids over 15% of	
]			3	undulating, coating of carbonate derived silt on one face, open up to 1/2"	₽₽	surface, clasts of light gray (N7), limestone up to 3/16"x1-3/16" cover]
-				173.15-173.3' - Fracture, 45 deg, rough,	丗	<5% of surface, clasts are oriented	R28: 6 minutes
			3	undulating, tight	╂┯╂	horizontally	-
175	175.0				╀┼	No Recovery 169.2-170.0'	_

APPENDIX 2BB-244 Rev. 7



PROJECT NUMBER: BORING NUMBER: 338884.FL

A-20

SHEET 10 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723068.1 N, 458060.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS : 1.6	31 ft bg	gs on (5/14/07 START: 4/24/2007 END: 5/	1/200	7 LOGGER : C. Dougherty, R. McC	Comb
30€	(%)			DISCONTINUITIES	ျှ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ZES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH BI	E RU 3TH, OVEF	(%) _Q	TUF F007	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPT SURF	COR	RQE	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-132.7		_		173.7, 173.9' - Fractures (2), horizontal,	Ï	Limestone	
			5	smooth, planar, open up to 1/4" 174.0, 174.4, 174.5' - Fractures (3),	╁	- 170.0-172.0' - Same as 168.0-169.2'	1
				horizontal, rough, undulating, coating of silt	Ħ	except moderately fossiliferous (molds and casts), gray clasts now	1
			1	infill at 174.0', open up to 1/2" - 175.2, 175.3, 175.35, 175.6, 175.7' -	Ħ	- 5% of core, area of 3/16" to 3/8" voids from 171.0-171.6	-
	R29-HQ			Fractures (5), horizontal, rough, planar, open	L	172.0-173.7' - yellowish gray, (5Y	1
	5 ft 72%	23	>10	1/8" to 1/4" 175.7-176.2' - Fractures (2), 70 deg, rough,	₩	- 7/2), fine grained, moderate HCl reaction, medium strong (R3), small	1
	12/0		2	undulating, tight	厂	(1/16") voids over 15% of surface	1
				177.2' - Fracture, horizontal, rough, undulating, tight	世	– 173.7-175.0' - moderate yellowish brown, (10YR 5/4), fine grained,	1
			NR	177.4-178.2' - Fracture zone	\perp	moderate HCl reaction, weak (R2),	R29: 4 minutes
180	180.0		1417	178.3' - Fracture, smooth, undulating, open up to 1/8"	╁	 small (<1/16") voids cover about 20% of core surface 	
-137.7	100.0			178.4' - Fracture, 45 deg, rough, undulating, —	III	☐ 175.0-178.0' - Same as 173.7-175.0' ☐	1 -
			2	open <1/8" 180.0-180.6' - soil and rock fragments	Ш	except with larger (3/8"x3/8") cavities from 175.7-177.4' and fewer small	1 1
				180.1,180.95' - Fractures (2), horizontal,	口	(1/16") voids below 176.0'	
			>10	smooth, planar, coating of carbonate derived silt, open up to 1/8"	世	178.0-178.6' - yellowish gray and light olive gray, (5Y 7/2 and 5Y 5/2),	
	R30-HQ			181.1-181.7' - Fracture zone	╁	fine grained, mild HCl reaction,	1
	5 ft 90%	13	3	182.0' - Fracture, 20 deg, rough, undulating, open up to 1/8"	F	medium strong to strong (R3 to R4), thinly laminated bedding with few	1 1
				182.3' - Fracture, horizontal, rough, undulating, coating of carbonate derived silt,	Ħ	small (1/16") voids (bedding about 1/2" thick)	1 1
			4	open to 1/4"	世	No Recovery 178.6-180.0'	1
			1	182.7' - Fracture, horizontal, rough, undulating, rock fragments up to 1", open	₽	Silty Sand (SM) 180.0-180.4' - moderate olive brown,	R30: 9 minutes
185	185.0		NR	183.0, 183.2, 183.4, 183.5' - Fractures (4),	匚	(5Y 4/4), fine grained, mild HCl	1
-142.7				horizontal, rough, undulating, open from 1/4 — to 1/2"	Н	reaction, carbonate derived	1
			1	184.3' - Fracture, horizontal, smooth,	口	L Limestone 180.4-181.1' - yellowish gray, (5Y	SC-15 collected at 185.6-
			_	undulating, open up to 3/8" 185.5' - Fracture, 30 deg, rough, undulating,	Ш	7/2), fine grained, mild HCl reaction, medium strong (R3), thinly laminated	186.35'
			7	dark staining on 40% of surface, tight 186.4-187.0' - Fractures (6), horizontal,	Ъ	bedding , few small (<1/16") voids	1
	R31-HQ	52	4	smooth, planar, except at 186.4' which is	H	181.1-183.5' - yellowish gray, (5Y - 7/2), fine grained, mild HCl reaction,]
	5 ft 100%	52	4	rough and undulating, all are open up to about 1/4"	Ħ	very weak to strong (R1 to R4), few]
			3	186.8-187.0' - Fracture, vertical, rough,	L ⁺	small (<1/16") voids, few fossil molds/casts (3/16"), large]
			J	undulating, tight 187.1' - Fracture, horizontal, smooth, planar,	H	(3/8"x1-3/16") void at 183']
			3	open up to 1/4"	\vdash	183.5-184.5' - yellowish brown, (10YR 5/4), fine grained, mild HCl	R31: 10 minutes
190	190.0		J	187.4, 187.5, 187.6' - Fractures (3), horizontal, rough, undulating, open up to 1/2" —	尸	reaction, weak to medium strong (R2 to R3), small (<1/16") voids cover	
-147.7			3	188.0' - Fracture, 15 deg, rough, undulating,	厂	about 25% of surface, larger (3/16")]
				coating of carbonate derived silt, dark staining on 50% of surface, open to 1"	上	voids and fossil molds are about 5%, moderately fossiliferous	
			1	188.2' - Fracture, horizontal, rough,	\vdash	No Recovery 184.5-185.0'	
				undulating, open up to 1/2" 188.8' - Fracture, horizontal, smooth,	F	Limestone 185.0-186.6' - Same as 183.5-184.5'	
	R32-HQ 5 ft	65	1	undulating, open up to 1/2" 188.8-189.0' - Fracture, vertical, rough,	F	except few fossil casts/molds, few	
	90%			undulating, tight	H	larger voids. 186.6-187.5' - yellowish gray, (5Y	
			3	189.7' - Fracture, horizontal, rough, undulating, dark staining on 70% of surface	出	7/2), fine grained, mild HCl reaction,	
				189.9' - Fracture, 55 deg, smooth, undulating	F	strong (R4), laminated bedding (1/2"-1" thick), small (<1/16") voids	D22: 0 minutes
			1	190.2' - Fracture, horizontal, smooth, undulating, open up to 1/8"	\Box	present in alternating bedding	R32: 9 minutes
195	195.0		NR		口	laminations	
\Box					_	l	



PROJECT NUMBER: BORING NUMBER: 338884.FL

A-20

SHEET 11 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723068.1 N, 458060.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS: 1.6	31 ft bo	gs on (6/14/07 START : 4/24/2007 END : 5/	1/200	7 LOGGER : C. Dougherty, R. McC	Comb
>00	(6			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEDTH OF CASING
H H H	JE F. F. R. F.	D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	1 5	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
PT.	NG CO	αD	AC-	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	SHR	ŭ	R H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	ς	CHARACTERISTICS	BROFO, TEOT REGGETO, ETG.
-152.7			1	190.6' - Fracture, 5 deg, rough, planar, open up to 1/4"	Н	Limestone - 187.5-188.7' - yellowish gray, (5Y	
			'	190.9' - Fracture, horizontal, rough,	Ш	7/2), fine grained, mild to moderate	SC-16 collected at 195.5-
1 7				undulating, fragments, open up to 1"	Н	HCl reaction, strong (R4), very	196.8'
-			2	191.1-191.3' - Fracture, 45 deg, rough, undulating, tight	Ħ	 fossiliferous, small (<1/16") voids cover about 25% of surface, larger (> 	1 7
-	R33-HQ			192.1' - Fracture, horizontal, rough,		3/8") voids and fossil molds/casts	1
-	5 ft 94%	23	>10	undulating, open up to 1/4" 193.3' - Fracture, horizontal, rough,	╫	 cover about 5% of surface 188.7-190.0' - Same as 185.0-186.6' 	1
-	9470			undulating, tight	口	except with zone of small (<1/16")	-
-			>10	193.7, 193.8' - Fractures (2), horizontal,	\Box	- voids 10% and fossil molds from	-
-				rough, undulating, open up to 3/4" 195.0-195.5' - rock fragments with rough and	H	189.0-189.3', laminated bedding at top and bottom of interval	R33: 7 minutes
-			0	undulating surfaces		 190.0-190.5' - light olive gray, (5Y 	End of drilling, 200',
200 <u> </u>	200.0		NR	196.8' - Fracture, 45 deg, rough, undulating,	╂┼┤	5/2), fine grained, mild HCl reaction, strong (R4), laminated bedding (1/4"	4/25/07 at 10:57
-137.7			6	169.9-197.3' - Fracture, 70 deg, rough,	Д	to 3/4" thick beds), small (<1/16")	Resume drilling 5/1/07 R. McComb is the logging -
				undulating, open up to 1/2" 197.4-197.8' - Fracture, 60 deg, rough,	Ш	voids present in alternating beds, 10% overall coverage	person from 200' to the end
			>10	undulating, open up to 1/8"	\mathbb{H}	_ 190.5-191.0' - moderate olive brown,	of borehole
			- 10	197.8-198.5' - Fracture zone, multiple	戸	(5Y 4/4), fine grained, mild to	_
	R34-HQ	48	4	fragments up to 3" long 200.1' - Fracture, <5 deg, rough, undulating,		moderate HCl reaction, medium strong (R3), very fossiliferous,	
	5 ft 100%	40	4	loose	Ш	fragments (up to 1.5") of light olive]
				200.2' - Fracture, <5 deg, rough, stepped, loose	Ш	grey (5Y 5/2) limestone, cavities up to 1.5" diameter occupy about 25%	SC-17 collected at 202.95-
-			0	200.55, 200.82' - Fractures (2), horizontal,	1-1	of core surface.	204.05' -
-				rough, undulating, loose 200.9, 200.95' - Fractures (2), horizontal,	\Box	191.0-194.5' - dusky yellow to light	R34: 9 minutes
205	205.0		1	smooth, stepped, loose		olive, (5Y 6/4 to 5Y 5/2), fine grained, mild HCl reaction, weak to medium	-
205 <u>-</u> -162.7	205.0			200.95-201.85' - Fracture zone, horizontal, —	╫	strong (R2 to R3), with dusky yellow	-
-			1	rough, stepped to undulating, loose 202.25' - Fracture, 20 deg, rough, stepped,	ш	areas being weaker, crenelated bedding lamination grading into more	-
-				loose	丗	uniform laminated bedding by 194.0',	-
-			3	202.35' - Fracture, 40 deg, rough, stepped to undulating, loose	+	small (<1/16") voids about 10% coverage, trace organics, large	-
-	R35-HQ			202.8' - Fracture, horizontal, rough, stepped	井	- (3/8"x1-3/16") cavity at about 192.0'	-
-	5 ft	52	1	to undulating, loose 202.95' - Fracture, horizontal, smooth, planar,	Ш	No Recovery 194.5-195.0' Limestone	-
	97%			loose	₽₽	- 195.0-198.0' - yellowish gray, (5YR	SC-18 collected at 207.55- 209.04'
			0	204.05' - Fracture, 40 deg, rough, stepped,	Ш	7/2), moderate HCl reaction, weak to	
				tight 205.4' - Fracture, <5 deg, rough, stepped,	\mathbb{H}	medium strong (R2 to R3), very fossiliferous, small voids (1/16") over	
			3	loose		30% of surface, larger (3/16")	R35: 6 minutes
210	210.0		NR	206.2' - Fracture, 0-90 deg, rough, stepped, tight —		cavities over < 5% of surface (molds/casts)	
-167.7			-	206.8, 206.9' - Fractures (2), 40 deg, rough,	$\vdash\vdash\vdash$	198.0-199.7' - yellowish gray to light]
]			>10	stepped, loose 207.7' - Fracture, 70 deg, rough, stepped,	Ш	olive gray, (5Y 7/2 to 5Y 5/2), fine grained, mild HCl reaction, weak to	1
1				loose	Ш	medium strong (R2 to R3), laminated	1
			>10	209.01' - Fracture, horizontal, smooth, planar,	$\dashv \dashv$	bedding 198.0-198.8, few fossil	1
-	R36-HQ			loose 209.1, 209.27' - Fracture (2), <5 deg, smooth,	\Box	 molds/casts, small (<1/16") voids about 10% coverage 	1
-	5 ft 80%	0	>10	undulating, loose	ᡛ州	No Recovery 199.7-200.0'	
-	0070			210.1' - Fractures (2), horizontal, smooth, planar, loose	田	-	-
-			>10	210.3' - Fracture, 60 deg, smooth, stepped,	団	-	-
-				loose	+	-	R36: 5 minutes
-			NR	210.5, 210.6' - Fractures (2), horizontal, smooth, planar, loose	\Box	_	-
215	215.0				\vdash		



PROJECT NUMBER:

33884.FL BORING NUMBER:

A-20 SHEET 12 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723068.1 N, 458060.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS : 1.6	1 ft bo	gs on (6/14/07 START : 4/24/2007 END : 5/	1/200	7 LOGGER : C. Dougherty, R. McC	Comb
>00	<u></u>			DISCONTINUITIES	ڻ ا	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE	INT. YER	D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	٦ ا	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
LEV.	ORE	Ø	SAC.	PLANARITY, INFILLING MATERIAL AND	ΥMB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	0,72	22	# #	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	
-172.7 -			3	210.9' - Fracture, <5 deg, rough, stepped, loose	L	Limestone - 200.0-205.0' - yellowish gray, (5Y	
				210.9-211.5' - Fracture zone, various	Е	7/2), very fine grained, weak to]
			2-10	orientations, rock fragments 211.5' - Fracture, 20 deg, rough, stepped,	厂	medium strong (R2 to R3), cavities up to 1/16" over to 40% of surface	
			2-10	loose	Н	(more common 204.0-205.0) with	
	R37-HQ		3-10	212.0, 212.1' - Fractures (2), 40 deg, rough, undulating, loose		zone of cavities interbedded with zones of few cavities. Cavities	1
	5 ft 98%	55	3-10	212.25, 212.55' - Fractures (2), <5 deg,	Ħ	typically 1/16"x1/16" (casts/molds),	SC-19 collected at 217.45-
			. 40	rough, undulating, loose 212.8-213.1' - Fracture zone, 40-0 deg,	世	largest is 2"x1/2" at 203.55 Limestone	218.25' -
			>10	rough, loose	\vdash	205.0-206.0' - yellowish gray to light	1
			. 40	213.3, 213.45' - Fractures (2), <5 deg, rough,	ш	olive gray, (5Y 7/2 to 5Y 5/2), fine to	R37: 6 minutes
220	220.0		>10	stepped, loose 213.75, 213.85' - Fractures (2), horizontal	\blacksquare	 very fine grained, weak (R2), with angular medium strong (R3) 	1
-177.7			NR)	and vertical, rough, stepped, loose	1—	limestone fragments (brecciated),	-
-			>10	214.0' - Fracture, horizontal, rough, undulating, loose	Ħ	 cavities cover 50% in fine grained material, about 3-5% in fine grained 	1 1
-				215.1' - Fracture, horizontal, smooth,	世	angular limestone rock fragments	1
-			3	undulating, loose 215.6, 215.75' - Fractures (2), <5 deg, rough,	╨	206-208.7' - light olive gray, (5Y 5/2), fine to very fine grained, mild HCl	1
-	R38-HQ			stepped, loose	匚	reaction, very weak (R1), cavities of	1 1
-	5 ft 66%	14	>10	216.2' - Fracture, <5 deg, rough, undulating, loose	世	_ 1/16" to 1/32" covering 40-50% of surface, trace fossil casts/molds	1
-	00%		0	216.65' - Fracture, 40 deg, rough, undulating,	╁	208.7-209.85' - yellowish gray, (5Y	1 -
-				loose 216.85-217.1' - Fracture zone, 0-90 deg,	H	_ 7/2), very fine grained, moderate HCl reaction, very weak (R1),	1 -
-			NR	rough, undulating to stepped, loose	世	voids/cavities up to 3/8"x3/8"	R38: 5 minutes
-				217.45' - Fracture, <5 deg, rough, undulating, loose	₽	covering 30-40% of surface, becoming very thinly laminated with	-
225 <u> </u>	225.0			218.3' - Fracture, horizontal, smooth,	╨	— depth	
-			>10	stepped, loose 218.45-219.3' - Fracture zone, 0-90 deg,	口	No Recovery 209.85-210.0' Limestone	1 -
-				smooth to rough, undulating, loose	╁	- 210.0-210.6' - Same as	1 -
-			3	219.3' - Fracture, <5 deg, rough, stepped, loose	╁	208.7-209.85' except voids <10% 210.6-211.4' - yellowish gray, (5Y	1 -
-	R39-HQ			220.01-220.45' - Fracture zone, various	Ħ	- 7/2), very fine to fine grained,	1 -
_	5 ft	12	>10	orientations 220.85' - Fracture, 50 deg, rough, stepped,	世	moderate HCl reaction, very weak (R1), cobble- to gravel-sized	1 -
-	70%			loose -	₽	 limestone, voids up to 1/16" covering 	1 -
-			>10	221.2' - Fracture, 20 deg, smooth, planar, loose	П	20-30%, trace fossil mold/casts 211.4-213.3' - yellowish gray to light	-
-				221.65' - Fracture, 60 deg, rough, undulating,	口	olive gray, (5Y 7/2 to 5Y 5/2),	R39: 7 minutes
-			NR	loose 221.85' - Fracture, <5 deg, rough, stepped to	╁	extremely weak (R0), voids and cavities up to 1"x1-3/16" cover 100%	1300. / Hilliules
230 -187.7	230.0			undulating, loose —	厈	— of surface, fossil molds/casts	
-107.7			>10	222.3' - Fracture, 0-50 deg, rough, stepped, loose	Ħ	213.3-214.0' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2),] -
-				222.55-222.7, 222.9 - 223.1' - Fracture zone,	片	fine grained, weak (R2),	-
			>10	horizontal, rough, stepped, loose 225.0-226.0' - Fracture zone, limestone	\vdash	interlaminated with very fine grained, weak (R2) limestone	
-	<u></u>			fragments, various orientations	Ш	No Recovery 214.0-215.0'	
_	R40-HQ 5 ft	8	0	226.55' - Fracture, horizontal, rough, stepped, loose	口	Limestone 215.0-218.4' - yellowish gray, (5Y]
	48%			226.7, 226.85' - Fractures (2), horizontal,	\vdash	_ 7/2), very fine to fine grained,	
				smooth, planar, loose 227.1-227.6' - Fracture zone, 0-90 deg,	F	moderate HCl reaction, very weak to weak (R1 to R2), coarser grained]
			NR	rough, stepped	Ħ	limestone with voids and cavities up	
				227.6' - Fracture, horizontal, smooth, loose 227.6-227.8' - Fracture, vertical, rough,	H	to 3/8"x3/16" over 30-40% of surface,	R40: 5 minutes
235	235.0			stepped, tight	\sqsubseteq	fossiliferous (molds/casts),	



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-20
SHEET 13 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723068.1 N, 458060.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 1.6	1 ft bo	gs on (6/14/07 START : 4/24/2007 END : 5/	1/200	7 LOGGER : C. Dougherty, R. McC	Comb
≥ ∩ ⊋	(%			DISCONTINUITIES	၂ ပွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-192.7	R41-HQ 5 ft 20%	0	>10	227.8-228.8' - Fracture zone, 0-90 deg, rough, stepped to undulating, loose 230.1' - Fracture, 0-40 deg, rough, stepped, loose 230.7' - Fracture, 30 deg, smooth to rough, stepped, loose 230.7-232.4' - Fracture zone, 0-90 deg, smooth to rough, stepped to planar, loose to tight 235.0-236.0' - Fracture zone, 0-90 deg, smooth to rough, stepped to planar, loose to tight		218.4-219.9' - yellowish gray, (5Y 7/2), fine grained, weak (R2), with gravel- to cobble-sized, angular limestone rock fragments (very fine grained, weak (R2)), voids/cavities up to 3/4"x3/4" over 15-20% of surface No Recovery 219.9-220.0' Limestone 220.0-220.1' - yellowish gray, (5Y 7/2), very fine grained, strong HCI reaction, weak (R2), no voids/cavities Limestone 220.1-220.5' - dusky yellow, (5Y 6/4), moderate HCI reaction, weak to very	
-197.7 -197.7 - - - - -	R42-HQ 5 ft 54%	8	>10 >10 2 NR	240.0-242.0' - Fracture zone, 0-90 deg, smooth to rough, stepped to planar, loose to tight 242.0' - Fracture, 0-30 deg, rough, undulating 242.2' - Fracture, 0-30 deg, rough, undulating, loose		weak (R2 to R1), cavities/voids up to 3/8"x3/8" over 20-30%, sharp contact with underlying limestone 220.5-221.9' - yellowish gray and light olive brown, (5Y 7/2 and 5Y 5/6), mottled, very weak (R1), voids over 10-15%, cavities up to 3/8"x3/16" 221.9-223.3' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, very weak (R1), voids and cavities up to 3/8"-3/4" x 3/8"-3/4" over 70-80% of surface. Very fine grained limestone in fine grained matrix	- - - - - - - - - - - - - - - -
	245.0 R43-HQ 5 ft 16%	0	>10	245.0-245.8' - Fracture zone, various orientations, gravel and cobble sized rock fragments		No Recovery 223.3-225.0' Limestone 225.0-228.5' - yellowish gray, (5Y 7/2), extremely weak to weak (R0 to R2), fossiliferous (cast/molds), becoming predominantly gravel to sand-sized limestone fragments, cavities up to 3/4" to 1-3/16" in diameter, thinly laminated, with few voids (<15%) from 226.5-226.9' No Recovery 228.5-230.0' Limestone 230.0-232.4' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate to strong HCI reaction, weak to very weak (R2 to R1), trace fossil molds/casts, voids (<1/16")	
-207.7 - - - - - - - - - - - - - - - - - -	77.7 - - - - - - - - - - - - - - - - - -		>10	250.0-250.9' - Fracture zone, various orientations, gravel and cobble sized rock fragments		covering 5-10% with occasional 20-30% coverage in fine grained limestone No Recovery 232.4-235.0' Limestone 235.0-236.0' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, very weak (R1), voids <1/16" over 50-60% of surface No Recovery 236.0-240.0'	- - - - - R44: 4 minutes

Rev. 7



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-20	SHEET	14	OF	14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723068.1 N, 458060.9 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

一番	WATER	LEVELS: 1.6	31 ft b	gs on (6/14/07 START : 4/24/2007 END : 5/	1/200	D7 LOGGER: C. Dougherty, R. McComb
R45-HO Sft 0 Sft	> O ::	(,)			DISCONTINUITIES	Ō	LITHOLOGY COMMENTS
R45-HO Sft 0 Sft	DEPTH BELOV SURFACE ANI ELEVATION (fi	CORE RUN, LENGTH, AND RECOVERY (%	Ø	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS MINERALOGY, TEXTURE, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS TEST BESUITS, ETC.
R45-HQ 5ft 0 257.2-257.7' - Fracture zone, 0-90 deg, smooth to rough, undulating to stepped NR 280 260.0 280 280.0 28							- 240.0-242.7' - yellowish gray, (5Y
S ft 0 S	-			NA			reaction, very weak (R1), voids typically 1/16" or less over 60-70% surface, rare cavities (3/8"x3/8"),
Limestone 260 260.0 260.0 260.0 260.0 260.0 260.0 260.7 - Fracture zone, 0-90 deg, rough, stepped to undulating, loose, gravel sized rock fragments 260.0 260.0 R46-HC 5 ft 0 34% NR NR NR NR NR And Complete the fraction of the f	-	5 ft		>10			texture, 1 to 2 thin very fine grained limestone laminae 241.0-242.0
260.0-267.7' - Fracture zone, 0-90 deg, rough, stepped to undulating, loose, gravel sized rock fragments 260.0-267.7' - Fracture zone, 0-90 deg, rough, stepped to undulating, loose, gravel sized rock fragments 250.0-265.8' - dusky yellow to light olive brown, (5Y 6/4 to 5Y 5/6), wet, loose, mild to moderate HCI reaction, very poorly sorted, silty to clayey 3ilt With Limestone Fragments (ML) 256.8-257.2' - pale greenish yellow, (10*812), wet, loose Limestone 257.2-257.7' - yellowish gray, (5Y 7/2), moderate to mild HCI reaction, very weak (R1), fossiliferous, molds and casts, voids and cavities No Recovery 257.7-260.0' Limestone 260.0-261.0' - yellowish gray, (5Y 7/2), fine grained, moderate HCI reaction, very weak (R1), voids <1/td>	-			NR	- -		Limestone 245.0-245.8' - Same as 240.0-242.7' No Recovery 245.8-250.0' R45: 4 minutes Limestone
olive brown, (5Y 6/4 fo 5Y 5/6), wet, loose, mild to moderate HCI reaction, very poorly sorted, silty to clayey Silt With Limestone Fragments (ML) 256.8-257.2' - pale greenish yellow, (10Y 8/2), wet, loose Limestone 257.2-257.7' - yellowish gray, (5Y 7/2), moderate to mild HCI reaction, very weak (R1), fossiliferous, molds and casts, voids and cavities No Recovery 257.7-260.0' Limestone 260.0-261.0' - yellowish gray, (5Y 7/2), fine grained, moderate HCI reaction, very weak (R1), voids <1/16" over 50-60%, cavities typically 3/16"3/8", fossiliferous (mold/casts) 261.0-261.7' - pale greenish yellow, (10Y 8/2), very fine grained, moldracts yellow, (10Y 8/2), very fine grained, mild to moderate HCI reaction, very weak (R1), voids <1/16" over 50-60%, cavities typically 3/16"3/8", fossiliferous (mold/casts) 261.0-261.7' - pale greenish yellow, (10Y 8/2), very fine grained, mild to moderate HCI reaction, very weak (R1), becoming silty to sandy, soft, and loose with depth No Recovery 261.7-265.0' Bottom of Boring at 265.0 ft bgs on		260.0		>10	rough, stepped to undulating, loose, gravel	Ė	No Recovery 250.9-255.0' Poorly Graded Sand (SP)
R46-HQ 5 ft 34% NR NR NR NR NR NR NR NR NR N	-			>10	Sizeu Took Iragilietiis	Ė	olive brown, (5Y 6/4 to 5Y 5/6), wet, loose, mild to moderate HCI reaction,
No Recovery 257.7-260.0' Limestone 260.0-261.0' - yellowish gray, (5Y 7/2), fine grained, moderate HCI reaction, very weak (R1), voids <1/1/16" over 50-60%, cavities typically 3/16"x3/8", fossiliferous (mold/casts) 261.0-261.7' - pale greenish yellow, (10Y 8/2), very fine grained, mild to moderate HCI reaction, very weak (R1), becoming silty to sandy, soft, and loose with depth No Recovery 261.7-265.0' Bottom of Boring at 265.0 ft bgs on	- - -	5 ft		NR	- - - -		Silt With Limestone Fragments (ML) 256.8-257.2' - pale greenish yellow, (10Y 8/2), wet, loose Limestone 257.2-257.7' - yellowish gray, (5Y 7/2), moderate to mild HCI reaction, very weak (R1), fossiliferous, molds
		265.0					Limestone 260.0-261.0' - yellowish gray, (5Y 7/2), fine grained, moderate HCI reaction, very weak (R1), voids <1/16" over 50-60%, cavities typically 3/16"x3/8", fossiliferous (mold/casts) 261.0-261.7' - pale greenish yellow, (10Y 8/2), very fine grained, mild to moderate HCI reaction, very weak (R1), becoming silty to sandy, soft, and loose with depth No Recovery 261.7-265.0' Bottom of Boring at 265.0 ft bgs on



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-21

SHEET 1 OF 11

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723168.5 N, 458055.6 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 2-7/8 wing bit

ORIENTATION: Vertical

RILLIN	<u>G METH</u>	OD AND	EQUIPM	ENT : CME 55 S/	/N 316625, mud rotary, auto hammer, AWJ rods, 2-7/8 wing bit ORIENTATION : Vertical
VATER	LEVELS	: 4.72 ft l	ogs on 3/	12/07	START : 3/11/2007 END : 3/20/2007 LOGGER : C. LeBlanc, M. Faurote
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
		RECOVE	RY (ft)	TEST RESOLTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE,
YAT Y				011 011 011	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY
			#TYPE	6"-6"-6" (N)	Solidicities, soliding of the office, winders lead 1
42.4				. ,	Start with 2-7/8" bit
-					
_					- L Cohoffer and La Plana start legging
_					J. Schaffer and Le Blanc start logging
_]
_					1 1
-	2.5				1 1
-	3.5				Silty Sand (SM)
_				4-3-3	3.5-4.6' - yellowish gray, (5Y 7/2), moist to wet, loose,
_		1.1	SS-1	(6)	very fine to fine grained, no HCl reaction, trace
5	5.0		<u> </u>		organics, 20% low plastic fines, trace organics, root /fragments, sand is silica
7.4					magnicitis, sailu is siilea
_					1 1
-					
-					-
_					
_					<u> </u>
	8.5				
_					Silt (ML)
-		1.0	SS-2	4-8-13	8.5-9.5' - dark yellowish orange, (10YR 6/6), wet, very
_		1.0	002	(21)	stiff, nonplastic, very rapid dilatancy, mild to moderate HCl reaction, very strong (R5), 5-10% very fine to fine
10 2.4	10.0				\sand, carbonate materials \text{Driller's Remark: Harder drilling at 10.5'}
- _					Dillier's Remark. Harder drilling at 10.5
_					<u> </u>
]]
-					1
-					
-					
-	13.5			47 -0/0	Silt (ML)
_	140	0.8	SS-3	17-50/3 (67/9")	13.5-14.3' - dark yellowish orange, (10YR 6/6), wet, -
_	14.3			(0110)	hard, nonplastic, very rapid dilatancy, mild to
5					moderate HCl reaction, 13% very fine to fine
7.4					\sand-sized grains \rightarrow Driller's Remark: Slight circulation loss at
_					- 15.0'
-					
-					
_					
_]]
_	18.5				1
-	18.9	0.1	SS-4	50/5	Limestone Fragments
-				(50/5")	I \ 18.5-18.6' - vellowish gray. (5Y 8/1). mild to moderate / - I
-					HCl reaction, highly fossiliferous
20					
			1	l	1 1



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-21

SHEET 2 OF 11

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723168.5 N, 458055.6 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 2-7/8 wing bit

ORIENTATION: Vertical

						FND : 3/20/20				ORIENTATION : VEILICAL
WATER	LEVELS	. 4.12 1[[ogs on 3/		START : 3/11/2007	END: 3/20/20/ SOIL DESCRIPTIO		LOGGER		LeBlanc, M. Faurote COMMENTS
≥ 9€	SAMDLE	INTERVA	I (ft)	STANDARD PENETRATION		COL DECOM NO	•		SYMBOLIC LOG	COMMENTO
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAWIFLE		• •	TEST RESULTS	SOIL NAME	E, USCS GROUP SYN	CS GROUP SYMBOL, COLOR,		길	DEPTH OF CASING, DRILLING RATE,
AATI		RECOVE			MOISTURE	CONTENT, RELATIV	E DENSITY OI	R	IBOL	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
SUR FIE			#TYPE	6"-6"-6" (N)	CONSISTENC	CY, SOIL STRUCTUR	E, WIINERALO	Gi	SYN	INSTRUMENTATION
22.4				(1.1)					$\overline{}$	
-								- 1		-
-								- 1		-
-										-
-								-		-
-										-
-								-		-
-	23.5				Silt With Sand	(ML)			ш	-
-		1.5	SS-5	17-26-20	23.5-25.0' - darl	k yellowish orange, (10YR 6/6), m	noist -	Ш	-
		1.5	33-3	(46)	to wet, hard, not moderate HCLre	nplastic, rapid dilata eaction, 15% very fil	ncy, mild to ne to medium		Ш	-
25 <u> </u>	25.0				sand-sized grain	ns, all carbonate	ic to incularii		Щ	
'''-								-		-
-										-
-								- 4		-
-								- 4		-
-								-		-
-								- 4		-
-	28.5				0.11 0 1.115.1	0 1 (011)			1111	-
-				3-2-2	Silty Sand With 28.5-29.6' - mod	i Gravei (SM) derate yellowish bro	vn. (10YR 5/4	_{4).} -		-
-		1.1	SS-6	(4)	wet, very loose,	fine to coarse grain	ed, mild HCI			-
30	30.0				reaction, 25% fi	ne gravel-sized, 39% Iterial appears to be	% nonplastic f limestone	ines,		
12.4					fragments			/ _		_
-								_		_
-										_
-										_
_										_
-										_
-	33.5				_					_
1 -			00.7	26-36-50/2	Gravelly Silt Wi	ith Sand (ML) rk yellowish orange	to dark olive	orav _		_
1 -	34.7	0.8	SS-7	(86/8")	(10YR 6/6 to 5Y	7 5/2), wet, hard, nor	plastic, very	rapid		_
35	U- 1 .1				dilatancy, strong	g HCl reaction, 30% nents, 20% fine to co	tine gravel-si arse sand m	ized aild to		
7.4						eaction for limeston				_
1 -										_
1 _								J		_
_										_
]		_
]		
1 -	38.5									_
1 -		0.9	SS-8	37-50/5					\prod	_
1 -	39.4	0.9	55.50	(87/11")	L					_
40								[1		_
								- 1		



PROJECT NUMBER:	BORING NUMBER:			
338884 FI	Δ-21	CHEET	3 OF 11	

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723168.5 N, 458055.6 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 2-7/8 wing bit ORIENTATION: Vertical

WATER	LEVELS	: 4.72 ft b	gs on 3/1	12/07	START : 3/11/2007 END : 3/20/2007 LOGGER : C. LeBlanc, M. Faurote
>				STANDARD	SOIL DESCRIPTION © COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
A BE		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
LEV/			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
2.4				(14)	Silty Sand (SM)
-					38.5-39.4' - moderate yellowish brown, (10YR 5/4), - moist to wet, very dense, very fine to medium grained,
-					mild to moderate HCl reaction, 35-40% nonplastic 7
-					fines, trace organics and/or black minerals, appears massive with no bedding, carbonate materials
_					
_	43.5				
-		0.8	SS-9	47-50/5 (97/11")	Silty Gravelly Sand (SM) 43.5-44.3' - moderate yellowish brown, (10YR 5/4),
-	44.4			(07711)	moist to wet, very dense, fine to coarse grained, mild to moderate HCl reaction, 30% fine to coarse
45 -2.6					│ \gravel-sized limestone fragments, 20% nonplastic │ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │
-					\fines, all carbonate materials
-					
-					†
-					1
]
_	48.5				
-				2-2-20	Silty Sand With Gravel (SM) 48.5-49.4' - moderate yellowish brown to dark
-		0.9	SS-10	(22)	yellowish brown, (10YR 5/4 to 10YR 4/2), wet, medium dense, fine to coarse grained, mild HCl
50 -7.6	50.0				│ reaction, 25% fine to coarse gravel-sized limestone │ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │
-					\fragments, 20% nonplastic fines, all carbonate
-					
-					† †
-					1
]
-	53.5				
-		, _		9-22-14	Silty Sand With Gravel (SM) 53.5-55.0' - moderate yellowish brown to dark
-		1.5	SS-11	(36)	yellowish brown, (10YR 5/4 to10YR 4/2), wet, dense, fine to coarse grained, mild HCl reaction, 20% fine
55 <u> </u>	55.0				└ gravel-sized limestone fragments, 25% nonplastic
-					\fines, trace organics, all carbonate / _
-					
-					
]
] [
-	58:5		00.46	F0/4	
-		0.0_/	\SS-12 <i>)</i>	50/1 (50/1")	Limestone Fragments \[\sum_{58.5'} - \text{ few coarse sand-sized limestone fragments} \] \[\sum_{-1} \] No chatter, smooth drilling
-					\recovered
60					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-21	SHEET	4	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723168.5 N, 458055.6 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER	LEVELS	: 4.72 ft b	gs on 3/1	12/07 S	START : 3/11/2007 END : 3/20/2007	LOGGER	: C.	LeBlanc, M. Faurote
				STANDARD	SOIL DESCRIPTION		G	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	OOII NAME HOOG SECUE OVARES. SEC.		SYMBOLIC LOG	DEDTILOS CACINO DONANIO DATE
A BE		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOI MOISTURE CONTENT, RELATIVE DENSITY (OR	SOLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
EPT! URF,			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALO	OGY	YME	INSTRUMENTATION
				(N)			S	
-						-		-
-						-		-
-						-		-
-						-		-
-						-		-
-	63.5					_		
-	63.9	0.4	SS-13	50/5	Silt With Sand (ML)	-(4)	Ш	SS-13 appears like extremely weak limestone
				(50/5")	63.5-63.9' - moderate yellowish brown, (10YR 5 moist to wet, hard, nonplastic, very rapid dilatan	ncy,		imestone
65					mild HCl reaction, 15-20% fine to coarse sand, carbonate	all		
-22.6					Carbonate			65-67' Minor drill chatter -
_						_		_
_						-		_
-						-		
-						_		circulation -
-						-		-
-	68.5 68.9	0.2	SS-14	50/4	_ Limestone Fragments With Silt And Sand			-
-				(50/4")	Limestone Fragments With Silt And Sand 68.5-68.8' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to10YR 4/2), wet, do	ense /-		-
70					nonplastic, mild HCl reaction, all carbonate			-
-27.6								Driller's Remark: "Soft" 70-72', but
								maintained circulation -
_						_		
_						_		Minor drill chatter 72-73'
-						_		_
-	73.5 73.9	0.1	SS-15	50/4.5	→ Limestone Fragments			-
-	13.9	0.1	00-10	(50/4.5")	73 5-73 6' - moderate vellowish brown (10YR 5	5/4), -		-
75 -					mild HCl reaction, coarse gravel-sized fragment fossiliferous	its, / –		-
75 <u> </u>								Driller's Remark: "Soft" at 75-77'
-						-		-
-						-]
						_]
								Minor drill chatter 77-78'
-	78.5 78.7	0.0	00.10	50/0	- Limate - Francisco	_		Driller's Remark: "Soft" at 78-78.5' -
-	. 5.7	0.0	SS-16	50/2 (50/2")	Limestone Fragments 78.5' - one coarse sand-sized limestone fragme	ent /-		-
-					recovered	/ -		-
80								



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-21

SHEET 5 OF 11

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723168.5 N, 458055.6 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 2-7/8 wing bit

ORIENTATION: Vertical

						y, auto nammer, Avvu rous				ORIENTATION : VEILICAI
WATER	LEVELS	. 4.1∠ T(l	ogs on 3/1		START : 3/11/2007	END: 3/20/2007 SOIL DESCRIPTION	LUG	GER :	U.	LeBlanc, M. Faurote COMMENTS
ŞQ⊋	044:5: -		. (0)	STANDARD PENETRATION	——	SOIL DESCRIPTION		\dashv	8	OOMINICITIO
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	· ,	TEST RESULTS	SOIL NAME	E, USCS GROUP SYMBO	I COLOR		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
A BE		RECOVE	ERY (ft)		MOISTURE	CONTENT, RELATIVE DI	ENSITY OR		<u></u>	DRILLING FLUID LOSS, TESTS, AND
FREVE			#TYPE	6"-6"-6"	CONSISTENC	CY, SOIL STRUCTURE, M	IINERALOGY		¥I	INSTRUMENTATION
				(N)				_	Ś	
-37.6										Significant drill chatter 80-82'
								- 1		
-								- 1		-
-								- 1		-
-								- 1		Driller's Remark: 82-83.5', soft drilling
-								- 1		
-								4		-
	83.5									_
		0.8	SS-17	47-50/5	Silty Gravelly S	Sand (SM)	(10VD 5/4)			
	84.4	0.0	33-17	(97/11")	83.5-84.3 - 11100	derate yellowish brown, e, fine to coarse grained	mild HCl			_
85 -					\ reaction, 32% f	ine to coarse gravel-size	ed limestone	/1		-
-42.6					\fragments, 19%	6 nonplastic fines, all car	bonate			Sporadic drill chatter 85-87'
-								- 1		-
-								4		-
_								4		_
								J		_
								- 1		Drill chatter 87-88'
-								- 1		_
-	00.5							- 1		Driller's Remark: "Softened considerably"
-	88.5				Silt (ML)			-	Ш	88-88.5'
-				7-2-15	-\ 88.5`-89.0' - mo	derate yellowish brown,	(10YR 5/4),	, 		_
_		1.0	SS-18	(17)	\ wet, stiff, low pl	lasticity, rapid dilatancy,	mild HCI	/41		_
90	90.0				reaction, 10-15'	% very fine sand-sized o	grains, sharp			
-47.6					Silty Gravelly S			- ⁻ /		Circulation loss at 90'
					\89.0-89.5' - Sar	me as 83.5-84.3'		/1		Water level on 3/12/07 at 08:00 4.72' from top of 10" casing
-								_ 1		Set 15' of 6" casing then set 90' of 4" casing
-								- 1		(HW); changed to 3-7/8" bit
-										-
-								4		-
								4		_
	93. <u>5</u> 93.7							\perp	ot	_
	₹3.T	0.1	SS-19	50/2	Limestone Frag	gments	(40VD 5/4)	ſŦ	┪	
1 7				(50/2")	\ \ 93.5-93.6" - moo	derate yellowish brown, on, 20% coverage of sm	(101K 5/4), all (1/16")	/1		-
95					voids on fragme	ent surfaces, several fine	e gravel-sized	/ 1		-
-52.6					limestone fragn	nents		⅃┫		-
-										-
-								4		Maintained airculation from 00 115
								_]		Maintained circulation from 90-115'
										_
								1		
1 7								- 1		-
-	00.5							- 1		-
-	98.5			37-50/4				-		-
-	99.3	0.8	SS-20	(87/10")						-
-	55.5			(/	h			ď	끡	_
100										



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-21

SHEET 6 OF 11

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723168.5 N, 458055.6 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

					N 310025, Mud Totary, auto Hammer, AWJ Tods, 2-7			ORIENTATION : Vertical
WATER	LEVELS	: 4.72 ft l	ogs on 3/	12/07	START : 3/11/2007 END : 3/20/2007	LOGGEF	<u>≀: C.</u>	LeBlanc, M. Faurote
>				STANDARD	SOIL DESCRIPTION		ပ္ခ	COMMENTS
O A S	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS			2	
		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, CO	DLOR,	월	DEPTH OF CASING, DRILLING RATE,
T A A			#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSI' CONSISTENCY, SOIL STRUCTURE, MINEF		SYMBOLIC LOG	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
DEPTH BELOW SURFACE AND ELEVATION (ft)			#ITPE	(N)			SYI	
-57.6					Silty Gravelly Sand (SM)		П	
-					98.5-99.3' - moderate yellowish brown, (10Y	R 5/4),	1	Soft steady drilling with no chatter
-					wet, dense, fine to coarse grained, mild HCl 30% fine to coarse gravel-sized material, 25	reaction,	1	-
-					sand and gravel-sized material appears to b	e -		_
					limestone fragments			
-						-	1	Slight drill chatter at 102.5'
-	400 =					-	1	
-	103.5				Silt With Sand And Gravel (ML)		-	-
-		0.4	SS-21	10-50/5.5	103.5-103.9' - moderate yellowish brown, (1	0YR 5/4), Г	Ш	_
_	104.5			(60/11.5")	wet, hard, nonplastic, mild HCl reaction, inte	erbedded / _		
105					layers of silt and sand-sized and fine to coar gravel-sized limestone fragments	se		
-62.6					graver-sized innestone tragments]	Driller's Remark: Smooth soft drilling from
-						-	1	105' to 108.5'
-						-		-
-						-		-
I -						-		_
_						_		
	108.5					-	1	
-	108.9	0.2	SS-22	50/5	Limestone Fragments			Minor chatter at 107' and 108'
-	100.0	-: <u>-</u>		(50/5")	\ 108.5-108.7' - mild HCl reaction, coarse san			_
-					\and fine to coarse gravel-sized limestone fra	agments / _		-
110						_		
-67.6								Soft drilling from 110-112' with minor chatter,
							1	maintained circulation -
-						-	1	_
-						-		-
-						-		Driller's Remark: Soft drilling at 112'
-						-		Minor chatter at 113'
_						-		
	113.5						L	
]				04.40.00	Silt With Sand (SM)	O) (D, E(1))		Advanced 4" casing from 95' to 115' below
-		1.3	SS-23	21-12-20 (32)	113.5-115.0' - moderate yellowish brown, (1) wet, hard, nonplastic, rapid dilatancy, mild H	UYR 5/4),		ground surface. Ground water level on morning of 3/13/07 is
	114.8			(02)	reaction, 20-25% very fine sand-sized carbo	onate _		4.69' below top of casing
115 <u> </u>					¬ particles, scattered fine to coarse sand-sized	d /	Ш	Maintained circulation from 115'
'2.0					\particles, coarse gravel-sized limestone frag	ments / _		115-117' Soft drilling with no chatter
_						_		_
]						-		
-						-	1	117-117.5', Sporadic minor drill chatter
-						-		Drill chatter 117.5'-118', softened 118'-118.5' -
-						-		-
_	118.5						ļ.,	_
		, ,	00.01	8-30-50/1.5				
	110.6	1.1	SS-24	(80/7.5")		-		_
120	119.6				h	Ē		
120					1		\vdash	-



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-21

SHEET 7 OF 11

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723168.5 N, 458055.6 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

						nammer, Avvu rous, 2-776 w			ORIENTATION : Vertical
WATER	LEVELS	: 4.72 ft b	ogs on 3/	12/07	START : 3/11/2007	END: 3/20/2007	LOGGE	R : C.	LeBlanc, M. Faurote
				STANDARD	SOI	L DESCRIPTION		_ o	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				SYMBOLIC LOG	
표원인		RECOVE	ERY (ft)	120111200210		S GROUP SYMBOL, COLO		1 5	DEPTH OF CASING, DRILLING RATE,
T Ă Ă			<u> </u>	6"-6"-6"		ENT, RELATIVE DENSITY (DIL STRUCTURE, MINERAL(₽	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			#TYPE	(N)	0011010121101,00	TE OTTOOTOTIE, MITTER VIEW	001	SY	IN O IN O IN CONTROL OF
-77.6				` '	Silty Sand With Grav	rel (SM)		\vdash	Driller's Remark: Drill chatter 120-122', soft
-					118.5-119.6' - modera	ate yellówish brown, (10YF		1	122-123', drill chatter 123-123.5'
-						HCl reaction, fine to coars		1	_
l _						fragments, 20% gravel-siz 15% nonplastic fines, all	zea		
					carbonate	1070 Horipiastic IIIIes, ali			
-								1	_
-							-	1	-
-							-	1	-
-	123.5 123.8	0.3	SS-25	50/4	Oile - O I Mittle O	L (OM)		70.171	=
l -	123.0	0.3	35-25	(50/4")	Silty Sand With Grav	/ei (SM) ellowish brown to moderate	. آ		_
l _				(00/1)	yellowish brown, (10)	'R 6/2 to 10YR 5/4), wet, v	ery		
125					dense, mild HCl reac	tion, fine to coarse sand-si	ized	1	
-82.6						20% gravel-sized limestor plastic fines, all carbonate	ne –	1	Chatter 125-126'
-					maginents, 1376 horip	mastic filles, all carbonate		1	Driller's Remark: Softened considerably on
-								-	126-128.5', circulation maintained to 136'
-								1	_
l _									_
1									
-							-	1	_
-	120 5						-	1	-
-	128.5				Silty Gravelly Sand (SM)		111	-
-				19-25-33	128.5-129.6' - pale ye	ellowish brown to moderate		-	-
l -		1.1	SS-26	(58)		'R 6/2 to 10YR 5/4), wet, v			_
130_	130.0					tion, fine to coarse sand-si 30% gravel-sized limestor			
-87.6						lastic fines, all carbonate	/		Driller's Remark: Soft 130-132.5'
-								1	Driller's Remark: Harder 132-133.5', minor – chatter observed on 133-133.5'
-							-	1	
-								1	-
-							-	-	_
-								4	_
I _									
	133.5								
-	133.8	0.3	SS-27	50/3	Silty Sand With Grav]
-				(50/3")	133.5-133.75' - pale y	vellowish brown to moderate 'R 6/2 to 10YR 5/4), wet, v	te /·	1	
					dense, mild HCl reac	tion, fine to coarse sand-si	ized	1	-
135 <u></u> -92.6					limestone fragments,	20% gravel-sized limestor		1	Steady chatter 135-138.5'
52.5					tragments, 15% nonp	lastic fines, all carbonate		1	Stoday oriallor 100-100.0
I -								1	
									Significant chatter 136-138.5'
-							•		Circulation loss at 136.5'
-								1	
-								1	-
-								1	-
-	138.5 138.7	0.0	00.55	F0/2 F	Limestone Fragmen	ts		Ш	_
l _	100.7	0.2	SS-28	50/2.5 (50/2.5")		ive gray, (5Y 5/2), mild to n. fine to coarse sand-size	nd [Very hard at 139.0'
				(30/2.3)		on, fine to coarse sand-size or fossils, trace black parti			End of soil boring at 139', begin rock coring
140					possibly pyrite		, ,	1]
140					Begin Rock Coring at	: 139.0 ft bgs		1	
					See the next sheet fo				
-									



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-21 SHEET 8 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723168.5 N, 458055.6 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND FOUIPMENT: CME 55 S/N 316625, mud rotary, NO tools, HW casing

ORIENTATION · Vertical

CORING	METHOD AN	ND EC	QUIPN	IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
WATER	LEVELS: 4.7	2 ft bo	as on :	3/12/07 START : 3/11/2007 END : 3/2	20/200	DOT LOGGER : C. LeBlanc, M. Fauro	te
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- 140 -97.6 -	139.0 R1-NQ 2.5 ft 80%	14	>10	139.0-140.0' - Fracture zone, multiple laminated wavy discontinuities and fractures 140.0' - Bedding plane or mechanical break, 10 deg, smooth, planar, tight		Limestone 139.0-141.0' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, medium strong to strong (R3 to R4), 25% unfilled surface	Ground water level at 4.49' below top of casing - Le Blanc and T. Stewart start logging at 139' HW casing advanced to - 138.5'
-	141.5		NR	140.2' - Bedding plane, 5 deg, smooth, planar, tight	Ш	voids (< 1/16") spheroidal to irregular shaped, thinly bedded to laminated,	R1: 29 minutes
-	141.5		2	140.7' - Bedding plane, 5 deg, rough, undulating, gray discoloration over 60% of surface, tight		 poorly fossiliferous (molds/casts) No Recovery 141.0-141.5' Limestone 	-
- - -	R2-NQ 5 ft	17	2 >10	140.9' - Bedding plane, 5 deg, rough, undulating, 1/4" fossil molds/casts on fracture surface 141.0' - Bedding plane or mechanical break, rough, planar, fracture along bedding plane, open 1/16"		141.5-142.3' - Same as 139.0-141.0' 142.3-143.9' - light olive gray, (5Y 5/2), medium grained, mild to moderate HCl reaction, 1/16" voids on 40% of surface, fine to medium carbonate subrounded granules.	- Slight circulation loss at
- 145 <u>-</u> -102.6 - -	48% 146.5		NR	141.8' - Fracture, 80 deg, rough, undulating, stains over 20% of surface 142.3-142.6' - Fracture zone, 1/4" to 3/4" rock fragments 143.1' - Bedding plane or mechanical break, horizontal, rough, undulating, open 2"		granular/sucrosic texture, traces of fine grain medium dark gray (N4) particles No Recovery 143.9-146.5'	R2: 46 minutes -
-	140.5		>10	143.3' - Fracture, 50 deg, rough, undulating, tight 143.6' - Fracture, 70 deg, rough, undulating,	Ħ	Limestone - 146.5-147.6' - Same as 142.3-143.9'	-
- -			>10	open 143.6-143.9' - Fracture zone, 3/16" - 1-9/16" subangular rock fragments 146.6' - Fracture, 10 deg, rough, undulating,		147.6-150.6' - light olive gray, (5Y 5/2), fine to medium grained, moderate HCl reaction, medium	Harder drilling at 148'
- - 150	R3-NQ 5 ft 82%	20	>10	open 1/8" 147.1' - Mechanical break, 5 deg, rough, undulating 147.2-147.6' - Fracture zone, rough,		strong (R3), 30-40% small (1/16") voids, trace of unfilled elongated (3/16" x 1/16") cavities, stains on 20% of surface, trace to 10% fine to	-
-107.6 -			>10 NR	undulating, rock fragments 147.8' - Fracture, 30 deg, smooth, undulating, trace staining of black speckles 148.2-148.7' - Fracture zone, 30-40 deg		medium grained medium dark gray (N4) particles No Recovery 150.6-151.5'	R3: 15 minutes
-	151.5		2	148.2' - Fracture, 30-40 deg, rough, stepped, tight 148.7' - Fracture, 5 deg, rough, undulating, open 1/8"		Limestone 151.5-155.8' - light olive gray with medium light gray and very pale	-
-	DANO		6	148.95' - Fracture, 5-10 deg, rough, undulating, pink discoloration, open 1/4" 149.2' - Bedding plane, horizontal, rough, undulating, gray stains, open up to 1/2"		orange mottling, (5Y 5/2 with N6 and 10YR 8/2), fine grained, moderate to strong HCl reaction, medium strong (R3), poorly fossiliferous, 1/16" voids	-
- 155	R4-NQ 5 ft 86%	23	>10	149.6' - Fracture, 40-45 deg, rough, undulating, trace black staining 149.7-150.6' - Fracture zone, 40-50 deg,		on 25% of surface, massive bedding except laminated from 153.4-159.9'	-
-112.6 -			5	multiple 40-50 deg fractures and angular fragments with black staining 150.25, 158.3' - Bedding plane (2), horizontal, rough, undulating, tight		 - - No Recovery 155.8-156.5'	R4: 28 minutes
-	156.5		NR	152.1' - Fracture, 25 deg, rough, undulating, tight 152.3' - Fracture, 70 deg, rough, undulating,		-]
-			2	black stains over 85% of surface 152.4' - Fracture, horizontal, rough, undulating, open 1/4"		-	-
-	R5-NQ		4	152.55' - Bedding plane, horizontal, rough, undulating, open 1/4"		-	
					П		
					Ш		



PROJECT NUMBER: BORING NUMBER: 338884.FL A-21 SHEET 9 OF 11

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723168.5 N, 458055.6 E (NAD83)

DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler ELEVATION: 42.4 ft (NAVD88)

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical WATER LEVELS: 4.72 ft bgs on 3/12/07 START: 3/11/2007 END: 3/20/2007 LOGGER: C. LeBlanc, M. Faurote DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD <u>0</u> MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS 5 ft 152.7' - Bedding plane, horizontal, rough, SC-1 collected at 158.95-Limestone 84% planar, grayish orange (10YR 7/4) stains on 156.5-160.7' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), olive gray (5y 3/2) mottling at 157.3', fine 160 25% of surface 153.0' - Fracture, 75-80 deg, rough, -117.6 4 grained, moderate HCI reaction, undulating, black stain over 10-15% of R5: 47 minutes surface weak to medium strong (R2 to R3), NR 153.2, 153.3, 153.4, 153.55, 153.7' - Bedding 3/8" voids on 15% of surface 161.5 (40-45% at 158.0-159.0'), casts over plane (5), horizontal, rough, planar, open < 45% of surface, trace cavities 1/16" 2 153.7-153.95' - Fracture zone, fragments (3/16-1/8"), voids and cavities have <3/4" an elongated subhorizontal 153.95, 154.1, 154.3, 154.4, 154.6' alignment, cavities concentrated 1 Bedding plane (5), 5-10 deg, tight, brownish from 156.5 -157.0' and 160.0-160.5' black staining on surface No Recovery 160.7-161.5' R6-NC 154.9' - Fracture, 80 deg, rough, undulating, tight, 5-10% staining as black speckles Limestone 161.5-165.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine 5 5 ft 27 73% 155.2, 155.25' - Bedding plane (2), grained, moderate to strong HCI horizontal, rough, planar, tight 165 3 155.4' - Bedding plane or mechanical break, reaction, weak to medium strong (R2 -122.6 30-40 deg, rough, undulating, open 1/4" 156.6' - Mechanical break, horizontal, rough, to R3), fossiliferous (casts/molds, R6: 35 minutes 1/16" and smaller), 30% voids NR (1/16"), 5-10% elongated cavities (3/16-1/16"), massive/homogeneous fine grained appearance 164.0-164.7'

No Recovery 165.2-166.5' open 1/16" 156.8' - Fracture, 60-70 deg, rough, 166.5 undulating, tight >10 157.6' - Bedding plane, 30 deg, rough, undulating, tight 157.85' - Bedding plane, horizontal, rough, **Limestone** 166.5-169.0' - yellowish gray, (5Y SC-2 collected at 167.55-3 168 25' planar, tight 7/2), fine grained, moderate HCI 158.5, 158.7, 158.8' - Bedding plane (3), reaction, 35-40% small (1/16") voids Significant circulation loss R7-NQ horizontal, rough, planar, tight concentrated at 166.5-167.3, 1 5 ft 22 158.95' - Bedding plane, 15-20 deg, rough, moderately fossiliferous (molds up to 50% undulating, tight 3/8" x 1-3/8") 159.9' - Bedding plane, horizontal, rough, No Recovery 169.0-171.5' 170 planar, open 1/16" -127 6 NR 160.0, 160.4, 160.5' - Bedding plane (3), horizontal, rough, undulating, tight 161.7' - Fracture, 80 deg, rough, undulating, R7: 26 minutes End drilling for day 171.5 tight (3/14/07) at 171.5 161.9' - Bedding plane, horizontal, rough, Limestone Water level at 4.52' below 171.5-175.4' - light brown to >10 undulating, open 1/4" top of casing 3/15/07 163.2' - Fracture, 60 deg, rough, undulating, yellowish gray, (5YR 6/4 to 5Y 7/2), Advanced HW casing to fine to medium grained, mild to 168' on 3/15/07 163.5, 163.6' - Bedding plane (2), horizontal, >10 moderate HCI reaction, medium Water level is at top of strong to strong (R3 to R4), laminated bedding 172.6-173.1' with rough, undulating, open 1/16" casing when drilling 163.8, 163.95' - Bedding plane (2), R8-NQ resumed 3/20/07 alternating beds of very dark and light crystallized materials (pyrite and horizontal, rough, undulating, 1/16" open 2 5 ft 22 78% 164.2' - Fracture, 65-75 deg, rough, undulating, open 1/16", stains on 25% of hematite), very fossiliferous (35% 175 3 surface void spaces from fossil molds) from -132<u>.6</u> 164.6' - Fracture, 5-10 deg, rough, 173 1-175 4 undulating, 1/4" open 164.75-164.9' - Fracture zone, angular rock No Recovery 175.4-176.5' R8: 129 minutes NR fragments 176.5 165.15' - Mechanical break, horizontal, Limestone rough, undulating, tight 10 176.5-176.8' - medium grained, mild 166.6' - Mechanical break, horizontal, rough, HCI reaction, medium strong (R3), undulating, tight 35-40% fossil related void spaces 167.1-167.25' - Fracture zone, rock 6 fragments 167.4' - Mechanical break, horizontal, rough, R9-NQ undulating, tight



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-21 SHEET 10 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723168.5 N, 458055.6 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

CORING	METHOD A	ND EC	JUIPN	ENT : CME 55 S/N 316625, mud rotary, NQ tools, HW	casing		ORIENTATION : Vertical
WATER	LEVELS: 4.7	'2 ft b	gs on :	3/12/07 START: 3/11/2007 END: 3	3/20/20	07 LOGGER : C. LeBlanc, M. F	aurote
>	<u> </u>			DISCONTINUITIES	(1)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	5 ft	0	>10	167.5' - Fracture, 25 deg, rough, undulating,		176.8-177.35' - yellowish gray, (5Y	Faurote start logging at
180 <u>-</u> -137.6	. 78%		>10	tight 168.2' - Fracture, 30 deg, rough, undulating, tight	丰	 7/2), very fine grained, moderate HC reaction, medium strong to strong (R3 to R4), thin to laminar bedded 	179' to the end of borehole
-	181.5		NR	168.45' - Fracture, 80 deg, rough, undulating, black stains on 15% of surface 168.65' - Fracture, 20 deg, rough, undulating	Ħ	 177.35-180.4' - moderate yellowish brown, (10YR 5/4), fine to very fine grained, moderate to strong HCI 	R9: 67 minutes
-			0	171.6' - Fracture, 45 deg, rough 171.75-172.3' - Fracture zone, multiple small fragments 172.55, 172.75, 172.8' - Bedding plane (3),	挂	 reaction, indistinctly bedded and presents about 25% void space due to fossil casts and molds No Recovery 180.4-181.5' 	
-			5	smooth, planar 172.8-172.95' - Fracture, rough, "L" shaped fracture	#	Limestone 181.5-183.5' - light brown, (5YR 6/4) very fine grained, mild HCl reaction,	
- 185 <u>-</u> -142.6	R10-NQ 5 ft 40%	20	NR	172.95-173.6' - Fracture zone or mechanical break 173.85' - Mechanical break, rough, undulating, irregular, no fill 174.0' - Fracture, rough 174.25' - Fracture or mechanical break.		medium strong (R3), 25% void space from fossil molds and casts No Recovery 183.5-186.5'	e
-	186.5			horizontal 174.5-175.35' - Fracture zone, multiple breaks		- - - - Limestone	R10: 23 minutes
-			>10	176.45-177.45' - Fracture zone, horizontal, rough to smooth, undulating, multiple fractures, most appear horizontal 177.45-178.45' - Fracture zone, mostly		 Linestone 186.5-188.1' - light brown, (5YR 5/6) very fine grained, mild HCl reaction, medium strong to strong (R3 to R4), 	
-	R11-NQ		9	horizontal fractures, mechanical breaks that look like shatter cones at 177.80' 178.45-179.5' - Fracture zone or mechanical	井	- exhibits fossil related voids to 35% of the visible rock 188.1-188.5' - moderate yellowish	
- 190	5 ft 68%	0	>10	break 179.5-180.35' - Fracture zone, 2 flat surfaces and a broken zone		 brown, (10YR 5/4), very fine grained mild HCl reaction, medium strong to strong (R3 to R4), thinly to laminar 	
-147.6 - - -	191.5		NR	182.45' - Mechanical break, rough 182.75-183.05' - Fracture, 80 deg, vertical fracture, not separated, and does not extend beyond this piece 183.0-183.35' - Fracture zone, multiple		 bedded or pseudo bedded 188.5-189.9' - pale yellowish brown, (10YR 6/2), mild HCl reaction, weak to medium strong (R2 to R3), highly fossiliferous with large echinoderm 	R11: 35 minutes
-			>10	smooth, planar faces 186.5' - Fracture zone, multiple broken fragments smaller than 1.5", no defined	E	 and gastropod casts, total void space about 30%, organic traces along some fossil casts No Proposers 499, 414 51 	e
-			6	feature 187.75-188.35' - Fracture, vertical, rough, undulating	井	No Recovery 189.9-191.5' Limestone 191.5-191.8' - Same as 188.5-189.9 191.8-192.1' - yellowish gray, (5Y	
_	R12-NQ 5 ft 72%		>10	188.35' - Fracture, rough, planar, iron staining on surface 188.40' - Fracture, healed 188.65-188.95' - Fracture, vertical, exhibits		7/2), very fine grained, mild HCl reaction, laminar bedded	
195 152.6 -			3 NR	very heavy solution erosion features and infilling or plating of iron oxides creating a very rough surface 191.5-191.9' - Fracture zone, numerous		medium strong (R3), highly fossiliferous exhibiting 30% void spaces from casts and molds, and numerous shell fragments, apparent	
-	196.5		>10	small rock fragments 191.7' - Fracture, smooth, planar 191.9' - Fracture, slightly rough, planar, iron	士	clasts of fine grained rock are visible within the fossil rich rock, solution cavities with iron oxide minerals or	The rock presents an
- - -	R13-NQ 3.8 ft 61%		4	oxide stains 192.15' - Fracture, 0-7 deg, rough, staining or minerals on fracture faces 192.55' - Fracture, 60 deg, rough, recrystallization on the face that is very rough		stains 193.5-195.1' - Same as 191.8-192.1 No Recovery 195.1-196.5' Limestone 196.5-197.0' - Same as 191.8-192.1	overall picture of subsidence or collapse and reinduration due to the

Rev. 7



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-21	SHEET	11	OF	11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723168.5 N, 458055.6 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

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WATER	LEVELS: 4.7	'2 ft bo	as on 3	3/12/07 START: 3/11/2007 END: 3/	20/20	007	LOGGER : C. LeBlanc, M. Faurot	e
		,		DISCONTINUITIES	Т	Ť	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)				SYMBOLIC LOG	Н	LITIOLOGI	COMMENTO
S ≤ Z	JA ≿		FRACTURES PER FOOT	DESCRIPTION	13	ı	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
불병은	8. ř. ř.	(%) Q	풀	DEDTH TYPE OBJECTATION BOHOUNESS	7 ặ	ı	MINERALOGY, TEXTURE,	FLUID LOSS, CORING RATE AND
Ĭ Ĕ Š Š	SGE SGE	D (PA	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	Įβ	ı	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	Ö Ü Ü	R Q	잠	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ιź	ı	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
БООШ	014	ъ.	шш		0)	₽		
1			l l	192.55-193.4' - Fracture, 10-80 deg, multiple	\vdash	1	197.0-198.1' - moderate yellowish	R13: 4 minutes
200			NR	fractures with crystallization of iron	h	t	brown to light brown, (10YR 5/4 to	Shows interrupted bedded -
200_ -157.6	200.3			compounds and organics 193.4-195.0' - Mechanical break, multiple		╊	_ 5YR 6/4), mild HCl reaction, medium strong to strong (R3 to R4), solution	and differential compaction, plus a variety
-137.0	200.3			breaks	Г	t	channels along fracture plans	of clasts types in less than
				195.0' - Fracture, 45 deg, recrystallized	1	Г	198.1-198.4' - light brown, (5YR 5/6),	1/4" sizes. At 198.4' there
I -				carbonate microcrystalline masses	1	ŀ	thin to laminar bedded in regular	is an undulant contact that
I -				196.45-197.1' - Fracture zone, numerous	-	ŀ	planes with silt and sand-sized grains	looks like shallow ripple
				small rock fragments, one fragment shows	ı	ı	in varying proportions	marks of low amplitude
				intersecting 45 deg fractures with deposit of	1	Γ	198.4-198.8' - pale yellowish brown,	May exhibit healed
I -				recrystallized minerals	1	ŀ	(10YR 6/2), moderate HCl reaction,	subsidence features
-				197.05-198.1' - Fracture, 65-80 deg, rough,	4	L	weak to medium strong (R2 to R3),	TD=200.3' at 17:48 on
1				irregular edged joint exhibiting dark stains, the surface shows recrystallized minerals	1	L	fossil void spaces about 30% No Recovery 198.8-200.3	3/20/07 Water level at 3' below
1 -				including iron oxides	1	Γ	Bottom of Boring at 200.3 ft bgs on	ground surface on 3/21/07
-				198.4' - Fracture, horizontal, planar, iron	1	F	3/20/2007	-
1 -				oxide minerals and some (2-5%) fine	1	F	5.25.2001	_
1				grained, silt sized infilling	1	L		
1 -				198.7' - Fracture, 65 deg, rough, angular	1	r	_	
-				faces with some silt sized infilling	1	F		-
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PROJECT NUMBER:	BORING NUMBER:		
338884 FI	Δ-21 Δ	CHEET	1 OF 0

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723171.1 N, 458054.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

						tary, auto nammer, Av				ONIENTATION : Vertical
WAIER	LEVELS	: 4.72 ft b	gs on 3/		START : 5/22/2007	END: 5/23/200 SOIL DESCRIPTION		aGER	: K.	Gomez COMMENTS
≥ Ω€	CANADI	INTERM	1 (6)	STANDARD PENETRATION		JOIL DESCRIPTION	N		90	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		TEST RESULTS	SOIL NAME	E, USCS GROUP SYM	IBOL, COLOR.		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H BI ATIC		RECOVE	RY (ft)		MOISTURE	CONTENT, RELATIVI	E DENSITY OR		BOL	DRILLING FLUID LOSS, TESTS, AND
EP1			#TYPE	6"-6"-6" (N)	CONSISTENC	CY, SOIL STRUCTURE	E, MINERALOGY		SYM	INSTRUMENTATION
42.8	0.0			(14)	Fill				.;; XXX	
-		0.4	SS-1	4-5-6	0.0-0.4' - limest	tone, derived silt, san	d and gravel mix	x_/=	XXX	Water level is based on Ground Water
-		0.4	33-1	(11)				-		Monitoring at LNP site (FSAR Table -
-	1.5							_		2.4.12.08) A-21A drilled in construction road; road
-								-		material is silty sand with gravel limestone -
-								-		derived product Relogged by J. Schaeffer and T. Stewart
_								_		Water levels not recorded during drilling –
_								_		_
_								_		_
_								_		_
5	5.0								7777	_
37.8				1-1-2	Clayey Sand (S	SC) bluish gray with light	brown staining			_
_		0.8	SS-2	(3)		R 5/6), moist, very lo	ose, very fine to		////	_
_	6.5			. ,	fine grained, no plasticity fines,	HCl reaction, 20% r	nedium to high	/]		_
					plactiony inico,	ourid to office				_
										_
										_
10	10.0									_
32.8					Silt (ML)	: 1 (40)(D =	7/4)	.,		
		1.3	SS-3	12-11-15 (26)		yish orange, (10YR 7 / rapid dilatancy, milo				_
	11.5			(20)	reaction, 5-10%	very fine to fine san	d-sized, all	A	Ш	
					carbonate			_/		_
										_
-										7
-								_		_
-								_		_
								-		7
15	15.0							-		7
27.8	10.0	0.6	SC 4	21-50/3	Silt With Limes	stone (ML)				\neg
-	15.8	0.0	SS-4	(71/9")	_ 15.0-15.6' - Sar	me as 10.0-11.3' exc e sand- to fine grave	ept scattered		Ш	-
-					fragments, all c		. 5.255	_/		7
-										7
-								-		7
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-21A

SHEET 2 OF 8

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723171.1 N, 458054.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS	: 4.72 ft k	ogs on 3/	12/07	START : 5/22/2007 END : 5/23/2007 LOG	GER	: R.	Gomez
				STANDARD	SOIL DESCRIPTION			COMMENTS
AND (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS			ГО	
HE SE		RECOVE	RY (ft)	120111200210	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		OLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		SYMBOLIC LOG	INSTRUMENTATION
SC				(N)			ώ HT	
22.8	20.0			19-16-15	Silty Sand (SM) 20.0-21.5' - grayish orange to dark yellowish orange,	_		_
_		1.5	SS-5	(31)	(10YR 7/4 to 10YR 6/6), wet, dense, fine to coarse	4		_
_	21.5				grained, mild to moderate HCl reaction, 30% nonplastic fines, all carbonate derived		Ш	-
_						_ 1		-
-						-		-
-						-		-
-						-		_
-						-		_
						-		-
25 <u> </u>	25.0				Sandy Silt (ML)		Ш	
-		1.4	SS-6	23-22-26	25.0-26.4' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), wet, hard, nonplastic, 41%	-1		-
-	26.5	1		(48)	fine to medium grained sand	-		-
-	20.3					-		-
-						-		-
-						-		-
_								-
-								_
						1		_
30	30.0							
12.8		1.1	SS-7	4-20-50/1	Silty Sand (SM) 30.0-31.1' - Same as 25.0-26.4' except very dense,			_
_	31.1	1.1	33-7	(70/7")	25-30% nonplastic fines			_
_						_		_
_						_		-
_						-		-
-						-		Heavy grinding and chattering; 10 minutes to
-						-		drill 33.0-35.0'
-								-
-	35.0							-
35 7.8	35.1	0.0	SS-8	50/1	No Recovery 35.0-35.1'	才		Set HW casing to 35' and switch to rock
-				(50/1")	Begin Rock Coring at 35.0 ft bgs See the next sheet for the rock core log	-		End of drilling for the day, 5/22/07
-					See the next cheet for the reak sere leg	-		-
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338884.FL A-21A

SHEET 3 OF 8

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723171.1 N, 458054.1 E (NAD83)

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER LEVELS: 4.72 ft bgs on 3/12/07 START: 5/22/2007 END: 5/23/2007 LOGGER: R. Gomez DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 7.8 Limestone Begin rock coring at 08:17, 1 35.0-38.6' - pale yellowish brown, 35.6' - Bedding plane, 0-30 deg, rough, (10YR 6/2), moderate to strong HCI reaction, very weak (R1), thin planar, tight reaction, very weak (RT), triin bedding, moderately fossiliferous (casts/molds), sample is 20-30% voids/casts <1/8", trace irregular shaped cavities 1/4"x1/8", trace 1 36.8' - Bedding plane, 5-10 deg, rough, R1-HQ undulating, tight to open (1/8") 5 ft 50 4 coarse grain organic fragments, 72% 37.7' - Fracture, 50 deg, rough, undulating 37.85, 37.95,' - Bedding plane (2), horizontal, wavy bedding plane contacts with carbonate carbonate silt lenses present at 2 37.9-38.1 No Recovery 38.6-40.0' fines R1: 5 minutes 38.5' - Mechanical break NR 40 40.0 28 Limestone 2 40.3, 40.4' - Mechanical break (2), horizontal, 40.0-43.0' - pale yellowish brown, rough, undulating, tight (10YR 6/2), fine to medium grained, 41.0, 41.1' - Mechanical break (2), horizontal, moderate to strong HCl reaction, rough, undulating, tight 4 extremely weak to very weak (R0 to 41.6, 41.8' - Bedding plane (2), horizontal, R1), 3-5% fine grain moderately dark rough, undulating, tight gray (N4) particles in matrix, 5-7% R2-HQ coarse grain black particles, 5 ft 23 4 42.15' - Fracture, 40 deg, smooth, planar, 60% moderately fossiliferous tiaht (casts/molds), fossils (up to 3/8"), 42.2, 42.5, 42.9' - Mechanical break (3), <5 15-25% voids/casts (<1/16") deg, rough, undulating, tight No Recovery 43.0-45.0' NR R2: 3 minutes 45 45 0 45.0-46.4' - Mechanical break, multiple Limestone >10 45.0-48.9' - dark yellowish brown, irregular breaks (10YR 4/2), extremely weak to very weak (R0 to R1), 3-7% black organic lamination (<1/16") and coarse grain particles, 25-35% spheroidal voids >10 (<1/8"), moderately fossiliferous R3-HQ 47.2, 47.4, 47.6, 47.8, 48.4, 48.8, 48.9' -(casts and molds), most fossils 5 ft 15 6 Mechanical break (7), horizontal, rough, <1/8", trace dissolution cavities undulating, tight across the entire run 3 No Recovery 48.9-50.0' R3: 2 minutes NR 50.0 -7.2 50.0-50.3' - Fracture zone, subangular rock Limestone fragments 1/2"-1-1/8" in size >10 50.0-54.2' - dark yellowish brown, 50.0, 50.1, 50.3, 50.45' - Bedding plane (4), (10YR 4/2), very fine to fine grained, 5-10 deg, rough, undulating, open (1/16"), moderate HCl reaction, very weak to weak (R1 to R2), 15-20% spheroidal and elongated voids <1/8", 5-10% occuring on organic laminations 50.6, 50.7' - Bedding plane (2), 5-10 deg, 5 elongated dissolution cavities rough, undulating, open (1/16") R4-HQ 28 2 51.7' - Bedding plane, horizontal, rough, unfilled, both elongated voids and 5 ft undulating, open (1/8") 52.1, 52.65, 53.0, 53.15' - Bedding plane (4), cavities appear to be sub horizontally 84% aligned, 3-5% organic material as 15-20 deg, rough, undulating, tight coarse black particles and 3 53.25' - Bedding plane, 30 deg, rough, laminations at 51.3' and 52.3' undulating, organics on upper surface 0 R4: 5 minutes No Recovery 54.2-55.0' NR 55 55.0



338884.FL A-21A

SHEET 4 OF 8

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723171.1 N, 458054.1 E (NAD83)

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER LEVELS: 4.72 ft bgs on 3/12/07 START: 5/22/2007 END: 5/23/2007 LOGGER: R. Gomez DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -12.2 Limestone 55.2-55.45' - Fracture zone, 1/4" to 1-1/2" >10 55.0-58.9' - pale yellowish brown with rock fragments trace olive gray mottling, (10YR 6/2 with 5Y 4/1), very fine to fine grained, 55.65' - Bedding plane, 2-5 deg, rough, planar, open (<1/16") moderate to strong HCl reaction, weak to medium strong (R2 to R3), 10-15% voids (<1/16"), elongated, poorly fossiliferous (casts), fossils 3 55.95' - Bedding plane, 5 deg, rough, stepped, open (<1/16") R5-HQ 56.1, 56.3' - Mechanical break 56.5' - Fracture, 60 deg, rough, undulating, 47 4 5 ft are <1/16", 3-7% medium grained angular shaped black particles, trace SC-1 collected at 57.5-78% open (<1/8") 57.3' - Fracture, 50 deg, rough, undulating, 58.9' 1 short (<1/16") discontinuous black open (<1/8") laminations grading from weak rock 57.4' - Bedding plane or mechanical break (R2) at top to medium strong rock R5: 7 minutes 57.5' - Bedding plane, horizontal, rough, stepped, 3/8" relief on surface NR (R3) at the bottom No Recovery 58.9-60.0' 60 60.0 58.9' - Bedding plane or mechanical break, -17.2 Limestone horizontal, rough, planar, open (< 1/16") 60.0-61.2' - pale yellowish brown to 1 60.3' - Bedding plane, horizontal, rough, moderate yellowish brown, (10YR 6/2 undulating, open (1/2") to 10YR 5/4), moderate to strong HCI 61.2, 61.4' - Bedding plane or mechanical 2 reaction, medium strong (R3), 3-5% break (2), 5-10 deg, rough, undulating, open voids <1/16", 5-10% horizontally aligned <3/8" flat black flakes R6-HO 62.0' - Bedding plane, horizontal, rough, 3 61.2-61.4' - Same as 60.0-61.2' 35 5 ft undulating, open (1/8") 62.3' - Bedding plane, 5-10 deg, rough, except weak (R2), 25-35% voids 92% <1/16", 5-10% coarse grain black undulating, tight 4 particles 62.5' - Mechanical break 61.4-62.0' - Same as 60.0-61.2' 62.0-64.6' - Same as 61.2-61.4' 62.8, 63.05, 63.3, 63.5, 63.8' - Bedding plane or mechanical break (5), horizontal, rough, R6: 6 minutes 0 undulating, open (<1/16") No Recovery 64.6-65.0' NR 65 65.0 Limestone 65.0-71.0' - mottled pale yellowish brown and dark yellowish brown, (10YR 6/2 and 10YR 4/2), fine >10 65.6-65.78' - Fracture zone, rock fragments SC-2 collected at 65.78grained, moderate to strong HCI 0 reaction, weak to medium strong (R2 to R3), 10-15% voids <1/16", voids R7-HQ 67.2' - Bedding plane, horizontal, rough, restricted to pale yellowish brown 5 ft 68 1 undulating 100% color, 3-7% medium grain black flakes present as short discontinuous laminations across rock sample, very 0 thinly bedded at 69.0-69.3', mottled areas appear to be bioturbated zones 69.0' - Bedding plane, horizontal, rough, R7: 10 minutes oriented subhorizontally 4 planar, 1/16" silt and/or clay sized infilling 69.3' - Bedding plane, horizontal, rough, 70.0 $-27.\overline{2}$ planar, tight medium grained black flakes on 2 surface 69.6' - Fracture, 20-30 deg, smooth, stepped, 1-3/4" fossil on fracture surface 71.0-74.4' - pale yellowish brown, (10YR 6/2), fine grained, moderate to 70.68' - Bedding plane, 10-15 deg, rough, undulating, at top of extremely weak rock 70.88' - Bedding plane, 5-10 deg, rough, undulating, at top of extremely weak rock 70.88' - Bedding plane, 5-10 deg, rough, undulating top of fersions to the standard to the standard top of fersions to the standard top of the standard top 2 strong HCl reaction, 20-30% voids/casts <1/16", moderately R8-HO 60 1 fossiliferous with casts (up to 1/2"), 5 ft undulating, top of fractured rock 71.0' - Bedding plane, <5 deg, rough, 88% 5-10% medium to coarse grain black particles, 3-5% medium to coarse undulating, base of fractured zone grained dark gray angular to 1 71.3' - Fracture, 80 deg, rough, undulating, subangular shaped particles, 1/2" tight, fracture up to 7" long thick organic layer at 73.6', below R8: 7 minutes 1 72.7' - Bedding plane, 5-10 deg, rough, 73.6' rock looks more weathered NR undulating, tight than above 75 75.0

APPENDIX 2BB-264 Rev. 7



338884.FL A-21A

SHEET 5 OF 8

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723171.1 N, 458054.1 E (NAD83)

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER LEVELS: 4.72 ft bgs on 3/12/07 START: 5/22/2007 END: 5/23/2007 LOGGER: R. Gomez DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT DESCRIPTION ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 73.6' - Bedding plane, 0-5 deg, rough, undulating, 1/2" thick organic layer -32.2 No Recovery 74.4-75.0 0 Limestone 73.8' - Mechanical break, 30 deg, rough, 75.0-78.6' - moderate yellowish undulating, tight brown to pale vellowish brown. (10YR 5/4 to 10YR 6/2), moderate HCI reaction, weak (R2), 25-30% voids <1/16", trace unfilled cavities 1"x1/2" (mostly near bottom), 74.1' - Bedding plane or mechanical break, 1 horizontal, rough, undulating, tight 76.6' - Fracture, 30 deg, rough, undulating, R9-HQ 40 >10 5 ft 76.6-77.1' - Fracture, vertical, rough, undulating, black staining on 15% of surface, moderately fossiliferous (casts), 96% 3-7% fine to medium grained black >10 multiple intersecting mechanical breaks particles; 1-1/2" thick organic lense 77.6-78.6' - Fracture zone, high angle 78.6-79.8' - Same as 75.0-78.6' fractures through an interval of apparently except very weak (R1) R9: 6 minutes 0 weathered rock 78.6, 78.8' - Bedding plane (2), horizontal, 80 80.0 NR No Recovery 79.8-80.0' rough, undulating, top and base of -37.2 Limestone organic-rich carbonate fines layer >10 80.0-84.4' - pale yellowish brown, 80.0-80.3' - Fracture zone, rock fragments (10YR 6/2), moderate to strong HCI 80.6' - Bedding plane or mechanical break, reaction, weak (R2), moderately horizontal 3 fossiliferous (cast/molds), 3-7% 81.0' - Fracture, 65-75 deg, rough, undulating 81.3' - Fracture, 30 deg, rough, undulating, medium to coarse grain black R10-H0 particles, fossils (up to 5/8"), various 2 tiaht 10 5 ft fossil types present including tubular 81.7' - Fracture, 40 deg, rough, undulating, 88% shaped organisms, top 0.4' of run tight appears weathered 82.1' - Fracture, 30 deg, rough, undulating, 2 top of zone of fragmented rock 82.7' - Fracture, 70-80 deg, rough, 1 R10: 10 minutes undulating, tight No Recovery 84.4-85.0' NR 83.1' - Fracture, 70 deg, rough, undulating, 85 85.0 tight -42.2 SC-3 collected at 85.0-Limestone 83.2' - Fracture, horizontal, rough, undulating 0 85.0-85.9' - pale yellowish brown, (10YR 6/2), strong HCl reaction, 85 82 83.8-84.3' - Fracture zone 84.3' - Fracture, 30-40 deg, rough, strong (R4), 5-10% void <1/16", undulating, base of fractured zone 10-20% unfilled cavities irregularly 85.9' - Fracture, 30 deg, rough, undulating, shaped up to 1" in size, some are infilling on surface dissolution cavities, moderately Circulation loss at 87.0' R11-HQ NR fossiliferous (casts/molds), fossils up 15 Core loss assumed to 5 ft 46% to 5/8" in size, intervals of occur from 85.9-88.6' weathering/dissolution cavities of fragmented core, subrounded to 88.5-89.6' - Fracture zone, fragments from >10 subangular in shape, brownish black 3/8" to 1", staining on few surfaces, possibly staining on some fragments, stained R11: 6 minutes weathered rock, possible dissolution cavity dark yellowish brown over bottom >10 0 4' 90.0 89.7' - Fracture, 60 deg, rough, undulating, No Recovery 85.9-88.6' open (<1/16") 90.3-91.0' - Fracture zone, 1/2"-2" rock $-47.\overline{2}$ Limestone 10 88.6-90.0' - Same as 85.0-85.9' 90.0-91.5' - moderate yellowish fragments 91.1' - Fracture, 40-50 deg, rough, brown with 40% mottled with very 2 undulating, open (2") pale orange, (10YR 5/4 with 10YR 91.5' - Fracture, 70 deg, rough, undulating, 8/2), moderately fossiliferous R12-H0 open (1/16") (cast/molds), fossils (mostly <1/4" 52 1 5 ft but a few are up to 1/2"), 25-30% 94% 92.7' - Fracture, 5-10 deg, rough, undulating, spheroidal voids (<1/16"), voids open (<1/16") mostly restricted to the pale yellowish 93.0, 93.1' - Fracture (2), 30 deg, rough, 4 brown color areas undulating, tight 93.3' - Fracture, 50 deg, rough, undulating, R12: 7 minutes 1 tiaht NR 95 95.0



338884.FL A-21A

SHEET 6 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723171.1 N, 458054.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

				LINT : CIVIL 330X 3/N 340233, Mud Totally, TIQ tools, TV		100055 - 5	
WATER	LEVELS : 4.7	2 ft bo	gs on :		23/200		T
≳o⊊	<u> </u>			DISCONTINUITIES	<u> </u> g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	CIZE AND DEDTH OF CACING
ᆱ끯은	F.H.	(%) Q	N C	DEDTIL TYPE OBJECTATION BOLIOUNESS	1 ⋈	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
T A A) 0 0	0	CT RFC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	₩	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	요년원	a	유	THICKNESS, SURFACE STAINING, AND TIGHTNESS	\frac{1}{5}	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-52.2		_		93.95, 94.3' - Bedding plane or mechanical	$+\ddot{-}$	91.5-94.7' - Same as 90.0-91.5'	
-52.2			0	break (2), 5-10 deg, rough, undulating, tight	Н	 except pale yellowish brown, 	SC-4 collected at 95.13-
				95.0-95.2' - Fracture zone, zone of	Ш	(10YR6/2), with brownish black	95.96'
1 1				mechanical breaks	Н	rippled lamination at 94.5'	1
1 -			>10	96.0-97.6' - Fracture zone, 50-70 deg,	Н	 No Recovery 94.7-95.0' 	-
1 4				fractures are intersected by potential	ш	Limestone	_
	R13-HQ	15	>10	mechanical breaks	Н	95.0-97.6' - moderate yellowish - brown to pale yellowish brown,	
1 7	5 ft 52%	15			Ш	(10YR 5/4 to 10YR 6/2), fine grained,	1
1 -	0270				ш	weak to medium strong (R2 to R3),	-
1 -					+	15-20% elongated voids <1/8" sub	_
			NR			horizontally oriented, moderately	_
					ш	fossiliferous with casts up to 3/8"	R13: 4 minutes
100	400.0				H	No Recovery 97.6-100.0'	1
100_ -57.2	100.0				世	Limestone	-
"."_			>10		Ш	- 100.0-103.2' - pale yellowish brown,	
				100.5-100.75' - Fracture zone	Н	(10YR 6/2), fine grained, moderately	
]				100.9' - Fracture, 20 deg, rough, undulating,	\Box	fossiliferous with casts up to 5/8"	1
1 -			>10	open (1/8") 101.4' - Fracture, 20 deg, rough, undulating,	ш	 weathered over top 0.7', color may 	-
-]			open (1/2")	╆	be due to potential staining or	-
	R14-HQ 5 ft	18	0	101.6' - Fracture, 80 deg, rough, undulating,		weathering, 10-15% medium to coarse grain black particles, trace	
	64%	10	U	tight	ш	short (1/16") discontinuous black	
1 -			0	101.7' - Fracture, 0-10 deg, rough,	Н	laminations throughout core run	-
-				undulating, tight		 No Recovery 103.2-105.0' 	-
1 4			NID	101.8' - Fracture, 15-20 deg, rough, undulating, top of fractured zone	ш	_	
			NR	102.0' - Fracture, 60 deg, rough, undulating,	Н		R14: 3 minutes
105	105.0			base of fractured zone		=	1
-62.2	105.0			-	₩	 Limestone	_
"			2	105.1' - Bedding plane or mechanical break, horizontal, rough, undulating, open (1/8")	╆╫	- 105.0-109.5' - moderate yellowish	_
				105.35' - Bedding plane or mechanical break,		brown with 15-20% dark yellowish	
				30 deg, rough, undulating, tight	Ш	brown mottling, (10YR 5/4 with 10YR	
1 1			0	<i>5, 6, 7</i>	ш	- 4/2), fine grained, moderate HCl	-
-	D45.110				\Box	reaction, weak (R2), 15-25% voids <1/16", poorly fossiliferous (molds),	-
1]	R15-HQ 5 ft	38	>10	107.35' - Fracture, horizontal, rough,	Н	- trace irregular shaped unfilled	
	90%	55	- 10	undulating, open		cavities up to 5/8"	
				107.35-107.55' - Fracture zone	\Box	F '	1
-			9	107.6-107.8' - Fracture, 60 deg, rough,	╫	-	1
				undulating, open (1/4")	\Box	_	Bus s
			2	107.95-108.7' - Fracture, 80 deg, rough,		_	R15: 5 minutes
110	110.0		NR	undulating, open 108.2' - Fracture, horizontal, intersects one	Н	No Recovery 109.5-110.0'	1
-67.2	1 10.0			fragment of fracture at 107.95-108.7'	団	 Limestone	-
-			9	108.4' - Fracture, horizontal, rough,	+	- 110.0-112.5' - pale yellowish brown,	-
				undulating, open, intersects one fragment of	Н	(10YR 6/2), fine grained, moderate	
			.40	fracture at 107.95-108.7'	Ш	HCl reaction, weak (R2), 5-10%	
			>10	108.8-109.0' - Fractures, 60 deg, rough, undulating, open	11	 voids up to 1/8", trace cavities up to 3/4"x3/4" infilled with fine grained 	1
-	R16-HQ		- 40	109.0-109.5' - Fracture, vertical, rough,	╫	weak (R2) carbonate material	-
	5 ft	0	>10	undulating, open	Ш	_ ` '	1
	50%	-		109.5' - Fracture, 15 deg, rough, undulating,	Н	No Recovery 112.5-115.0'	
1 7				open	\mathbb{H}		1
			NR	110.15' - Fracture, horizontal, rough,	Ш	-	1
-			INIX	undulating, open 110.15-110.5' - Fracture, vertical, rough,	+	_	D46, 7 minutes
l				undulating, open, rock fragments on smaller	Н	_	R16: 7 minutes
115	115.0			side of fracture	Ш		1
1	. 10.0				\Box		



135

135.0

PROJECT NUMBER: BORING NUMBER:

338884.FL A-21A

SHEET 7 OF 8

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723171.1 N, 458054.1 E (NAD83)

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER LEVELS: 4.72 ft bgs on 3/12/07 START: 5/22/2007 END: 5/23/2007 LOGGER: R. Gomez DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT DESCRIPTION ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -72.2 111.0-111.5' - Fractures (2), 85 deg and Limestone >10 vertical, rough, undulating, open 115.0-118.0' - grayish orange to pale 111.4-111.65' - Fracture, 60 deg, rough, yellowish brown, (10YR 7/4 to 10YR 6/2), fine to medium grained, undulating, open moderate to strong HCl reaction, weak (R2), except very weak (R1) at 115.0-115.3', moderately fossiliferous, 25% coverage of very small (<1/16") voids, 5-10% small (1/16") voids, 5-10% small 111.65-112.0' - Fractures, 75 deg, rough, 2 undulating, open 112.0-112.5' - Fracture zone 115.0-115.15' - Fracture zone 115.2, 115.35' - Fractures (2), <10 deg, R17-HQ 18 4 5 ft 60% (1/16"-3/16") voids, trace cavities up rough, undulating, open to 1-3/16"x3/8", 50% of cavities 115.65, 115.75' - Fractures (2), horizontal, rough, stepped, open infilled with carbonate material NR 115.75-116.0' - Fracture zone similar to 110.0-112.5', visible shell R17: 4 minutes 116.1-116.25' - Fracture, 45 deg, rough, fragments at 115.0-115.5', large (about 50% of core by volume) cavity (not infilled) at 115.45-115.65', 120 120.0 planar, tight 116.35' - Fracture, horizontal, rough, -77 2 undulating, open strength of HCI reaction decreases >10 117.1' - Fracture, <10 deg, rough, undulating, with depth No Recovery 118.0-120.0' SC-5 collected at 120.88open 117.5, 117.6, 117.65' - Fractures (3), Limestone 121.71' 2 120.0-124.5' - grayish orange to pale yellowish brown, (10YR 7/4 to 10YR horizontal, rough, planar, open 120.2' - Fracture, horizontal, rough, R18-H0 6/2), fine grained, mild HCl reaction. undulating, open 57 1 5 ft 120.25-120.6' - Fracture zone 120.85' - Fracture, horizontal, rough, weak (R2), except very weak (R1) at 90% 124.1-124.5', very small (<1/16") undulating, open 121.75, 121.9' - Fractures (2), horizontal, voids, trace small (1/16"-1/8") voids, 0 trace casts/cavities up to 3/4"x3/8" rough, undulating, open 10% casts/cavities at 120.0-120.75' R18: 4 minutes 5 122.2-122.3' - Fracture, 45 deg, rough, with partial (carbonate) infilling undulating, open No Recovery 124.5-125.0' NR 125 125.0 124.1, 124.2' - Fractures (2), horizontal, -82.2 Limestone rough, undulating, open 125.0-126.45' - pale yellowish brown, (10YR 6/2), fine grained, mild HCI reaction, weak (R2), weathered, >10 124.2-124.35' - Fracture, vertical, smooth, planar, open 124.3, 124.7' - Fractures (2), 10 deg, rough, 10-15% (<1/16") voids, trace small (1/16"-1/4")voids, 5-10% >10 undulating, open 125.0-125.6' - Fracture zone (8) casts/cavities up to 1-3/16"x3/4", R19-HQ 125.6' - Fracture, horizontal, rough, poorly fossiliferous 0 5 ft undulating, open 125.6-125.9' - Fracture, 75 deg, rough, 40% 126.45-127.0' - Same as 125.0-126.45' except weak to undulating, open 125.9-126.05' - Fracture, 75 deg, rough, medium strong (R2 to R3), trace voids up to 1/16", no fossils NR undulating, open casts/cavities R19: 5 minutes 126.05-126.3' - Fracture zone 126.45-126.6' - Fracture zone No Recovery 127.0-130.0' 130 130.0 126.55-127.0' - Fracture, vertical, rough, -87.2 Limestone undulating, tight 130.0-133.1' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, >10 126.75' - Fracture, horizontal, rough. undulating, open 126.75-127.0' - Fracture, 60 deg, rough, weak to medium strong (R2 to R3), SC-6 collected at 131.2trace voids (<1/16), no visible 1 undulating, tight 130.0-130.15' - Fracture, vertical, rough, casts/cavities, dark gray to black irregular laminae at 130.5-131.0' 132.1 R20-H0 planar, open 2 5 ft 45 130.15' - Fracture, horizontal, rough, planar, 78% 130.15-130.85' - Fracture, vertical, rough, 133.1-133.3' - Same as 130.0-133.1' 1 undulating, 1/4" relief except very fine to fine grained, moderate HCl reaction, medium 130.75' - Fracture, horizontal, rough, R20: 5 minutes undulating, open strong (R3) NR 130.8-131.0' - Fracture zone



338884.FL A-21A

SHEET 8 OF 8

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723171.1 N, 458054.1 E (NAD83)

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS: 4.7	'2 ft b	gs on 3	8/12/07 START : 5/22/2007 END	: 5/23	/200	7 LOGGER : R. Gomez	
3 □₽	(%			DISCONTINUITIES		ွှ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ZES T	DESCRIPTION		SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ACE ATIC	L RU	D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,		ğ	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
LEV.	ORE ECO	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNE		YMB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	022	₾	# 5		33	Ś	CHARACTERISTICS	<u> </u>
-92.2			>10	131.0-131.2' - Fracture, vertical, rough, undulating, open	╁	┦	133.3-133.9' - moderate yellowish - brown, (10YR 5/4), fine grained, mild	_
_			. 10	132.3-132.7' - Fracture, 60 deg, rough,	F	П	HCl reaction, very weak to weak (R1]
				undulating, open 132.7-132.9' - Fracture, 60 deg, rough,	E	П	to R2), trace voids up to 1/16",	
_			1	undulating, open	1-	\dashv	 5-10% casts/cavities up to 3/8"x3/8", poorly fossiliferous 	1
-	R21-HQ			133.1' - Fracture, horizontal, rough,	1		No Recovery 133.9-135.0'	1
_	5 ft 76%	37	6	undulating, open 135.0-135.15' - Fracture zone	1	╁	 Limestone 135.0-138.8' - yellowish gray, (5Y 	1 1
_	70,0			135.5-135.65' - Fracture, horizontal, rough,	- 1	Ц	8/1), 30% medium light gray mottling,	1
-			5	undulating, open 136.5', 137.2', 137.3' - Fractures (3),	_ †	┰	 very fine grained, moderate HCl reaction, medium strong (R3), trace 	1
-				horizontal, rough, undulating, 1/4" relief	+	\dashv	voids to 1/16", 10% casts/cavities up	R21: 7 minutes
_			NR	137.4' - Fracture, horizontal, rough,	- ‡	\exists	to 2"x3/8", partial infill of cavities	-
140 <u> </u>	140.0		$\vdash \vdash$	undulating, open 137.6' - Fracture, horizontal, rough,	士	Ⅎ	No Recovery 138.8-140.0' Limestone	-
			8	undulating, open, black organic staining over	· ‡	Ц	- 140.0-141.8' - yellowish gray with	-
_				75% of fracture surface 137.9-138.0' - Fracture zone	丰	Ц	very pale orange mottling, (5Y 7/2	-
_			>10	138.0-138.3' - Fracture zone, horizontal,		\dashv	with 10YR 8/3), very fine to fine grained, moderate to strong HCI	
_				rough, undulating, tight to healed, 1/2" spacing between fractures	F	\exists	reaction, weak to medium strong (R2	_
_	R22-HQ 5 ft	7	>10	140.0-140.2' - Mechanical break (2)	上	⇉	to R3), 10% voids (up to 1/16") at - 140.35-140.65', 141.05-141.3' and	_
	50%	,		140.4-140.5' - Fracture, 60 deg, rough,	上	┦	141.5-141.6', no visible	
				undulating, open 140.5' - Fracture, horizontal, rough,	F	Ц	casts/cavities, trace small (<1/16") pyrite inclusion present throughout	
_			NR	undulating, open	1	\Box	core but more noticeable along	1
_				140.5-140.9' - Fracture, vertical, smooth, undulating, tight, "V" shaped	1-	\dashv	fractures	R22: 6 minutes
145	145.0			140.65' - Fracture, horizontal, rough,	- ‡	\dashv	 141.8-142.5' - pale yellowish brown, (10YR 6/2), fine to medium grained, 	1 1
-102.2	1 10.0			undulating, open 140.75, 140.95' - Fracture, horizontal,	1	╧	mild to moderate HCl reaction,	1
-			>10	smooth, planar, tight	1	┵	 extremely weak (R0), trace voids up to 1/16", no cavities 	1
_				141.3' - Fracture, horizontal, rough,	- ‡	耳	No Recovery 142.5-145.0'	1
-			>10	undulating, 1/8" relief 141.65', 141.8' - Fracture, 75 deg, smooth,	t	\Box	Limestone 145.0-146.0' - pale yellowish brown	-
-	R23-HQ			undulating, open	F	\dashv	to moderate yellowish brown, (10YR	-
_	5 ft	53	3	141.8-142.5' - Fracture zone 145.75-145.9' - Fracture zone		⇉	6/2 to 10YR 5/4), medium grained, mild HCl reaction, weak (R2), 10%	-
-	78%		-	146.0' - Fracture, 5 deg, rough, undulating,	- +	┦	voids (up to 1/16"), trace	-
_			4	open 146.75-147.0' - Fracture zone	- ‡	П	casts/cavities (up to 3/4"x3/8"), trace	-
_				147.45' - Fracture, horizontal, rough, planar,	- Ł	\Box	black inclusions (up to 1/16") 146.0-146.0'	-
_			NR	1/8" relief	╁	\dashv	except fine to medium grained, trace	R23: 6 minutes
	150.0			147.8', 148.1' - Fracture, 50 deg, rough, planar, 1/4" relief, 30% black staining			voids up to 1/16", trace infilled — cavities	Total depth of bala 150.0
-107.2				(possibly pyrite) on surface	/]		_ 146.7-147.45' - Same as	Total depth of hole 150.0'
				\148.35' - Fracture, horizontal, rough, \undulating, tight			145.0-146.0']
				[22.2.2.2.2] (2	-	ĺ	- 147.45-148.9' - pale yellowish brown with very pale orange and light gray]
					1	İ	mottling, (10YR 6/2 with 10YR 8/2	1
					1	ľ	and N7), fine grained, moderate HCl reaction, weak to medium strong (R2] 1
-					1	Ì	to R3), 5% voids up to 1/16"	1
-					1	ŀ	- (decreasing with depth), no visible cavities	-
-						ŀ	No Recovery 148.9-150.0'	-
-					-	ŀ	Bottom of Boring at 150.0 ft bgs on	-
-					-	ŀ	_ 5/23/2007	-
					\dashv	4		_
I			ı I					I



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-22

SHEET 1 OF 11

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723199.8 N, 458088.0 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER	LEVELS	: 6.6 ft bo	gs on 3/23	3/07 S	START : 3/22/2007 END : 3/27/2007 LOGGEF	R : N.	. Jarzyniecki
				STANDARD	SOIL DESCRIPTION	U	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COLL NAME TIGOG COOL DOWN DO LOS	SYMBOLIC LOG	DEDTIL OF CACING SOULING SATE
A BE		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	S P I	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
EPT! URF,			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	¥MB	INSTRUMENTATION
<u>о</u> мш 42.6				(N)		0)	10:08 Begin drilling with 2-7/8" tri-cone bit
-					-	1	I
-					-	┨	Soil sampling every 5' from 3.5' below ground surface
-					-	1	1
-					-	1	1
-					-	1	1
-	3.5				-	1	1
-	0.0				Poorly Graded Sand With Silt (SP-SM)		1
-		0.9	SS-1	3-3-3 (6)	3.5-4.4' - moderate yellowish brown with dusky brown, - (10YR 5/4 with 5YR 2/2), wet, loose, very fine to fine	追	1
5	5.0			(0)	grained, 10% organics, 10-15% nonplastic fines, sand /-	1	1
37.6					lis silica]	
_					_]
_					_	1	
_					<u>-</u>	1	_
-					-	1	
_					-	-	-
-	8.5				Silt (ML)	Н.,	
-			00.0	12-16-13	8.5-9.6' - yellowish gray, (5Y 7/2), wet, very stiff,	$\ \ $	-
		1.1	SS-2	(29)	nonplastic, rapid dilatancy, moderate HCl reaction, 10% very fine sand-sized material, coarse gravel-size ∫	Ш	
10 32.6	10.0				limestone fragments (white [N9] to yellowish gray [5Y 8/1] at top of sample, strong HCl reaction), all	┨	1 -
-					carbonate	1	1
-					-	1	1
-					-	1	1
-					-	1	1
-					-	1	1
	13.5				-		
		0.9	SS-3	28-78/11.5	Silt With Sand (ML) 13.5-14.4' - Same as 8.5-9.6' except hard, 25% very	\prod]
_	14.5	0.0		(82")	_ fine to fine sand-sized material, one coarse	Ш	
15					\gravel-sized limestone fragment	1	_
27.6					-	1	
-					-	-	
-					-	-	-
-					-	\mathbf{I}	-
-					-	1	-
-	10.5				-	1	-
-	18.5 18.9	0.2	SS-4	50/4.5	Limestone Fragments	Ħ	‡ -
-				(50/4.5")	18.5-18.7' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, fragments to 1/2", 25% silt- and	1	-
20					sand-sized carbonate materials similar to 13.5-14.4'	1	1
						t	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-22	SHEET	2	OF	11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723199.8 N, 458088.0 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

						/, auto nammer, AvvJ rou			ORIENTATION : Vertical
WATER	LEVELS	: 6.6 ft bo	us on 3/2	3/U <i>1</i> S	START : 3/22/2007	END : 3/27/2007	LOGGEF	∢∶Ν. 	Jarzyniecki
200				STANDARD		SOIL DESCRIPTION		Į g	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COU NAME	LICOS ODOLID OVIMDO	N 001.0D	SYMBOLIC LOG	DEDTIL OF CACINIC DRILLING DATE
불병		RECOVE	ERY (ft)		MOISTURE	E, USCS GROUP SYMBO CONTENT, RELATIVE D	ENSITY OR	j	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
TAY A			#TYPE	6"-6"-6"		CY, SOIL STRUCTURE, N		ΜB	INSTRUMENTATION
SU				(N)				S	
22.6								П	
-							-	1	1
-							-	1	-
-							-	┨	-
I -							-	1	-
-							-	1	_
_							_	1	
	23.5							l	
-	23.9	0.4	SS-5	50/5.5	Silt With Sand ((ML)		Ш	
-				(50/5.5")	23.5-24.0' - yello	owish gray, (5Y 7/2), me, high dilatancy, mild to	oist to wet,	1	_
-					reaction, 20% ve	ery fine to fine grain ma	iterial, traces of	1	-
25 <u> </u>					coarse sand-size	ed grains, all carbonate	-	1	_
''.0							-	1	_
_									
								l	
							•	1	_
-							-	1	_
-							-	1	-
-							-	1	-
l -	28.5								_
_				00.40.00	Silty Sand (SM)) ky yellow, (5Y 6/4), moi	st to wet verv	$\ \ \ $	
		1.2	SS-6	20-43-36 (79)	dense, fine to co	oarse grained, rapid dila	atancy, mild to	Ш	
30	30.0			(10)	moderate HCl re	eaction, 47% nonplastic	fines, trace		
12.6					fine gravel, all ca	arbonate		1	_
-							-	1	-
-							-	┨	-
-							-	1	-
_							-	1	_
									_
							-	1	
	33:5						-	1	1
-	_33:β	0.0	SS-7	50/0.75	No Recovery 33	3.5'		H	
-				(50/0.75")	`			1	-
-							-	1	-
35							_	1	_
7.6							-	1	
							-	1	Driller's Remark: Chatter at 36-37'
-							-	1	1
-							-	1	-
-				1			-	1	-
-							-	1	_
_	38.5							 	
		1.5	SS-8	41-31-50/5.75 (81/11.75")			-]
40	40.0			(61/11./5)			-	1]
+ 0_	70.0				_				
								_	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-22	SHEET	3	OF	11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723199.8 N, 458088.0 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

						y, auto nammer, Avvu rous,			ORIENTATION : Vertical
WATER	LEVELS	: 6.6 ft bo	gs on 3/23	3/07 I	START : 3/22/2007	END : 3/27/2007	LOGGE	₹ : N. T	Jarzyniecki
≥∩≎				STANDARD		SOIL DESCRIPTION		چ ا	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NIANAE	E, USCS GROUP SYMBOL,	COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
A SCE		RECOVE	RY (ft)			E, USCS GROUP STIMBUL, CONTENT, RELATIVE DEI		ĬΘ	DRILLING FLUID LOSS, TESTS, AND
E R S			#TYPE	6"-6"-6"	CONSISTENC	CY, SOIL STRUCTURE, MIN	NERALOGY	Ĭ₩	INSTRUMENTATION
2.6				(N)	Cilty Cond (CM	<u> </u>	1	S	
2.0					Silty Sand (SM 38.5-40.0' - mod	i) derate olive brown, (5Y 4/	4), wet, very	1	_
l -					dense, fine to c	coarse grained, mild to mo	derate HCI	1	_
l _					gravel-sized ma	% low plastic fines, 10% f	ine / .	1	_
l _					gravor oizoa me	atoriai			
								1	
-								1]
-	43.5						-	1]
-	10.0			24-50/6		And Limestone (ML)	-	Ш	1
-	44.5	1.0	SS-9	(74/12")	43.5-44.5' - dus	sky yellow, (5Y 6/4), wet, h dilatancy, mild to modera	nard, low	1111	-
15	+4.5			<u> </u>	\ reaction, 10-25	% fine to coarse sand-size	ed grains /	\mathbf{H}	-
45 <u> </u>					\ (varies through	out sample), limestone ler	ns at 📙	1	-
-					\43.8-43.9°, orga	anic lens 1/8" thick at 43.6	ວ .	1	-
-								1	-
-								1	-
-								-	-
-								-	_
-								1	_
l _	48.5								_
l _		1.0	SS-10	22-9-2		h Limestone (SM) derate yellowish brown, (1	0YR 6/4)		_
l _	49.5	1.0	00-10	(11)	wet, medium de	ense, fine to coarse graine	ed, mild to		
50						reaction, 37% low plastic fes at 48.6', 48.8', 49.3'	ines,	1	
-7.4					VIIII lestorie ierise	55 at 40.0 , 40.0 , 49.5			
-								1]
-							·	1	1
-								1	
-							-	1	-
-							-	1	-
-	E0 -							1	-
-	53.5				Sandy Silt (ML))		\mathbf{f}_{Π}	-
-		1.5	SS-11	19-34-48	53.5-55.0' - mod	derate olive brown. (5Y 4/	4), wet, hard,	$\ \ $	-
-		1.5	33-11	(82)	low plasticity, sl	low to rapid dilatancy, mile % fine to coarse sand-size	d HCl ed grains all	$\ \ $	-
55 -12.4	55.0				carbonate, orga	anic lenses (olive gray [5Y		Ш	-
-12.4					\54.5-55.0'			1	_
-							-	1	_
-								1	
I -								1	
l _									
Ι -									
I -	58:5							1]
-	55.0	0.1	SS-12	50/2	Sandy Silt (ML))	/]
-				(50/2")	\58.5-58.7' - Sar	me as 53.5-55.0' except w	rith organics /	1	
60							-	1	-
30							_	\vdash	



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-22

SHEET 4 OF 11

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723199.8 N, 458088.0 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER	LEVELS	: 6.6 ft bo	s on 3/23	3/07 S	START : 3/22/2007 END : 3/27/2007	LOGGER	R : N.	Jarzyniecki
				STANDARD	SOIL DESCRIPTION		_O	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	` ,	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLO	ıD.	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
TH BE		RECOVE			MOISTURE CONTENT, RELATIVE DENSITY (OR	BOLI	DRILLING FLUID LOSS, TESTS, AND
DEPT SURF ELEV			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALO	OGY	SYM	INSTRUMENTATION
-17.4							П	
						_		
						_		
-						_		_
-						-		-
-						-		-
-	63.5			40-50/5.5	Silt With Sand (ML)		Ш	-
-	64.5	0.8	SS-13	(90/11.5")	63.5-64.3' - yellowish gray, (5Y 7/2), wet, hard, ¬ nonplastic, rapid dilatancy, mild to moderate HC	CI	Ш	-
65	0 1.0				reaction, 15-25% fine to coarse sand-sized grain	ins, / ¯		-
-22.4					light olive gray (5Y 5/2) laminations at 64.1-64.2			
]]						_		
-						-		-
-						-		-
-						-		-
-	69.5					-		-
-	68:6	0.0	SS-14	50/1.5	No Recovery 68.5'		H	4" HW casing set to 70' below ground
-				(50/1.5")		_		surface -
70						_		
-27.4						_		16:56 Resume drilling, clearing hole
-						-		-
-						-		-
-						-		-
-						-		-
	73.5							3/22/07 End drilling for the day at 73.5'
	73.8	0.3	SS-15	50/4 (50/4")	Elastic Silt (MH) 73.5-73.6' - yellowish gray to light olive gray, (5)	Y 7/2	777	3/23/07, 07:58 Water level 6.6' below ground surface
-				()	to 5Y 5/2), wet, soft, low to medium plasticity, sl rapid dilatancy, mild HCl reaction, trace fine to	low to		
75 <u> </u>					medium sand-sized material, white carbonate c	ay –		08:17 Resume drilling by bringing up 73.5' sample —
-					stringers throughout Silty Sand With Limestone (SM)			-
-					73.6-73.8' - yellowish gray to light olive gray, (5' to 5Y 5/2), wet, dense, fine to coarse grained, m	Y 7/2 -		-
-					HCI reaction, 32% low plastic fines, limestone le	ens at		-
					73.6', all carbonate]
						_		
-	78.5 78.8	0.4	00.40	50/0	Limeatone Francisco			
-	7 0.0	0.1	SS-16	50/3 (50/3")	Limestone Fragments 78.5-78.6' - dusky yellow, (5Y 6/4), mild HCl rea	action, /-		-
-					fragments to 1/2", voids over 50% of surface			-
80							\vdash	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-22	SHEET	5	OF	11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723199.8 N, 458088.0 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER	LEVELS	: 6.6 ft bo	gs on 3/23	3/07	START : 3/22/2007 END : 3/27/2007 LOGGER : N. Jarzyniecki	
				STANDARD	SOIL DESCRIPTION g COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	
A S S A T I O		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND	
EVEN H			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
-37.4				(N)		\dashv
-						\exists
-					- Daillanda Danasada Oliahkahartan daillian	1
-					Driller's Remark: Slight chatter during drilling	1
-					1	1
-					1	1
-	83. <u>5</u> 83.7				1	1
	83.7	0.1	SS-17	50/2 (50/2")	Limestone Fragments 83.5-83.6' - Same as 78.5-78.6' -]
l _				(30/2)	05.5-05.0 - Same as 70.5-70.0	_
85					_	_
-42.4					_	4
-						4
-						4
-						\exists
-						\exists
-	88.5					\exists
-	00.5				Silty Sand With Limestone (SM)	┪
-		1.3	SS-18	18-28-27	88.5-89.8' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), wet, very	1
90	90.0			(55)	dense, fine to coarse grained, mild to moderate HCl	1
-47.4					reaction, 20-25% nonplastic fines, 5-10% organics, 10% fine gravel-sized grains, limestone lens at 88.95',	٦
					\all carbonate]
_]	
_					<u> </u>	4
-					_	4
-					-	4
-	93.5				Limestone With Silty Sand	\exists
-		1.2	SS-19	33-12-15	93.5-94.7' - moderaté vellowish brown. (10YR 5/4).	\exists
95	95.0	1.2	00 10	(27)	wet, mild to moderate HCl reaction, 60% limestone fragments to 1", 15-20% nonplastic fines, 20% fine to	\exists
-52.4	95.0				\coarse sand, all carbonate	ᅥ
-					1	1
-					Driller's Remark: Lost circulation at 96'	1
-]	1
]]]
-]	
-	98.5					4
-				10-8-2		4
-		1.0	SS-20	(10)		4
100	100.0					\dashv



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-22	SHEET	6	OF	11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723199.8 N, 458088.0 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

						ry, auto nammer, Avvo rous,			
WATER	LEVELS	: 6.6 ft bo	gs on 3/2:	3/07	START : 3/22/2007	END: 3/27/2007	LOGGEF	R : N.	Jarzyniecki
>				STANDARD		SOIL DESCRIPTION		ا ي	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				SYMBOLIC LOG	
BH		RECOVE	ERY (ft)	1		IE, USCS GROUP SYMBOL		일	DEPTH OF CASING, DRILLING RATE,
T X X			<u> </u>	6"-6"-6"		E CONTENT, RELATIVE DE ICY, SOIL STRUCTURE, MII		\ BC	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			#TYPE	(N)	CONGICIEN	ior, coll orreordict, mil	TEL VILOUT	S	IN ON COME TO A TO A
-57.4				. ,	Limestone Wit	th Silty Sand	I	Н	
-	-				98.5-99.5' - pal	le yellowish brown to mod	erate -	łI	-
-					yellowish brow	n, (10YR 6/2 to 10YR 5/4)	, mild to	1	
l _	[fragments to 1.	reaction, fine to coarse gr-1/2", soil fraction is fine to	avei-sizeu		Casing advanced to 100'
					sand-sized gra	ains with 32% nonplastic fi	nes (varies in	H	
-	1				sample), limes	tone lens from 98.5-98.8',	all carbonate	1	Driller's Remark: Slight loss of circulation at
-	1						-	1	102' -
-	-						-	1	-
-	103.5				0111 0 11471	(011)		11.11.1	_
l _				44.44.0	103 5-105 0' - 1	th Limestone (SM) moderate yellowish brown	to dark -		
		1.5	SS-21	11-14-6 (20)	yellowish brow	n, (10YR 5/4 to 10YR 4/2)	, wet,	Ш	
105	105.0			(20)	medium dense	e, fine to coarse grained, n	nild HCI]
-62.4	100.0				reaction, 20% i	nonplastic fines, 30% fine mestone fragments, all car	to coarse		Advancing casing to 105'
-	-				\graver-sized lin	nesione nagments, all car	bollate /_		-
-							-	1	_
-							-	.	
								H	
-	1						-	1	
-							-	1	-
-	-						-	1	-
-	198:5		00.00	50/4.5	L	400 =1			
I _		0.0	SS-22	50/1.5 (50/1.5")	No Recovery 1				3/23/07, 15:10 End soil sampling at 108.5' 3/23/07, 15:46 Preparing for rock coring
				(30/1.3)	Begin Rock Co	oring at 109.0 ft bgs		H	3/23/07, 13.401 repaining for facilities
110	1				See the next si	heet for the rock core log	-	1	
-67.4	1						_	1	_
-	-						-	1	-
-							-	1	_
l -							_	.	_
								H	
-]						_	1	
-	1						-	1	_
-	1						-		-
-	-						-		_
-							-	.	_
1]			1					
115							_		
-72.4	1							1	
-	1						-	1	
-	-						-		-
-							_		_
I -				1			_	.	
-]						-		1
-	1						-	1	
-	-						-		-
-							-		-
_							_]	
120									
								П	
								L	



338884.FL A-22

SHEET 7 OF 11

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723199.8 N, 458088.0 E (NAD83)

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER	LEVELS : 6.6	ft bg	s on 3	/23/07 START : 3/22/2007 END : 3/	27/200	07 LOGGER : N. Jarzyniecki	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
ELOV ON (ft)	AND 37 (%)	_	ZES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH BI	E RU STH, OVEF	RQD(%)	FOOF	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	S Q	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	109.0		1	109.3' - Fracture, vertical, rough, undulating	Ħ	Limestone	3/23/07, 16:48 Start coring
110_	R1-NQ		2	109.7' - Fracture, vertical, rough, undulating	П	 109.0-111.4' - light olive gray, (5Y 5/2), very fine grained, moderate HCl 	Note: R1 is short run (2.5') - to set stroke
-67.4	2.5 ft 96%	28		110.0' - Fracture, vertical, smooth to rough, undulating	Д	reaction, weak to medium strong (R2 to R3), poorly fossiliferous, voids up	
-	. 3070		2	110.7' - Mechanical break	П	to 1/16"over 15-20% of surface, larger cavities/fossil molds up to 1/4"	R1: 2 minutes Slight loss of circulation
-	111.5		NR)	111.15, 111.35' - Fracture (2), 70 deg, smooth to rough, undulating	口	 x 1/2" over <5% of surface, <5% fine 	during run, driller -
-			2	112.1' - Mechanical break	団	black inclusions No Recovery 111.4-111.5'	advancing casing to 111.5' 3/23/07 End drilling for the
-				112.2' - Bedding plane, <10 deg, smooth,	口	 Limestone 111.5-114.9' - Same as 109.0-111.4' 	day at 111.5' - 3/24/07, 07:54 water level
-			3	undulating 112.85, 113.25' - Bedding plane (2), <20 deg,	ш	except medium strong (R3), with	is 8.9' below ground
	R2-NQ 5 ft	52	0	rough, undulating 113.4' - Bedding plane, <10 deg, rough,	Ш	increasing fossil content, voids up to 1/16" over 20-25% of surface, fossil	surface – 08:17 Begin drilling _
-	70%	52		undulating 113.5, 113.9' - Mechanical break	Ш	molds up to 1/4" x 1/8" on 5-10% of surface	SC-1 collected as 112.8- 113.5'
115_ -72.4			2	114.9' - Fracture, 50 deg, rough, undulating	Ш	114.9-115.0' - Same as 111.5-114.9'	Slight circulation loss during R2-NQ run
-72.4			NR	115.2' - Bedding plane, <20 deg, rough to smooth, undulating	H	 except extremely weak to medium strong (R0 to R3), limestone has 	R2: 18 minutes
-			INIX	Smooth, undulating	団	moderate HCl reaction, silts have	-
-	116.5				ш	_ delayed mild HCl reaction No Recovery 115.0-116.5'	-
-			4	117.05, 117.25, 117.4' - Bedding plane (3),	Ш	Limestone 116.5-120.6' - light olive gray to	-
			3	20 deg, rough, undulating 117.7, 117.8, 117.9' - Bedding plane (3), <10	Ш	yellowish gray, (5Y 5/2 to 5Y 7/2), very fine grained, very weak to	
-				deg, smooth, planar 118.0, 118.75, 119.25, 120.0, 120.15' -	Ш	medium strong (R1 to R3),	_
-	R3-NQ 5 ft	44	2	Bedding plane (5), <10 deg, smooth, planar, infill of fine grained material at 119.25'	H	fossiliferous with casts and molds up to 1/4" x 1/2". Voids up to 1/16" over	_
-	82%			illilli oi lille grained material at 119.25	H	25% of surface, larger cavities/molds up to 1/2" x 1/2" on <5% of surface,	-
120_ -77.4			2	_	団	— thinly bedded	_
-					ш	No Recovery 120.6-121.5'	R3: 22 minutes
	121.5		NR		Ш		_
			5	404 OFL Badding plans 00 day group	H	Limestone - 121.5-122.85' - light olive gray, (5Y	
-				121.95' - Bedding plane, 20 deg, rough, undulating	囯	5/2), fine grained, weak to medium strong (R2 to R3), voids (1/16") over	-
-			3	122.0, 122.1, 122.3, 122.5, 122.6, 122.75, 122.85, 122.9' - Bedding plane (8), <10 deg,	囯	 15-20% of surface, moderately 	-
-	R4-NQ			smooth, undulating	団	fossiliferous with casts up to 1/4" x 1/4", larger cavities up to 1" x 1/2"	-
-	5 ft 84%	58	3	123.65, 123.8, 123.95' - Bedding plane (3), <10 deg, smooth to rough, undulating	団	 over <5% of surface, thinly bedded 122.85-122.9' - medium light gray, 	-
125	0-70				囯	(N6), very fine grained, medium — strong (R3), no voids/fossils/cavities	SC-2 collected at 124.0-
-82.4]		0			122.9-125.7' - Same as	125.4' —
] -			NR		囯	121.5-122.85' No Recovery 125.7-126.5'	R4: 15 minutes
-	126.5		INIX		囯	- -	-
-			3	126.85' - Fracture, 85 deg, rough to smooth,	囯	_	SC-3 collected at 127.10-
-				undulating 126.95, 127.05' - Bedding plane (2),	団	_	128.15'
1 -			1	horizontal, smooth, undulating 128.15' - Bedding plane, <10 deg, rough to	囯	_	-
L	R5-NQ			smooth, undulating	Ш		



338884.FL A-

A-22

SHEET 8 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723199.8 N, 458088.0 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

	METHOD A	,		UNIT CAME SE CAN ACCOR STANDARD NO ASSESSMENT			ODIENTATION MOTOR
				IENT : CME 55 S/N 316625, mud rotary, NQ tools, HW c			ORIENTATION : Vertical
WATER	LEVELS : 6.6	ft bgs	s on 3/		27/20		
≥□₽	(%			DISCONTINUITIES	Ŋ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	5 ft	48	4	128.55, 128.75' - Bedding plane (2),	ш	Limestone	
130_ -87.4	80%		>10	horizontal, smooth, undulating 129.3, 129.7' - Mechanical break (2) 129.4' - Bedding plane, 20 deg, smooth,	Ħ	 126.5-128.7' - light olive gray, (5Y 5/2), fine grained, weak (R2), small (1/16") voids over 15% of surface, 	Circulation loss during run, advancing casing —
-			NR	undulating 129.95-130.5' - Fracture zone	Ħ	fossiliferous, fossil casts up to 1/2" x 1/4", cavities 1" x 1/2" over <5% of surface, light gray (N6) mottling at	R5: 21 minutes
-	131.5		>10	131.5-131.7' - Fracture zone, 50-60 deg, intersecting fractures		- 128.15-128.7' with decrease in small voids (<1/16") to <5% 128.7-130.5' - dusky yellow, (5Y 6/4),	-
-			>10	132.4' - Bedding plane, <5 deg, smooth to rough, planar	Ħ	extremely weak to very weak (R0 to R1), small (<1/16") voids over 35% of surface, highly fossiliferous	_
-	R6-NQ 5 ft	53	2	132.7-132.8' - Fracture zone 132.9' - Bedding plane, <5 deg, smooth to rough, planar	Ħ	No Recovery 130.5-131.5' Limestone 131.5-135.5' - light olive gray, (5Y)	_
135_	80%		3	133.1' - Bedding plane, <10 deg, rough, undulating 134.35, 134.5' - Fracture (2), 20 deg, rough,		 5/2), fine grained, weak to medium strong (R2 to R3), small (<1/16") 	_
-92.4			NR	undulating 134.6' - Fracture, 70 deg, rough, undulating 135.0' - Fracture, 15 deg, smooth, planar		voids over 15-30% of surface increasing with depth, larger cavities up to 1" x 1" over 10% of surface,	Lost circulation at 135'
-	136.5			135.1' - Bedding plane, horizontal	H	discontinuous black organic laminae (<5%), interbed of very fine grained light olive gray (5Y 5/2) dense	-
-			>10	136.8-137.05' - Fracture zone 137.25' - Bedding plane, <15 deg, rough, undulating	Ħ	limestone with <5% voids (<1/16") over surface No Recovery 135.5-136.5'	
-	R7-NQ		>10	137.4' - Bedding plane, associated with cavity 137.95' - Fracture, 15-20 deg, rough, undulating	Ē	Limestone 136.5-139.7' - yellowish gray to light gray, (5Y 8/1 to N7), weak to medium	-
-	5 ft 64%	36	2	138.4-138.55' - Fracture zone 138.95' - Mechanical break 139.15, 139.45' - Bedding plane or		strong (R2 to R3), small voids (<1/8") over 10-20%, generally increasing with depth, larger cavities up to 1/2" x	-
140 <u>-</u> -97.4			NR	mechanical break (2), 10-15 deg, rough to smooth, undulating	Ħ	Tover up to 10% of surface, partial infilling of cavities with soft medium light gray (N6) material	R7: 8 minutes
-					F	- No Recovery 139.7-141.5'	3/24/07 End drilling for the
-	141.5				╬	Limestone	day at 141.5' -
-			>10	141.65-141.8' - Fracture zone 141.9' - Fracture, 60 deg, smooth, partial mineralization on surface, open	Ħ	- 141.5-141.8' - medium gray, (N5), weak to medium strong (R2 to R3), 20% small voids (<1/16") over	3/25/07, 07:59 Water level 2.9' below ground surface 08:41 Resume drilling
-	Do NO		>10	142.0' - Bedding plane, <5 deg, smooth, undulating, stains on surface 142.1, 142.2' - Fractures (2), 85 deg, smooth		20% strial volus (<1/16) over surface, cavities up to 1/4" x 1/4" <10% of surface 141.8-143.5' - yellowish gray with	-
-	R8-NQ 5 ft 74%	35	2	to rough, mineralization on surface 143.15, 143.55' - Bedding plane (2), <10 deg, rough to smooth, undulating		light gray and brownish gray interbed layering, (5Y 7/2 with N7 and 5Y 4/2), very fine grained, strong to very	-
145_ -102.4 -			6	144.3' - Bedding plane, <5 deg, smooth, undulating to planar, slight staining (<20%) on fracture surface	Ħ	- strong (R4 to R5), small (<1/16") voids <5" coverage, poorly fossiliferous	
-	146.5		NR	144.5' - Bedding plane, <20 deg, smooth to rough, undulating, partially associated with organic lens		143.5-144.5' - Same as 141.8-143.5' except weak to medium strong (R2 to R3), interbedded with light olive gray	R8: 14 minutes
-			>10	144.75' - Bedding plane, smooth, undulating 145.05-145.15' - Fracture zone 146.5-146.7' - Fracture zone	Ħ	(5Y 5/2), highly fossiliferous layers exhibiting small voids (<1/16") over 30% of surface	Driller's Remark: Circulation loss 100% near beginning of run R9
-			3	147.7, 147.85' - Bedding plane (2), <20 deg, smooth, undulating 147.95. 146.9' - Mechanical break		-	SC-4 collected at 147.0- 147.8'
	R9-NQ				\vdash		

APPENDIX 2BB-276 Rev. 7



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-22

SHEET 9 OF 11

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723199.8 N, 458088.0 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

WATER	LEVELS : 6.6	ft bg	s on 3/	/23/07 START : 3/22/2007 END : 3/	27/20	D7 LOGGER : N. Jarzyniecki	
≥∩≘	_ (%			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIO	E RU	(%) Q	F.00	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30Li	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
LEV EV	SORE	ROD	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	∀ME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ООШ	5 ft	62	1	148.15' - Bedding plane, <15 deg, smooth,	S	Limestone	
-	75%	-	L'H	undulating, associated with slightly softer		- 144.5-145.2' - dusky yellow, (5Y 6/4),	-
150_ -107.4			2	zone	₽	weak to medium strong (R2 to R3),	_
-107.4				148.85' - Bedding plane, <5 deg, smooth, planar	₽	30% small voids (<1/16"), similar to interbeds 143.5-144.5'	
-			NR	149.95, 150.15' - Mechanical break (2)	ш	No Recovery 145.2-146.5'	R9: 7 minutes
-	151.5				Ш	Limestone - 146.5-150.25' - light olive gray to	Casing advanced to 151'
-			>10	151.9-152.4' - Fracture zone, smooth to	┦┤	yellowish gray, (5Y 5/2 to 5Y 7/2),	_
-				rough, undulating, zone of organic layering		fine grained, medium strong to strong (R3 to R4), poorly to moderately	_
l _			4	452.0. 452.05. 452.41. Dadding plans (2)		fossiliferous with fossil casts/molds	_
l _			L .	152.9, 153.25, 153.4' - Bedding plane (3), 15-20 deg, smooth to rough, undulating	Н	up to 1/2" x 1/4", small 1/16" voids over <10% of surface increasing to	_
1 -	R10-NC 5 ft	53	>10	153.45' - Fracture, 65 deg, rough, undulating,	Щ	35% over interval from 147.9-148.9'	
	86%	55	- 10	medium gray infill (N5) infill on fracture face 153.55' - Fracture, 25 deg, smooth to rough,	Ш	No Recovery 150.25-151.5' Limestone	
155			1	undulating, black staining on 50% of surface	\mathbb{H}	151.5-155.8' - yellowish gray, (5Y	
-112.4			'	153.9-154.15' - Fracture zone — 154.3' - Bedding plane, <20 deg, organic	\Box	7/2), fine grained, weak to medium strong (R2 to R3), poorly	_
1 -]		0	laminations throughout		fossiliferous, <5% small 1/16" voids	R10: 9 minutes
1 -	156.5		NR	155.25' - Bedding plane, <20 deg 155.6' - Mechanical break	Н	over surface, fine black organic lamination from 153.9-154.3'	_
-			_	156.6, 157.6' - Bedding plane (2), 10 deg,	Ш	No Recovery 155.8-156.5'	_
-	1		1	smooth to rough, undulating 157.25, 159.75' - Mechanical break	Ш	Limestone 156.5-159.95' - yellowish gray, (5Y	_
-	1				Ш	7/2), fine grained, weak to medium	_
-	1		3	157.8, 157.9, 158.75' - Bedding plane (3), <5 deg, planar	\vdash	strong (R2 to R3), poorly fossiliferous, <5% small (1/16")	-
-	R11-NC				\Box	voids, interval from 159.0-159.5' is	-
-	5 ft 69%	53	2	159.0-159.5' - Bedding plane, 30 deg,		laminated with alternating colors of dusky yellow (5Y 6/4) and light olive	-
160	1		1	smooth, planar, organic staining on 35% of surface at 159.5'	╁	gray (5Y 5/2), laminations are	_
-117.4	1			_	Ш	 inclined 30%, olive gray material is fine grained and is medium strong to 	_
-	1		NR		ш	strong (R3 to R4)	R11: 15 minutes
-	161.5				Ш	- No Recovery 159.95-161.5'	-
-					\mathbb{H}	No Recovery 161.5-166.5'	-
-	1				Ħ	Ē	-
1 -	1					F	
-	1				Ш	Ē	-
-	R12-NC				╨	<u>-</u>	-
-	5 ft 0%	0	NR		Ш	=	-
165	- 0,0				Ш	-	-
-122.4	1			_	╁┤	_	_
-	-				Ħ	-	R12: 2 minutes
-	166 F					_	-
-	166.5				Ш	-	
-	1		7		+	-	
-	1			167.3' - Bedding plane, horizontal, smooth, planar	囯	-	
1 -	1		2	167.5-167.7' - Bedding plane, horizontal,	団	-	
1 -	R13-NG		_10	smooth, planar		-	-
			>10				
1							1



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-22

SHEET 10 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723199.8 N, 458088.0 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 6.6	ft bgs	on 3/	23/07 START: 3/22/2007 END: 3	/27/20	D7 LOGGER : N. Jarzyniecki	
≥ ∩ ∵	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A SCE	L H	(%) Q	등	DEPTH, TYPE, ORIENTATION, ROUGHNESS,		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EV.	ORE	ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	5 ft	<u>⊬</u> 38	# 5	<u> </u>	Ś	CHARACTERISTICS	, i
_	54%	30	\neg	168.4' - Bedding plane, 10 deg, smooth, undulating	世	Limestone - 166.5-169.2' - light olive gray, (5Y	_
170_				168.55' - Fracture zone, 1-3" pieces	╨	5/2), moderate HCl reaction, medium	
-127.4			NR	168.6' - Bedding plane, 15 deg, rough, undulating, open	皿	strong to strong (R3 to R4), zones - and blebs of 30-50% small (<3/16")	
				undulating, open	\mathbb{H}	voids alternating with fine grained	R13: 8 minutes
	171.5				\Box	material with few voids, void-rich	Casing advanced to 170'
				171.5, 171.6, 171.9, 172.2, 172.4, 173.0,	1	 zones occur along undulating bedding planes, larger cavities/fossil 	3/25/07 End of drilling for - the day at 171'
-			>10	173.15' - Bedding plane (7), horizontal, smooth, planar	11	molds (up to 1/2" x 3/4") vary from	3/26/07, 08:05 Cleaning
-			\neg	Sillouti, planta	口	 <5-10% over surface No Recovery 169.2-171.5' 	out hole to resume drilling -
-			>10	173.1' - Fracture, 80 deg, smooth, undulating	\Box	Limestone	-
-	R14-NQ		\dashv	173.4-173.8' - Fracture zone, 3/4"-2"	+	 171.5-176.2' - light olive gray, (5Y 5/2), dense, very fine grained, 	-
-	5 ft	50	>10	fragments 173.95' - Fracture, horizontal, rough,	+	moderate HCl reaction, strong (R4),	
-	94%		\dashv	undulating, black staining on 50% of surface	+	thinly laminated in zones 2-4" thick	-
175 <u> </u>			>10	174.2' - Fracture or mechanical break, 10	╨	alternating with zones of 25-30% small (<1/8") voids and few (<5%)	
-132.4				deg, rough, undulating 174.5' - Fracture, horizontal, rough, planar	世	larger cavities up to 1/2" diameter	SC-5 collected at 175.4-
_			0	174.8-175.2' - Fracture zone	+	<u>-</u>	176.2'
_	176.5		NR			No Recovery 176.2-176.5'	R14: 13 minutes
			₁		\bot	Limestone - 176.5-178.8' - light olive brown to	SC-6 collected at 176.5- 177.45' -
					Ш	yellowish gray, (5Y 5/6 to 5Y 7/2),	
				177.75' - Fracture, horizontal, rough,	Ш	strong HCl reaction, strong (R4), fossiliferous with casts/molds up to	
			>10	undulating	\mathbb{H}	1/2", small (1/16") voids over 10-20%	
	R15-HQ			177.75-178.8' - Fracture zone, 3/4"-3" fragments	\Box	of surface occuring in zones, very	1
-	5 ft 46%	19		nagments	1	 fine lens of rock with no voids No Recovery 178.8-181.5' 	1
180					111		
-137.4			NR	-	口	_	_
-					\Box	-	R15: 107 minutes -
-	101.5				╁┼	_	Stop drilling to mix mud -
-	181.5		\dashv	181.5-181.75' - Fracture zone, 1"-2"	+	_ Limestone	
-			>10	fragments	+	 181.5-182.6' - moderate olive brown 	-
-			\>10 <i>i</i>	182.05' - Bedding plane 182.3-182.6' - Fracture zone, 1"-3" fragments	+	with light olive gray zones, (5Y 3/4 with 5Y 3/4), fine to very fine grained,	-
-					口	 moderate to strong HCl reaction, 	-
-	D46 NO				世	strong (R4), <5% small (1/16") voids, poorly fossiliferous	-
-	R16-NQ 5 ft	0			+	- No Recovery 182.6-186.5'	-
-	22%		NR		\Box	-	-
185			,	_	┲╢		_
-142.4					口	_	
					Д	_	R16: 15 minutes
	186.5				\mathbb{H}		
				186.5-186.9' - Fracture zone, 3/4"-2"]
1			>10	fragments	1#		1
1				187.55' - Fracture, 25 deg, rough, undulating	14		1
			>10	187.85' - Bedding plane, rough, stepped	口		
-	R17-NQ		>10	188.35-188.65' - Fracture zone	\Box	-	
			\exists		+		1
							•



PROJECT NUMBER:	BORING NUMBER:					Т
338884 FI	Δ-22	SHEET	11	OE	11	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723199.8 N, 458088.0 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

00111110	, <u>.</u>		<u> </u>	TENT . CIVIE 33 3/N 3 10023, Mud Totally, NQ 1001S, HW C	aonig		ORIENTATION . Vertical
WATER	LEVELS: 6.6	ft bg	s on 3	/23/07 START : 3/22/2007 END : 3/	27/20	07 LOGGER : N. Jarzyniecki	
				DISCONTINUITIES	(5)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		(n	DESCRIPTION	SYMBOLIC LOG		
N A E	Z Z Z	_	FRACTURES PER FOOT	DESCRIFTION	□	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
AACI	NE E	Q D (%)	<u>₽</u> ö	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	걸	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
F 두 것	888	ص ص	AC R F	PLANARITY, INFILLING MATERIAL AND	₩ W	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
프잉크	898	ř	FH	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	BROI O, ILOT REGGETO, ETO.
	5 ft	22		188.7' - Fracture, 80 deg, rough, stepped,		Limestone	i
-	48%			black fine particles on fracture face	╁	- 186.5-188.9' - Same as 181.5-182.6'	-
190_				_	╨	except increasingly mottled moderate	
-147.4			NR		т	olive brown and light olive gray, (5Y	
1 -	1					- 4/4 and 5Y 5/2), fossils casts/molds	R17: 12 minutes
-	-				╨	up to 1/4" x 1/2", small (1/16") voids over 15% of surface, except <5%	-
Ι.	191.5				\bot	- over 188.2-188.4', moderate HCl	_
1						reaction, medium strong to strong	
-	1		5	192.0-193.5' - Bedding plane, numerous 2"	╨	(R3 to R4) rock	-
-	-			long bedding plane	╀	No Recovery 188.9-191.5'	-
1 _			4	192.25' - Bedding plane, <15 deg, rough,		Limestone	_
1				undulating, organic staining	ш	191.5-193.6' - olive brown, (5Y 4/4),	I -
1 -	R18-NG))	0	192.75, 193.1' - Fracture (2), 75 deg, rough,	╁	fine grained, moderate HCl reaction,	-
1 -	5 ft	25		undulating, black staining	╀	medium strong to strong (R3 to R4), less than 5% small (<1/16") voids on	-
I _	42%				\Box	surface, highly fossiliferous,	_
195					—	casts/molds up to 1/4" x 1/4"	1
-152.4	1		NR	_	╁┷	No Recovery 193.6-196.5'	_
-	-				╼	_	-
							R18: 10 minutes 3/26/07, 17:31 End drilling -
1	196.5				₽		for the day at 196.5'
-	190.5			196.5, 196.6, 197.55, 197.7, 197.9, 198.1' -	+	Limestone	3/27/07, 07:51 Water level
-	-		>10	Fractures (6), 0-15 deg, mostly rough and		- 196.5-199.0' - light olive gray to dark	is 3.3' below ground –
1				undulating, semi planar, organic black	\vdash	yellowish orange mottled, (5Y 5/2 to	surface
				staining	Н	10YR 6/6), dense, fine grained,	08:05 Resume drilling
1 -	-		>10	196.5-198.9' - Fracture zone, rough,		 moderate to strong HCl reaction, 	-
1 -				undulating, numerous 0-25 deg. fractures	╨	strong to very strong (R4 to R5),	_
1	R19-NG		0	over 1-2" intervals 196.85' - Fracture, 50 deg, rough, undulating,	Н	moderately fossiliferous, fossil casts up to 1/4" x 1/4", small 1/16" voids	
1 -	5 ft 50%	28		black organic staining	1	over <10% of surface	1
-	30 / 10			black organic staining	厂	No Recovery 199.0-201.5'	-
200				_	╀	_	
-157.4			NR		_		
-	1				ш		R19: 25 minutes
-	-				╁	-	3/27/07, 09:30 Boring total
-	201.5				+-	D. II. CD.: 1004.5.81	depth 201.5'
1 _					1	Bottom of Boring at 201.5 ft bgs on - 3/27/2007	Water level at 3.5' below
1					1	3/21/2001	\ground surface
1 -	1				1	-	
-	-				1	-	-
1 _					1		
1 7					1		
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33884.FL A-22A SHEET 1 OF 7

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723191.2 N, 458083.4 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8 tri-cone bit ORIENTATION : Vertical

						ary, cameau, Avvo rous,			OTHERTATION: Vertical
WAIER	LEVELS	: 4.0 ft bo	gs on 6/13	3/U/ S	START : 6/13/2007	END : 6/14/2003		:H : C	
				STANDARD		SOIL DESCRIPTION		<u> </u>	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS			<u> </u>	SYMBOLIC LOG	
H H H		RECOVE		TEST NESULTS	SOIL NAM	E, USCS GROUP SYME	BOL, COLOR,	음	DEPTH OF CASING, DRILLING RATE,
FEE		NECOVE			MOISTURE	CONTENT, RELATIVE	DENSITY OR	S S	DRILLING FLUID LÓSS, TESTS, AND INSTRUMENTATION
			#TYPE	6"-6"-6"	CONSISTEN	CY, SOIL STRUCTURE	, MINERALOGY	₹	INSTRUMENTATION
				(N)				o o	A COA is use shill at A CO with intent of starting
42.9								J	A-22A is re-drill of A-22 with intent of starting
									rock coring at approximately 35.0' - Blind drill in soils to 35.0'
-	1							1	1
-	-							+	
l -								4	1
									Driller's Remark: Sand at 2.0'
I -								1	
-	1							1	1
-	-							4	-
_								4	l
]								Water level 4.0' below ground surface
5								1	1
37.9	1						-	1	-
1 -	1							+	1
I -								4	1
l _								_	
								1	
-								1	1
-								1	-
-								4	Dellarda Danasador Tarradik ak 0.00
l _									Driller's Remark: Tan silt at 8.0'
-	1							1	1
	-							+	-
10 32.9							-	4	_
32.9]	
-	1							1	1
-	1							1	1
-	-							-	-
l _								4	_
]								
1 -								1	1
1 -	1							1	1
-	1							+	1 -
I -								4	Driller's Remark: Weak sandy limestone at -
15]						=		14.3'
27.9								1	1
I -	1							1	1
-	1							+	1
-	-							4]
I -	1							1]
									Driller's Remark: Harder limestone at 17'
1 -	1							1	1
-	1							1	-
-	-							4	1
I -]							1]
									1
20	1							1	1
								+	-
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	A-22A	SHEET	2	OF	7	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723191.2 N, 458083.4 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8 tri-cone bit

ORIENTATION: Vertical

WATER	LEVELS	: 4.0 ft bo	s on 6/13	3/07 S	START : 6/13/2007 END : 6/14/2007 LOGG	ER:	C. :	Sump
				STANDARD	SOIL DESCRIPTION		g	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COLL NAME TIGOGO COOLID CARDOL COLO		SYMBOLIC LOG	DEDTIL OF OACHIO DOUL IN COATE
H BE ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR			DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
EPT URF			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		3.VME	INSTRUMENTATION
22.9				(14)		\dashv	<u>"</u>	
-						1		1
-						1		1
-						1		Driller's Remark: Sandy silt with weak limestone at 21.5', gravel-sized clasts
]		illinestorie at 21.5 , gravei-sizeu clasts
_						4		_
_						4		-
_						4		-
-						4		-
25 17.9						-		-
-						1		-
-						1		Driller's Remark: Weak sandy limestone at
_						1		26.0'
_						4		Driller's Remark: Carbonate silt at 28-29'
_						4		-
-						4		-
30 12.9						\dashv		-
-						Ⅎ		-
-						1		1
-						1		1
						1		1
]		
_						4		
_						4		Driller's Remark: Hard limestone at 33.5'
-	35.0							-
35 7.9	35.3	0.3	SS-1	50/4 (50/4") /	Limestone Fragments 35.0-35.3'	\mathcal{F}	月	
-				(00/4)	Begin Rock Coring at 35.0 ft bgs See the next sheet for the rock core log	′ 		+
-					See the next sheet for the rock core log	+		+
-						1		1
-						1		1
						1		1
]]
						1		
-						4		_
40						4	4	



PROJECT NUMBER: BORING NUMBER:

338884.FL **A-22A**

SHEET 3 OF 7

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723191.2 N, 458083.4 E (NAD83)

DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: B. Truitt; Cathead Operator: P. Buchler ELEVATION: 42.9 ft (NAVD88)

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, SW/HW casing

WATER	LEVELS : 4.0			/13/07 START: 6/13/2007 END: 6/			
			0.10	DISCONTINUITIES	Т	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	507	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ACE	: RUI	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EPT CLEV	SORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	∀MB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	35.0 R0-NQ	<u>~</u>	шп	35.0-36.0' - Fracture zone, limestone	8	Limestone Fragments	Begin rock core at 35.0'; 6"
-	1 ft	0	>10	fragments	H	- 35.0-36.0' - Same as 36.0-37.6'	casing installed from -
-	36.0 100%			36.0-36.1' - Fracture zone, limestone	Ħ	_ Limestone	surface to 10.0', HW _ casing to 35.0'
-			3	fragments	Ħ	 36.0-37.6' - light olive gray, (5Y 5/2), moderate HCl reaction, medium 	R0: 1 minute – Note: core discarded
-			>10	36.1' - Fracture, horizontal, rough, undulating, slight clayey infill in fossil mold on surface	H	strong (R3), 10-15% small (1/16"	Note. core discarded
-			- 10	36.8' - Fracture or mechanical break, 70 deg, rough, undulating to semi-planar, slightly	\vdash	 diameter) void space across surface, fossiliferous (many more molds than 	-
-	R1-NQ			radiused	\vdash	casts), few larger cavities (up to 3/8"	-
-	5 ft 32%	9		36.9' - Fracture or mechanical break, horizontal, rough, undulating	Н	diameter)No Recovery 37.6-41.0'	-
-			NR	37.2' - Mechanical break, vertical, non-planar, spall	Т	-	
40				37.5-37.6' - Fracture zone, limestone	ш		_
2.9				fragments	Ш		R1: 4 minutes
	41.0]
-			0	41.0-43.0' - Compacted silty sand (carbonate derived)		Silty Sand (SM) - 41.0-43.0' - moderate yellowish]
-				-		brown, (10YR 5/4), fine grained,	_
-			0	-		moderate HCl reaction, compacted, - carbonate derived, preferentially	40 F 42 Ol Mara compatant
-	DO NO			43.0, 43.1, 43.2, 43.3' - Fractures or	Ш	oriented thin (1/16") dark black organic inclusions and laminations	42.5-43.0' More competent limestone beds with softer -
-	R2-NQ 5 ft	20	5	mechanical break (4), horizontal, rough,	H	- \((roughly horizontal), friable	compacted silt material in _ between
-	70%		4	undulating 44.0' - Fracture, >60 deg, rough, undulating,	世	Limestone 43.0-44.5' - grayish orange, (10YR	-
			1	non-planar	世	 7/4), moderate HCl reaction, weak to 	-
45 -2.1			NR	44.3' - Fracture, horizontal, rough, with sand on surface (possible thin interbed)	\vdash	medium strong (R2 to R3), fossiliferous (more molds than	R2: 3 minutes
-	46.0		1411	, , , , , , , , , , , , , , , , , , ,	\vdash	 casts), voids over 10% of surface (60% smaller than 1/16"; 40% up to 	-
-	46.0				\Box	3/8" fossil molds), inclusions up to	-
-			3	46.3, 46.5, 46.8, 47.4' - Fractures (4), rough, undulating, mostly horizontal	口	 1/4" light gray (N7) (fossil infilling) No Recovery 44.5-46.0' 	-
-					┢	Limestone	-
-			1		世	 46.0-49.1' - grayish orange, (10YR 5/4), moderate HCl reaction, very 	SC-1 collected at 47.4-
-	R3-NQ	2.4			Ъ	weak to weak (R1 to R2), easily broken by hand, void space across	1 70.0
1]	5 ft 62%	34	>10	48.5-49.1' - Fractures (2), 75 deg, rough, undulating	\vdash	surface 15-20%, (80% smaller than]
				undulating	F	1/16", 20% larger cavities up to 1" diameter, fossiliferous (many more	
50			NR	_	片	molds than casts), thin black organic	
-7.1			INIX		H	laminae at 48.5-49.1' No Recovery 49.1-51.0'	R3: 3 minutes
-	51.0				片	- 1:	_
-			2		世	Limestone – 51.0-56.0' - moderate yellowish	-
-				51.7, 51.9' - Mechanical break, horizontal,	H	brown, (10YR 5/4), mild to moderate HCl reaction, weak (R2), silty, finely	-
-			3	rough, undulating to semi-planar 52.1, 52.3, 52.9, 53.2, 53.4, 53.9' - Fractures	+	 laminated with dark black thin 	-
-	R4-NQ			(6), 30-40 deg, rough, undulating to semi-planar	仠	(<1/16") organic laminations, undulating non-planar bedding	
-	5 ft	62	3		厂	– planes	-
-	100%				口	-	-
55 55			0		仜	_	-
35_					T		
1					1		1



FRACTURES PER FOOT

3

3

1

>10

NR

1

3

1

4

NR

1

1

3

4

2

NR

1

0

3

stepped

to semi-planar

tight (possibly healed)

rough, undulating, irregular

bedding planes)

RQD(%)

WATER LEVELS: 4.0 ft bgs on 6/13/07

CORE RUN, LENGTH, AND RECOVERY (%)

R5-NC

5 ft

R6-NC

5 ft

94%

R7-NC

5 ft | 74

96%

R8-NC

5 ft 96% 62 | 1

46 | 1

25 >10

56.0

DEPTH BELOW SURFACE AND ELEVATION (ft)

-12.1

60

-17 1

65 -22 1

70

-27.1

75

71.0

61.0

66.0

PROJECT NUMBER: BORING NUMBER:

338884.FL A-22A

SHEET 4 OF 7

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723191.2 N, 458083.4 E (NAD83)

START: 6/13/2007

DESCRIPTION

DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND

THICKNESS, SURFACE STAINING, AND TIGHTNESS

55.1' - Fracture, 60 deg, rough, semi planar

55.9' - Bedding plane, horizontal, smooth,

1/4" thick black organic (lignite) laminae

57.8-59.5' - Fracture zone, limestone

56.5, 56.8' - Fractures (2), rough, undulating 56.9' - Bedding plane, horizontal, smooth,

61.3, 62.15, 62.25' - Fractures or mechanical

break (3), 30-60 deg, rough, undulating

undulating 63.0, 64.1' - Fractures (2), >80 deg, rough,

62.75' - Fracture, horizontal, rough,

64.4-64.5' - Carbonate sand interbed

65.0. 65.2. 65.35. 65.7' - Fractures (4).

horizontal, rough, undulating to planar

67.0' - Fracture or mechanical break, rough,

68.0' - Fracture, >80 deg, rough, undulating

69.1' - Fracture, 45 deg, rough, undulating to

71.8, 73.5, 74.1, 74.3' - Mechanical break (4),

74.5' - Fracture, >80 deg, non-planar (spall)

69.1-70.5' - Fracture, vertical, undulating,

69.7, 69.9, 70.1, 70.5 - Fractures (4),

horizontal, rough, undulating, (possible

66.35' - Fracture, horizontal, rough

undulating to semi-planar, open

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

END: 6/14/2007

90

 $\underline{\circ}$

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, SW/HW casing

DISCONTINUITIES

55.5' - Fracture, rough, undulating

parting along organic laminae

slightly radiused

fragments

ORIENTATION: Vertical LOGGER: C. Sump LITHOLOGY COMMENTS ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS R4: 5 minutes Limestone 56.0-56.5' - moderate yellowish brown, (10YR 5/4), 10-15% voids cover surface, few voids/cavities 56.5-56.9' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), very weak (R1), silt material with black laminar inclusions (organics, possibly lignite) 56.9-59.5' - moderate yellowish brown, (10YR 5/4), mild to moderate HCl reaction, very weak (R1), small voids (<1/16") occurring in irregular R5: 4 minutes zones (possible bioturbation), thin zones containing fine black laminae (organics), slightly friable No Recovery 59.5-61.0' Limestone 61.0-65.7' - moderate yellowish brown to dusky yellow, (10YR 5/4 to 5Y 6/4), mild to moderate HCI reaction, medium strong (R3), variable (5-15%) small (<1/16") voids across surface, thin silt zones (1"-1-1/2" thick) at 62.3' and 64.6' R6: 5 minutes No Recovery 65.7-66.0' Limestone 66.0-67.0' - dusky yellow, (5Y 6/4), fine grained, weak (R2), fossiliferous, silty, 5-10% small voids (<1/16") over surface 67.0-68.7' - dusky yellow to moderate yellowish brown, (5Y 6/4 to 10YR Possible bioturbation 5/4), intermingled zones of fine grained silty limestone (no voids) and limestone with 20-25% small voids (1/16" - 1/8") 68.7-70.5' - weak (R2), very finely laminated (1/16"-1/8"), silty, with R7: 3 minutes sparse inclusions of void rich (20-25%) limestone preferentially oriented parallel to bedding planes Start drilling 6/14/07 at 70.5-70.8' - grayish yellow, (5Y 8/4), 08:00. depth at 71.0' medium strong (R3), fossiliferous, Water level 3.9' below 15% small voids (<1/16") ground surface No Recovery 70.8-71.0'



338884.FL A-22A

SHEET 5 OF 7

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723191.2 N, 458083.4 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, SW/HW casing

ORIENTATION: Vertical

WATER	LEVELS: 4.0	ft bgs	s on 6	/13/07 START : 6/13/2007 END : 6/	14/20	D7 LOGGER : C. Sump	
\$ D €	(%)			DISCONTINUITIES	၂ ၅	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE	E RU STH, OVEF	(%) Q	TUR	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30Li	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
EPT SURF	CECC	ROL	RAC ER I	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	∀ME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-32.1	0716	ш.	шш	75.0' - Clay seam, 1/2" silty clay interbed,	0)	Limestone	R8: 3 minutes
-			2	dark brown/black organics	井	 71.0-75.8' - yellowish gray, (5Y 7/2), 	To. 5 minutes
-	76.0		NR	75.7' - Mechanical break, rough, undulating,	世	mild to moderate HCl reaction, weak to medium strong (R2 to R3), void	1 -
-			1	irregular 76.2' - Fracture, >60 deg, rough, undulating,	₽	 space over surface varies from 	1 -
-				irregular, tight (healed)	Ш	10-25% (60-70% small voids <1/16" with remainder ranging from 3/16" to	1 4
-			>10	77.4' - Fracture, 60 deg, slightly rough,	ш	>3/4"), fossiliferous (many more	1 4
_	DO NO			undulating to planar	+	molds than casts), void rich zone 71.5-71.8', minor clay infilling in	
_	R9-NQ 5 ft	26	>10	77.6-78.5 - Fracture zone, limestone fragments	\vdash	 larger (1") cavity, fine grained silty 	
_	80%				\Box	zone (no voids) 73.5-73.7', 1/2" thick organic rich black clay seam at 75.0'	
-			>10	79.1-79.3' - Fracture zone, limestone fragments, dark brownish black coating on	世	 No Recovery 75.8-76.0' 	1 4
80 <u> </u>				one fragment, greasy luster on surface, tacky —	₽₩	Limestone 76.0-80.0' - Same as 71.0-75.8'	DO: 0 minutes
-37.1			NR	(organics). 79.8' - Clay seam, 1/2" clay infilling, dark	Д	 except fractured/fragment zones 	R9: 2 minutes
_	81.0			brownish black, greasy luster, tacky	ш	associated with higher percentage of small voids/cavities (fossil molds),	1 4
-			>10	(organics) 81.0-81.2' - Fracture zone, limestone		organic seams (black) at 79.5' and	_
_				fragments	\vdash	80.0' No Recovery 80.0-81.0'	SC-2 collected at 81.6- 82.6'
_			0	81.6' - Mechanical break, horizontal, rough, undulating		_ Limestone	02.0
_				anddating		81.0-85.2' - moderate yellowish brown, (10YR 5/4), moderate HCl	_
_	R10-NQ 5 ft	54	0		₽	reaction, medium strong (R3),	_
_	84%				Щ	fossiliferous (many more molds than casts), 10-15% small voids covering	
_			2	84.0' - Fracture, rough, undulating, irregular	ш	_ surface (90% are <1/16"; 10% are	
85 -42.1				84.5, 84.7' - Fracture, >70 deg, rough, semi-planar —	坦	larger cavities [3/16"-3/8"])	P40 7
-42.1			0 NR	'	H	No Recovery 85.2-86.0'	R10: 7 minutes
_	86.0		1414		+	Limontono	
_			5	86.1, 86.2, 86.3, 86.5, 86.7' - Fractures (5), 60-70 deg, rough, undulating to semi-planar,		Limestone - 86.0-88.7' - Same as 81.0-85.2'	
_				irregular, conjugate sets	井	except strong (R4), increased percentage of voids and small (<3/8")	
_			>10	97 F 99 7! Fracture zone rough limestone	Ш	- cavities, fine grained dark olive gray	1 -
-	D44 NO			87.5-88.7' - Fracture zone, rough, limestone fragments, irregular surfaces	₽₩	limestone lense at 88.5-88.7'	1 4
-	R11-NQ 5 ft	12	>10		\blacksquare	_	1 -
-	54%				H	_ No Recovery 88.7-91.0'	-
-					田	_	-
90 <u> </u>			NR	_	+	<u> </u>	R11: 6 minutes
					\Box	-	Driller's Remark: 50% loss
-	91.0				卄	Limestone	of circulation at 90.0-91.0'
-			5	91.3' - Fracture, 60 deg, rough, undulating to	╁	 91.0-91.8' - moderate olive brown, 	-
-				semi-planar 91.5' - Fracture, horizontal, rough, undulating	Н	(5Y 4/4), fine grained, mild to moderate HCl reaction, strong to	-
-			3	91.6, 91.8, 91.9' - Fractures (3), 45 deg,	円	 very strong (R4 to R5), dense, no 	-
-	 R12-NQ			rough, undulating, irregular 92.3, 92.5, 92.6, 93.0' - Fractures (4), 50-60	田	_ voids	SC-3 collected at 93.4 -
-	5 ft	18	2	deg, rough, undulating and planar to	団	_	94.4'
-	68%		0	semi-planar, irregular 93.4' - Fracture zone, irregular, with	H	_	-
			-	limestone fragments	H	_	-
95				_	H		_
					-		



WATER LEVELS: 4.0 ft bgs on 6/13/07

PROJECT NUMBER: BORING NUMBER: 338884.FL

A-22A

SHEET 6 OF 7

ORIENTATION: Vertical

ROCK CORE LOG

LOGGER : C. Sump

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723191.2 N, 458083.4 E (NAD83)

DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: B. Truitt; Cathead Operator: P. Buchler ELEVATION: 42.9 ft (NAVD88)

END: 6/14/2007

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, SW/HW casing

START: 6/13/2007

WATER	LLVLLS . 4.0	it bg.	3 011 0	DISCONTINUITIES	T	LITHOLOGY	COMMENTS
§8€	CORE RUN, LENGTH, AND RECOVERY (%)		(0	 	8		COIVIIVIEIN 1 2
DEPTH BELOW SURFACE AND ELEVATION (ft)	L. AN	(9)	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
THE	GTH GOVE	(%) Q	D. D	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOL	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SUR	COR	A Q	FRA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-52.1			NR			Limestone	R12: 4 minutes
-				-	\vdash	- 91.8-94.4' - pale yellowish brown,	-
-	96.0			96.0-97.4' - Fracture zone, limestone	Ħ	(10YR 6/2), medium strong (R3), 10-15% small voids covering surface	-
-			>10	fragments	╫	 (<1/16"), few larger cavities infilled 	-
-			> 10	-		with fine grained yellowish gray (5Y 7/2) material, marbled zone of	-
-			>10	-	口	 yellowish brown void-rich limestone 	-
-	540.110			-	╁	with yellowish gray fine grained voidless limestone 94.0-94.4'	-
_	R13-NQ 5 ft	0		_	F	(possible breccia)	_
l -	28%			_	H	No Recovery 94.4-96.0'	<u> </u>
l _			NR	_	╨	Limestone 96.0-97.4' - pale yellowish brown,	<u> </u>
100_				_	Ш	(10YR 6/2), mild to moderate HCl	
-57.1						reaction, medium strong (R3), 15-20% small voids covering surface	R13: 3 minutes
	101.0				\vdash	(90% are voids <1/16", 10% are	
			>10	101.0-102.5' - Fracture zone, limestone	H	larger voids [3/16" - 3/4"]), fossiliferous (many more molds than	
-			>10	fragments with irregular non-planar surfaces -	Ħ	casts)	1
-			>10	_	╙	No Récovery 97.4-101.0' Limestone	1
-				102.5' - Fracture or mechanical break, 45	\Box	101.0-104.2' - yellowish gray to	1
-	R14-NQ		2	deg, rough, undulating, irregular	ш	dusky yellow, (5Y 7/2 to 5Y 6/4), moderate to mild HCl reaction,	1 1
-	5 ft 64%	40	0	103.4' - Fracture, 45 deg, rough, stepped,	╁	medium strong (R3), fossiliferous	1 1
-	0470		0	irregular	Ħ	(many more molds than casts),	1
105				-		10-15% small voids (<1/16") over surface, variable larger voids/cavities	-
105_ -62.1			NR	_	₩	(fossil molds) 3/16" to >3/4"	R14: 3 minutes
-				-	ш	diameter, larger cavities comprise up to 25% volume from 101.6-102.5'	1
-	106.0			-	仜	decreasing with depth	1
-			1	400 C 407 4 407 21 Freehures or	╁	No Recovery 104.2-106.0'	1
-				106.6, 107.1, 107.3' - Fractures or mechanical break (3), 60-70 deg, rough,	H	- 106.0-111.0' - Same as 101.0-104.2'	1 -
-			3	undulating to semi-planar, slightly radiused	世	except few voids/cavities greater than 3/16"	1 -
-	D45 NO			107.7' - Fracture or mechanical break, low	₽	- 41811 3/10	1 -
-	R15-NQ 5 ft	48	1	angle, undulating		1	1
-	100%			108.7, 109.1, 109.5, 109.6, 109.9, 110.0' -	上	<u> </u>	_
-			4	Fractures or mechanical break (6), rough, undulating, irregular	\vdash	<u> </u>	_
110_					片	<u>L</u>	
-67.1			1	_	片	1	R15: 5 minutes
l _	111.0			_	\vdash	L	
l _			>10	111.0-113.7' - Fracture zone, rough, undulating, limestone fragments, irregular -	Д	111.0-113.7' - Same as 106.0-111.0' - except variable percentage of voids	
			- 10	anddiaung, iinicatone nagmenta, ineguial	ഥ	(<10-20%), thin zone of yellowish	
			-10		\vdash	gray (5Y 7/2) fine-grained limestone at 111.8-112.0']
-			>10		Ė	- at 111.0-112.0]
-	R16-NQ		>10	_	世	ſ	1
-	5 ft 54%	0		-	╨	No Recovery 113.7-116.0'	1
-	1 0.70			-	口	1. 110 110.0000019 110.7-110.0	1
115			NR	-	世	†	1
115			INIX		\Box		+
I					1		1



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-22A

SHEET 7 OF 7

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723191.2 N, 458083.4 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, SW/HW casing ORIENTATION : Vertical

WATER	LEVELS: 4.0	ft bg	s on 6/	/13/07 START : 6/13/2007 END : 6/1	4/200)7 LOGGER : C. Sump	
30€	(%			DISCONTINUITIES	စ္က	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
FACE MATIC	E RL 3TH, OVEI	R Q D (%)	FOOF	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP. SURI ELE	COR	ROI	FRA(PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-72.1							R16: 3 minutes
-	116.0			-	Н	Limestone	1
- - -	110.0			-	\Box	 116.0-116.7' - Same as 111.0-113.7' except increasing percentage 	1
			3	116.3, 116.7, 116.8' - Fractures (3), horizontal, rough, undulating, irregular	H	voids/cavities 3/16"-3/4" in size (up to	1
				117.0' - Bedding plane or fracture, horizontal,	Ш	 10% of surface), notable infilling and recrystallization in fossil molds 	1
-			2	smooth, planar 117.25' - Sharp horizontal contact with light	Ш	116.7-117.25' - moderate yellowish brown, with pronounced bedding	1
-	R17-NQ	34	1	gray, fine grained limestone 117.8' - Contact with fossil and void rich	Ш	plane laminations, fine sand particles	1
	5 ft 58%	34		moderate yellowish brown limestone	Н	in fracture surface 117.25-117.8' - light gray, (N7), fine]
					\Box	grained, strong (R4), dense, no voids	
120_			NR		囯	117.8-118.9' - Same as 111.0-113.7' — except large 1" fossil cast at end of	R17: 4 minutes
-77.1				_	団	core No Recovery 118.9-121.0'	
-	121.0				Ш		Total depth 121.0'
-				-		Bottom of Boring at 121.0 ft bgs on 6/14/2007	-
-				-		_	-
-				-		-	-
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33884.FL A-23 SHEET 1 OF 13

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723141.4 N, 458146.5 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

LEVELS	: 0.5 ft bo	s on 4/10	0/07 5	START: 4/9/2007 END: 4/17/2007 LOGGER: R. McComb, C. Dougherty
			STANDARD	SOIL DESCRIPTION COMMENTS
SAMPLE INTERVAL (ft)				07 07 07 07 07 07 07 07 07 07 07 07 07 0
RECOVERY (ft)				SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
		#TYPE	6"-6"-6"	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
0.0			(N)	√ Poorly Graded Sand With Organics (SP)
0.0	0.0	00.4	1-2-2	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
	0.8	55-1	(4)	Poorly Graded Sand (SP) 0.1-0.75' - grayish black grading to medium gray, (N2
1.5				to N5), moist, very loose, fine grained, trace
				nonplastic fines, organics
				-
5.0				Clayey Sand (SC)
	0.5	SS-2	2-3-3	- 5.0-5.4' - greenish gray, (5G 6/1), moist, loose, fine - 1
0.5	0.5	00-2	(6)	grained, 40% fines, medium to high plasticity, silica
6.5				Silty Sand (SM)
				5.4-5.5' - yellowish gray, (5Y 7/2), moist, loose, fine to medium grained, 20% fines, strong HCI reaction,
				nonplastic fines, carbonate material
				- 1
				- 1
10.0				-
10.0				Silt And Limestone (ML)
	1.0	SS-3		10.0-11.0' - very pale orange, light olive brown to light -
11.5			(17)	moderate HCl reaction, nonplastic, carbonate; 20-25% limestone fragments, fine to coarse
				gravel-sized End drilling at 11.5' on 4/9/07 Resume drilling 4/10/07 water level is 0.5'
				below ground surface (start)
]
]
				
				Driller's Remark: hard drilling from 14-15.0', Limestone rock fragments in cuttings
15.0				
			10-11-14	Silt (ML) 15.0-16.05' - very pale orange, (10YR 8/2), wet, very -
	1.1	SS-4	(25)	stiff, rapid dilatancy, moderate HCl reaction,
16.5				nonplastic, carbonate; trace coarse sand to fine gravel-sized
	0.0 1.5 5.0 6.5 11.5	SAMPLE INTERVA RECOVE 0.0 0.8 1.5 5.0 0.5 6.5 11.0 11.5 15.0 11.1	SAMPLE INTERVAL (ft) RECOVERY (ft) 7 8779E 0.0 0.8 SS-1 1.5 0	SAMPLE INTERVAL (ft) RECOVERY (ft) 0.0 0.0 0.8 SS-1 1-2-2 (4) 1.5 0.5 SS-2 2-3-3 (6) 1.0 1.0 SS-3 10-9-5 (14) 15.0 1.1 SS-4 10-11-14 (25)



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-23	SHEET	2	OF	13

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723141.4 N, 458146.5 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	WATER LEVELS: 0.5 ft bgs on 4/10/07						
				STANDARD	SOIL DESCRIPTION O COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)			PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION		
ACE ATIO	RECOVERY (ft)				SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND		
LEV.			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY INSTRUMENTATION		
20.8	20.0			(14)	Silt With Sand (ML)		
_		0.9	SS-5	13-17-16	20.0-20.9' - very pale orange, (10YR 8/2), moist to		
-	21.5			(33)	\ reaction, 20% fine to medium grained sand, \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		
-					\nonplastic, all carbonate \		
]		
] [
_					<u> </u>		
-							
_					- 1		
25 <u> </u>	25.0				Sandy Silt (ML)		
-		0.9	SS-6	19-24-11	25.0-25.9' - Same as 20.0-20.9' except up to 38% -┃ ┃ -		
-	00.5	0.9	33-0	(35)	sand-sized grains with carbonate material		
-	26.5						
-					-		
_					1		
]		
_					<u> </u>		
_							
30 <u></u>	30.0				Cila Weah Count (AN)		
10.8			00.7	8-22-35	Silt With Sand (ML) 30.0-31.4' - moderate yellow, (5Y 7/6), wet, hard,		
-		1.4	SS-7	(57)	15-20% sand, nonplastic to low plasticity, rapid dilatancy, moderate HCl reaction, <1/16" thick calcite		
_	31.5				stringers, all carbonate		
-							
-					-		
-					1 		
-					11		
l _							
35	35.0 35.2	0.1	SS-8	50/2	Limestone Fragments		
5.8	35.2			(100")	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		
_					Begin Rock Coring at 35.0 ft bgs		
-					See the next sheet for the rock core log		
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PROJECT NUMBER:	BORING NUMBER:
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338884.FL A-23

SHEET 3 OF 13

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723141.4 N, 458146.5 E (NAD83)

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER LEVELS: 0.5 ft bgs on 4/10/07 START: 4/9/2007 END: 4/17/2007 LOGGER: R. McComb, C. Dougherty DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 9 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 5.8 Change to HQ rock coring Limestone >10 35.0-38.4' - pale yellowish brown, at 35.0' on 4/10/07 at 10:00 35.4-36.0' - Fracture zone, rough, stepped, (10YR 6/2), fine grained, mild to hours vertical fracture, limestone fragments on top, moderate HCI reaction, very weak various orientation (R1), voids <1/16" over 10-30% of 0 surface (becoming more numerous with depth), shallow cavities covering <1% (1/16"-1/8"x3/8"), high angle R1-HQ 5 ft 51 1 (60-70 degrees) unbroken fracture 68% zone from 37.7-38.0' 0 38.4' - Fracture, 50 deg, rough, stepped, No Recovery 38.4-40.0' R1: 9 minutes NR 40 40.0 0.8 40.0-43.4' - dusky yellow, (5Y 6/4), wet, soft, rapid dilatancy, mild HCl reaction, sandy, carbonate material NA R2-HQ 0 5 ft 68% No Recovery 43.4-45.0' NR R2: 3 minutes 45 45.0 -4.2 Limestone 45.2' - Fractures, rough, stepped, open 45.0-46.0' - dusky yellow, (5Y 6/4), fine grained, mild HCl reaction, 2 45.9' - Fractures, rough, planar, open extremely weak (R0), voids <1/16" 0 over 15-20% of surface, cavities up to 3/16"x3/16", trace mold/ casts Silt With Sand (ML) R3-HQ 0 46.0-48.2' - dusky yellow, (5Y 6/4), 5 ft 13 wet, soft to stiff, fine grained, 15-20% 0 sand, rapid dilatancy No Recovery 48.2-50.0' NR R3: 6 minutes 50.0 -9.2 50.0-50.45' - Fracture zone Limestone >10 50.0-50.45' - Same as 46.0-48.2' 50.45' - Fracture zone, 30 deg, rough, except with some limestone undulating, open >10 fragments 51.0' - Fracture zone, 60 deg, rough, 50.45-51.3' - light olive brown, dusky undulating, open 51.3-55.0' - Fracture zone, 80-90 degrees, yellow, (5Y 5/6 to 5Y 6/4), fine grained, mild to moderate HCl R4-HQ black organic material covering up to 40-50% 9 reaction, very weak (R1), laminated 5 ft of some surface 26% black organic material from 50.9-51.3', voids <1/16" over 5-10% NR of surface No Recovery 51.3-55.0' R4: 12 minutes 55 55.0



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-23 SHEET 4 OF 13

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723141.4 N, 458146.5 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

				HENT . CIVIE 330X 3/N 340233, ITIUU TOLAI Y, FIQ 10018, FIV			ORIENTATION: Vertical
WATER	LEVELS: 0.5	ft bg	s on 4		17/20		
> 0 0	<u></u>			DISCONTINUITIES	U	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		Ś	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
照유현	5,4	<u>@</u>	FRACTURES PER FOOT			MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
±ĕ.¥	1 H 1 H 1 H 1 H 1 H 1 H 1 H 1 H 1 H 1 H	(%) 🛭	FS	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
989		S O	RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	0715	ľĽ.	шп		S		
-14.2			1		\vdash	Limestone	
-			'	55.6' - Fractures, 0- <5 deg, rough, stepped,		 55.0-59.5' - dusky yellow to light olive brown, (5Y 6/4 to 5Y 5/6), fine 	
-				open	╁	grained, mild HCl reaction, extremely	-
-			3	56.2' - Fractures, horizontal, rough, stepped,	╀	weak to very weak (R0 to R1),	-
l _				open		extremely weak rock is friable, voids	
	R5-HQ			56.65-56.95' - Fractures, <5 deg, rough, stepped, open	—	<1/16" over 3-5% of surface, interval	
-	5 ft	30	2	57.1' - Fractures, 20-0 deg, rough, stepped	╨	 of black carbonaceous laminae up to 3/4" thick 	1
-	100%			57.85-58.1' - Fractures, <5 deg, rough,		_ 3/4 tillok	-
l -			2	stepped, open	┢	_	_
			-	58.5-58.8' - Fracture zone, 50 deg, rough,	H		
-				stepped, open			R5: 8 minutes
			0	59.4' - Fracture, 50 deg, rough, stepped,	╀	59.5-60.0' - yellowish gray, (5Y 7/2),	-
-19.2	60.0			open	╀	wery fine to fine grained, mild to	_
-19.2			1		П	moderate HCl reaction, weak (R2),	
			l '	60.6' - Fracture, rough, stepped, planar, open	Н	voids (<3/16") over 10-15% of	
-				04.0.04.01.5	╁	 surface, weak vertical fractures from 59.5-60.0', mottled 	1
-			>10	61.2-61.8' - Fracture zone, stepped,	仜	60.0-65.0' - yellowish gray, (5Y 7/2),	-
-				undulating, open	╀	- fine grained, mild HCl reaction,	_
	R6-HQ	38	2	00.051		extremely weak to very weak (R0 to	
	5 ft 100%	30	-	62.35' - Fractures, 50 deg, rough, undulating, tight	\vdash	R1), voids (<3/16") over 10-15% of	
-				62.8' - Fractures, <5 deg, rough, undulating,	╁	 surface becoming <1% at 63.0', fossils (casts/molds) rare to absent 	-
-			2	open -		with depth, trace black organic	-
-				63.4' - 30 deg, rough, undulating, open	₽	material at 61.0'	
1			1	63.9 - 64.0' - Fracture zone, horizontal,			R6: 7 minutes
65	65.0		'	rough, stepped, undulating, open	\vdash		
-24.2	00.0			-	╀┴	65.0-66.9' - dusky yellow, (5Y 6/4),	R7: 3 minutes
-			4	65.3' - Fractures, rough, stepped, open -	┰	 fine grained, mild to moderate HCl 	-
-				65.5' - Fractures, horizontal, smooth, planar,	╀	reaction, very weak to extremely	_
1			>10	open 65.65-66.02' - Fracture zone, horizontal,		weak (R1 to R0), voids <10% of surface becoming more common	
-			> 10	rough, undulating, open	Ш	with depth, very friable from	
-	R7-NQ			66.25-66.9' - Fracture zone, 0- 90 deg, rough,	╁	56.3-66.9'	-
-	5 ft	20	2	undulating, various orientations		 66.9-70.0' - yellowish gray, (5Y 7/2), 	-
-	100%			67.35' - Fractures, 50 deg, rough, stepped,	╨	mild to moderate HCl reaction, weak	
1			10	open 57.60-68.5" - Fracture zone, 50-90 deg,	\vdash	(R2), very fine grained, fine grained – matrix, voids (<1/16") over 15-20% of	
1 -			10	rough, undulating, open	Ė	surface, <5 cavities (3/8" diameter),	1
1 -				68.9' - Fractures, 0-80 deg, rough, undulating	╨	bioturbation zone below 68.4'	SC-1 collected at 68.9-
-			0		仜	-	70.0'
70	70.0				\vdash		_
-29.2			-10	70.0-71.05' - Fracture zone, 60 deg, rough,	<u> </u>	70.0-70.4' - yellowish gray, (5Y 7/2),	
1			>10	undulating to stepped, open	₩	fine grained, mild HCl reaction, very weak (R1), voids <1/16" over 10-15%	1
-				-		\of surface, trace fossil molds/casts	-
-			1	-	╀	- Silt (ML)	-
-						_ \70.4-70.65' - yellowish gray, (5Y 7/2),	
	R8-HQ	20		72.0' - Fractures, rough, undulating to		wet, soft, rapid dilatancy, mild HCl	SC-2 collected at 71.05-
1 -	5 ft 96%	26	4	stepped, open 72.5' - Fractures, horizontal and 70 deg,	┰┷	reaction	72.0'
1 -	00,0			rough, stepped, open	仜	 Limestone 70.65-72.5' - yellowish gray, (5Y 7/2), 	-
-			>10		1	fine grained, mild HCl reaction, very	-
I -				open	╀	weak (R1), voids <1/16" over 10-15%	
			>10	72.8' - Fractures, 60 deg, rough, stepped,		of surface, trace fossil molds/casts	R8: 7 minutes
75	75.0		<u>`</u>	open -	\vdash	72.5-73.5' - Same as 70.0-70.4' except voids 5-10% of surface	1
L ' -	7 0.0				1	evoeht voinz 2-10 % of sallage	
					1		
					1		

APPENDIX 2BB-290 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-23 SHEET 5 OF 13

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723141.4 N, 458146.5 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

CORING	NIETHOD AI	ND EC	ZUILIA	MENT: CME 550X S/N 340253, mud rotary, HQ tools, HV	v Casi	ig	ORIENTATION : Vertical
WATER	LEVELS: 0.5	ft bgs	s on 4	/10/07 START: 4/9/2007 END: 4/	17/20	D7 LOGGER : R. McComb, C. Doug	pherty
				DISCONTINUITIES	(0	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		m	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE OOLOD	
D A D	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	<u></u>	FRACTURES PER FOOT	DESCRIPTION	힐	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
ASE	KE	(%) Q		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	፬	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
	NS NS	Ø	SAC FIRE	PLANARITY, INFILLING MATERIAL AND	¥	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
		œ	뜐풉	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	Bitor o, reor neodero, ero.
-34.2			NR/	73.2-75.5' - Fracture zone, 60 deg, rough,	Ш	Limestone	
-			10	stepped, open	╂┼┤	- 73.5-74.8' - yellowish gray, (5Y 7/2),	1
-				73.5-75.0' - Fracture zone, various	Н	_ mild HCl reaction, extremely weak	_
				orientations		(R0), highly fractured, friable, silt and	
-			0	75.0-75.3' - Fracture zone, horizontal, rough, undulating, open	1	 clay along fracture planes and on fragments of rock 	1
-	R9-HQ			75.3' - Fractures, horizontal, rough,	╫	No Recovery 74.8-75.0'	1
-	5 ft	64	2	undulating, open	ш	- Limestone	_
	100%	٠.	-	75.9' - Fractures, <5 deg, rough, undulating,		75.0-76.4' - light olive gray to	
-				open	Ш	yellowish gray, (5Y 5/2 to 5Y 7/2),	1
-			10	77.45' - Fractures, <5 deg, rough, stepped,	HH	- fine grained, moderate HCl reaction,	1
-				open		extremely weak to very weak (R0 to	
1			2	77.7' - Fractures, 60 deg, rough, undulating, tight	Ш	R1), friable along fracture planes, voids <3/16" over 50-60% of surface,	R9: 4 minutes
80	80.0		-	78.0-79.0' - Fractures, 60 deg, rough,	\mathbb{H}	1-2 cavities (3/16"x3/16")	1
-39.2	00.0			stepped, open	口	76.4-79.0' - light olive grav to	-
-			1	79.3-79.65' - Fractures, <5 deg, rough,	ш	 yellowish gray, (5Y 5/2 to 5Y 7/2), 	-
			L' I	stepped, open	Н	fine to very fine grained, mild HCl	
1 -				80.1 - Fracture, <5 deg, rough, undulating,		reaction, very weak (R1), voids	
-			5	open 81.1-81.3' - Fractures, <5 deg, rough,	ш	— <3/16" over 25% to <5% of surface (decreasing with depth), >5 cavities	-
-				undulating, open	╆┯╢	(3/4"-2"x3/8") and 1/16"x1/16"	-
l _	R10-HQ 5 ft	36	2	81.5-81.7' - Fractures, horizontal, rough,		_ 79.0-79.5' - light olive gray to	
	100%	30	-	undulating, open	ш	yellowish gray, (5Y 5/2 to 5Y 7/2),	SC-3 collected at 82.7-
-				81.9-82.05' - Fractures, <5 deg, rough,	╁┼	 fine grained, mild HCl reaction, 	83.6'
-			1	undulating, open		_ extremely weak (R0), fragmented	-
l -				82.65' - Fractures, horizontal, rough, stepped, open	ш	79.5-80.0' - Same as 76.4-79.0' 80.0-82.4' - light olive gray to	_
			4.0	83.65' - Fracture, <5 deg, rough, undulating,	Н	yellowish gray, (5Y 5/2 to 5Y 7/2),	R10: Run time not
85	85.0		10	open		fine grained, mild HCl reaction,	recorded - Stop drilling for the day,
-44.2	00.0			83.8-84.7' - Fracture, 60 deg and 70 deg, —	╫	 extremely weak (R0), voids over 	4/10/07
_			0	rough, stepped, open	H	_ 10-15% of surface, >5 cavities up to	Water level 0.5' below
				84.95' - Fractures, 60 deg, rough, stepped,		1-3/4"x3/4"-1-3/16", interconnected 82.4-84.3' - light olive gray to	ground surface
				open	Н	yellowish gray, (5Y 5/2 to 5Y 7/2),	Resume drilling on 4/11/07
-			0	'		fine grained, mild HCl reaction, very	Water level 0.5' below
-	D44 110					weak (R1), voids <1/16" over 25-30%	ground surface
l _	R11-HQ 5 ft	64	1	87.25' - Fracture, rough, undulating, open,	Н	of surface, 3 to 4 cavities up to 3/8"x	
	74%	U-T		horizontal		3/16", trace fossils molds/casts	
1 -			1	99 15' Eracture zono 40 des zonos	口	- 84.3-85.0' - Same as 82.4-84.3'	DR: Soft at 88.2-90.0',
I -				88.15' - Fracture zone, 40 deg, rough, stepped, open	₽₩	except with >5 cavities (3/8"x3/8"), trace fossil molds/casts	assumed core loss from -
I -			NR	Stopped, open		- 85.0-88.2' - yellowish gray, (5Y 7/2),	this interval
						fine grained, mild HCl reaction, very	R11: 6 minutes
90	00.0		0	·	14	weak to weak (R1 to R2), voids	1
-49.2	90.0		Ť	90.0-94.0' - Fracture zone, gravel	H	— <1/16" over 15-20% of surface, >3	-
			>10			cavities (1/16"x3/16") interconnected,	1 4
			L_	stepped, open	Н	trace casts/molds No Recovery 88.2-89.5'	
1 -				90.8' - Fracture zone, 0-<5 deg, rough,	Ш	Limestone	1
1 -			2	undulating, open	口	89.5-90.0' - yellowish gray, (5Y 7/2),	1 -
-	B 40 1 10			91.1' - Fractures, 60 deg, rough, stepped,	Н	 fine grained, mild HCl reaction, 	-
I _	R12-HQ 5 ft	15	10	open	Н	extremely weak (R0), friable,	
I -	78%	10	10	91.5' - Fractures, 70 deg, rough, stepped, open, (7-1/5" long) from 91.3-91.9'		gravel-sized rock fragments with carbonaceous material over 15-20%	1
1 -	,			92.1' - Fractures, 0-90 deg, rough, stepped,	Ш	of surface	1 1
1 -			10	open from 92.1-92.7'	H	- Surface	-
I -			<u> </u>	92.7-92.9' - Fractures, 60 deg, rough,	\Box	_	
			NID	stepped, open	Н		R12: 10 minutes
95	05.0		NR	93.4-93.8' - Fractures, 0-90 deg, rough, stepped, open	Ш	_	1
90	95.0			элерреи, орен	+		

APPENDIX 2BB-291 Rev. 7



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-23 SHEET 6 OF 13

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723141.4 N, 458146.5 E (NAD83)

ELEVATION: 40.8 ft (NAVD88)

DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS: 0.5	ft bgs	s on 4	/10/07 START : 4/9/2007 END : 4/	17/20	07 LOGGER : R. McComb, C. Doug	herty
> O :=	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	TH.	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Ğ	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
THE STATE	CORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	×₩	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-54.2	O¬K	<u>~</u>	ΗД	THIOTALEON, OUT A FIGURATION OF THE HOLTINGEO	S	Limestone	
-54.2			2	95.4' - Fractures, horizontal, rough, stepped,	Ħ	- 90.0-91.0' - light olive gray, (5Y 5/2),	1 -
-				open .	世	very fine grained, moderate to strong HCl reaction, medium strong (R3),	SC-4 collected at 95.8-
-			1	95.8' - Fractures, horizontal, rough, undulating, open	₽	voids <1% to absent, (2-3 inches)	96.9'
-	D40 HO			96.9' - Fracture, 50 deg, rough, stepped	ш	carbonaceous laminae, 1 cavity 2-3/8"x3/8", 1 cavity 3/8"x3/16"	1 -
-	R13-HQ 5 ft	82	0		上	91.0-93.9' - yellowish, (5Y 7/2), fine	1 -
-	100%				╁╌	grained, mild HCl reaction, very weak to weak (R1 to R2), voids <1/16 over	1 -
_			3		H	25-30% of surface, several cavities	
_				98.5' - Fractures, 60 deg, rough, stepped, open	Ħ	(3/8"x3/8"), fragmented at bottom	l
_			10	98.7' - Fractures, rough, undulating, vertical	╨	No Recovery 93.9-95.0' Limestone	R13: 9 minutes
100_	100.0			98.9' - Fractures, <5 deg, rough, undulating, — open —	尸	95.0-96.9' - yellowish gray, (5Y 7/2), very fine to fine grained, mild to]
-59.2			>10	99.15-99.4' - Fracture zone, 60-70 deg,	厂	moderate HCl reaction, weak (R2),	
I -				rough, stepped 99.9-100.0' - Fracture, 60-70 deg, rough,		cavities <3/8"x3/8" (many infilled), fine grained contains voids over]
l _			>10	stepped, open	┢	15-20% of surface, very fine grain]
l _			- 10	100.0-101.0' - Fracture zone, 60-70 deg, rough, planar to undulating, open, some	F	rock contains less void percentage,]
l _	R14-HQ 5 ft	24	>10	black carbonaceous staining	H	trace fossil casts/molds. 96.9-100.0' - dusky yellow, (5Y 6/4),]
l _	60%	27	- 10	101.0-102.0' - 70-80 deg, 7-1/5"- 8-2/5" long 102.0-103.0' - fractures resulting in		fine grained, very weak to weak (R1]
l _				gravel-sized limestone fragments		to R2), voids <3/16" over 35-40% of surface, several cavities (1/16"x3/8"),	
l _			NR		口	one cavity through core, cavities	
l _			INIX		Ь	more abundant with depth. 100.0-103.0' - yellowish gray to	R14: 5 minutes
105_	105.0			_	ᅪ	dusky yellow, (5Y 7/2 to 5Y 6/4), fine grained, mild HCl reaction, very weak	
-64.2			3	105' - Fractures, rough, stepped, open 105.2' - Fractures, rough, planar, open	F	(R1), voids <3/16" over 25-30% of]
l _			5	105.2' - Fractures, 50 deg, rough, stepped,	F	surface, cavities (several) - 3/16"x3/16", black carbonaceous	00.5
l _			0	open .		laminae at 100.9'	SC-5 collected at 105.9- 107.4'
l _				_	╨	No Recovery 103.0-105.0' - Limestone]
l _	R15-HQ 5 ft	88	2	107.35-107.5' - Fractures, 30 deg, rough,	尸	105.0-109.9' - dusky yellow, (5Y 6/4),]
l _	98%	00		stepped, open	厂	fine grained, mild to moderate HCl reaction, very weak to weak (R1 to]
l _			0		上	R2), voids <1/16" over 25-30% of]
I -					<u> </u>	surface becoming less abundant with depth, cavities (>5) 3/16"x3/8"	
I -			0		F		R15: 5 minutes
	110.0		NR/	_	片	No Recovery 109.9-110.0'	_
-69.2			3	110.2' - Fractures, horizontal, rough,	片	Limestone - 110.0-115.0' - dusky yellow, (5Y 6/4),	
-				undulating, open 110.6-110.9' - Fracture zone, 70-0 deg,	片	fine to very fine grained, mild HCI]
-			>10	rough, stepped, open	F	reaction, very weak to extremely weak (R1 to R0), becoming weaker	
-				111.0-113' - Fracture zone, horizontal, rough, undulating, open	oxdot	with depth, voids <1/16" over 10-15%	_
-	R16-HQ 5 ft	35	>10		上	of surface, cavities (>5) below 114.0' (1/16"x1/8"), trace fossil mold/casts	_
-	100%				士	-	_
-			1	113.15' - Fracture, horizontal, rough,	\vdash	_	_
-				undulating -	F	 -	D40: 7 minutes
-			1		片	-	R16: 7 minutes
115	115.0			_	⊭		
						l .	



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-23

SHEET 7 OF 13

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723141.4 N, 458146.5 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 0.5	ft bgs	on 4/	10/07 START: 4/9/2007 END: 4/	17/20	07 LOGGER: R. McComb, C. Doug	herty
\$ D €	(%)			DISCONTINUITIES	၂ ပွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
-74.2	COR	RQ	FRA(PER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-74.2			>10	115.0-116.0' - Fracture zone, horizontal, rough, stepped, open	片	Limestone 115.0-116.0' - dusky yellow, (5Y 6/4), fine grained, mild HCl reaction,]
-	R17-HQ		>10	116.0-118' - Fracture zone, 90-<5 deg, rough, stepped, open		extremely weak (R0), abundant - cavities (>5) up to 3/4"-2"x 3/8"-3/4", voids over 60% of surface, fossil molds/casts	-
-	5 ft 66%	8	>10		片	into a control of the first state of the first stat]
_			>10			 (molds/casts) and organized shell material]
120	120.0		NR		\pm	 117.4-118.3' - light olive brown, (5Y 5/6), fine grained, mild HCl reaction, extremely weak (R0), friable, coarse 	R17: 4 minutes
-79.2			5	120.2' - Fractures, horizontal, rough, undulating, open		sand to gravel-sized fragments No Recovery 118.3-120.0' Limestone]
-			4	120.3' - Fractures, 40 deg, rough, stepped, open 120.5-120.65' - Fractures, horizontal, rough,	Ħ	120.0-121.6' - dusky yellow, (5Y 6/4), fine grained, weak (R2), voids up to 1/16" covering 15-20%, > cavities up]
-	R18-HQ 5 ft	40	10	stepped, open 120.75' - Fractures, 40-60 deg, rough, stepped, open		to 3/4-1-3/16"x3/8", fossil casts/molds 121.6-121.9' - dusky yellow, (5Y 6/4),	1
-	82%		0	121.05-121.4' - Fractures, <5 deg, rough, stepped, open 121.55-121.85' - Fractures, horizontal, rough,		fine grained, weak (R2), <10% voids over surface, no cavities at 121.0' 121.9-124.1' - dusky yellow, (5Y 6/4),	SC-6 collected at 123.0- 124.1' -
-			0 NR	planar, open 122.55' - Fractures, rough, stepped, open 122.8-103.0' - Fractures, horizontal, rough,	Ħ	fine grained, weak (R2), extremely weak (R0), at 122.6-123.0' No Recovery 124.1-125.0'	R18: 6 minutes
125 -84.2 -	125.0		10	open — 124.1' - Fracture, horizontal, rough, stepped, open		Limestone - 125.0-129.0' - dusky yellow, (5Y 6/4),	-
-			3	125.4-125.85' - Fracture zone, 0-<5 deg, rough, stepped to undulating, open 126.1-126.7' - Fracture zone, 50 deg, rough,		fine grained, very weak to extremely weak (R1 to R0), punctuated with thin beds up to 2-1/2" thick, fissile,]
-	R19-HQ 5 ft 80%	30	0	stepped, open 126.5-126.75' - Fractures, horizontal, rough, stepped, open		very weak, (R1), laminations (126.5-126.5', 126.8-127.5') mild to moderate HCl reaction, voids up to 1/16" over 30-40% of surface,	-
-	00 /8		2	128.35' - Fractures, 30 deg, rough, tight, undulating to stepped, clay and silt		cavities >5 (1/16"x3/16") fossiliferous (molds/casts) and shell material, laminated from 128.8-128.9'.]
	130.0		NR	128.75' - Fractures, 10 deg, rough, undulating, clay infilling, tight, 10% of surface <1/16" thick		No Recovery 129.0-130.0'	R19: 6 minutes
-89.2			>10	130.3-131.85' - Fracture zone, smooth, planar, open		Limestone - 130.0-131.5' - Same as 125.0-129.0']
_			10	404 051 Faratura of 1		131.5-131.9' - dusky yellow, (5Y 6/4),]
-	R20-HQ 5 ft 78%	28	1	131.85' - Fractures, <5 deg, rough, stepped, open	H	fine to very fine grained, punctuated with thin beds of fine grained laminations with voids]
-			2	132.85' - Fracture, rough, stepped, open 133.05' - Fractures, 0-90 deg, rough, stepped, open	Ħ	- 131.9-133.9' - Same as 125.0-129.0' except from 133.25-133.5 (<10% voids)]
135	135.0		NR	133.53' - Fractures, rough, planar, open		No Recovery 133.9-135.0' -	R20: 7 minutes
135	133.0						

APPENDIX 2BB-293 Rev. 7



PROJECT NUMBER: BORING NUMBER: 338884.FL A-23 SHEET 8 OF 13

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723141.4 N, 458146.5 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 0.5 ft bgs on 4/10/07 START: 4/9/2007 END: 4/17/2007 LOGGER: R. McComb, C. Dougherty DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT DESCRIPTION ROCK TYPE, COLOR. SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -94.2 Limestone 135.1' - Fractures, 50 deg, smooth, 2 135.0-136.4' - dusky yellow, (5Y 6/4), undulating, open fine grained, very weak to extremely weak (R1 to R0), trace fine grained 135.95' - Fractures, <5 deg, rough, undulating, open >10 laminations 136.4-139.4' - greenish gray, (5GY 6/1), very light gray mottled, very fine grained, strong HCI reaction, 136' - Fracture zone, gravels 136.4' - Fracture zone, 40 deg, rough, R21-HQ stepped, open SC-7 collected at 137.25-38 2 5 ft 136.9' - Fracture zone, 60-70 deg, rough, medium strong (R3), voids <3/16" 88% undulating, open over 3-5% of surface becoming more 137.1' - Fractures, 50 deg, rough, undulating, 4 common with depth, cavity open 1-3/16"-1-9/16", ovate shape (>5) 137.3' - Fractures, 30 deg, rough, undulating becomes numerous with depth, black R21: 9 minutes >10 to stepped, open carbonaceous material especially NR 138.1' - Fractures, <5 deg, rough, undulating, along fracture plane common below 140 140.0 138.5', HCl reaction becoming mild open -99 2 138.45' - Fractures, 30 deg, rough, stepped, with depth 10 open, dark brown to black stain over 60-70% No Recovery 139.4-140.0' of surface Limestone 140.0-143.1' - yellowish gray mottled with light olive gray, (5Y 7/2 with N8), very fine grained, moderate to strong 138.7' - Fractures, 80 deg, rough, stepped, 1 open 138.95' - Fractures, rough, undulating, open R22-H0 HCl reaction, weak to very weak (R2 139.1-140.3' - Fracture zone 76 1 5 ft 140.7' - Fractures, <5 deg, rough, undulating, to R1), interbedded/laminae of fine 100% open grained limestone, laminations from 141.7' - Fracture, horizontal, rough, 140.0-140.8' and 141.0-141.4', voids 1 undulating, open (<1/16") concentrated in fine grained 142.4' - Fracture, <5 deg, rough, stepped, material over 25% of surface, R22: 9 minutes open cavities less than <3/8", material is 5 143.6' - Fracture, <5 deg, smooth, medium strong to strong rock (R3 to 145 145 0 undulating, tight 104.2 144.1-144.85' - Fractures, <5 deg, rough, 143.1-145.0' - moderate olive brown, 2 undulating, open (5Y 4/4), mild HCl reaction, 144.9' - Fractures, vertical, rough, stepped, extremely weak (R0), friable, coarse open grained from 143.1-143.6 becoming 4 fine grained with depth, voids, 145.75-145.85' - Fractures, <5 deg, rough, undulating, open 146.0-146.5' - Fractures, <5 deg, rough, cavities over 70-80% from 143.6, R23-HQ diminishing to 10-15% with depth 2 62 5 ft 145.0-145.75' - light olive gray, (5Y undulating, open 100% 146.9' - Fractures, rough, planar, open 5/2), very fine to fine grained, mild 147.3' - Fractures, <5 deg, rough, undulating, HCl reaction, very weak (R1), voids 0 open over 10-15% of surface, <5 cavities 147.5-148.0' - Fractures, 75 deg, rough, 3/16"x3/16" R23: 5 minutes undulating, tight 145.75-147.3' - moderate olive 1 149.3' - Fracture, 20 deg, rough, planar, open brown, (5Y 4/4), mild HCl reaction, 150 150.0 extremely weak (R0), voids are 149.9' - Fracture, vertical, rough, stepped, 109.2 70-80% of surface open 3 147.3-150.0' - light olive gray, (5Y 150.3-150.7' - Fractures, smooth, planar to 5/2), very fine to fine grained, mild SC-8 collected at 150.7undulating, light tan to dark staining over HCl reaction, very weak (R1), fossils (casts/molds), becoming fragmented 151.8' 20-50% surface 0 at base, friable, weak (R2) 150.0-150.3' - light olive gray, (5Y R24-HQ 152.2' - Fractures, horizontal, rough, 42 3 5 ft 5/2), fine grained, mild HCl reaction, undulating, open 72% very weak (R1), voids over 10-15% 152.3' - Fractures, <5 deg, rough, undulating, of surface 1 open 152.4' - Fractures, 60 deg, rough, undulating, tight R24: 5 minutes NR 153.3' - Fracture, 0-90 deg, rough, stepped, open 155 155.0



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-23 SHEET 9 OF 13

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723141.4 N, 458146.5 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

	LEVELS: 0.5			/10/07 START: 4/9/2007 END: 4/			herty
				DISCONTINUITIES	Т	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) Q D	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-114.2 -	0116	œ	2	155.15' - Fractures, rough, undulating, open 155.7' - Fractures, 10 deg, smooth, planar,		150.3-150.7' - moderate olive brown, (5Y 4/4), fine grained, mild HCl reaction, extremely weak (R0), very thick laminations (wavy), voids up to	-
-	R25-HQ		2	open 155.8' - Fractures, rough, undulating 156.03' - Fractures, rough, stepped, open 156.7' - Fractures, <5 deg, rough, undulating,		 1/16" over 20-25% of surface, linear-shaped cavities up to 1-3/16"x3/16" 	-
- -	5 ft 60%	32	>10	tight 157.0-160.0' - Fracture zone, 90-0 deg, rough, open, gravel sized fragments		 Limestone 150.7-152.2' - yellowish gray, (5Y 7/2), mottled, fine to medium grained, mild HCl reaction, very weak to weak 	-
-			NR		Ė	(R1 to R2), voids over 35% of surface 152.2-153.6' - light olive brown, (5Y	R25: 5 minutes
160 <u> </u>	160.0		0		Ė	7/2), very weak (R1), voids over 25-30% of surface, cavities (3/16"x3/16"), some black organic material throughout	-
-	Doc 110		0		F	No Recovery 153.6-155.0' Limestone 155.0-155.4' - Same as 152.2-153.6' 155.4-156.0' - yellowish gray, (5Y	-
-	R26-HQ 5 ft 80%	50	>10	horizontal undulating to stepped, open		 7/2), very fine grained, strong HCI reaction, weak to medium strong (R2 to R3), voids/cavities absent, 	-
-			10 NR	163.3' - Fracture, rough, stepped, open, horizontal, fracture connecting 163.3-163.4' 163.4-163.65' - Fractures, <5 deg, undulating, smooth to rough		laminated, weak/unbroken fracture separated by overlying limestone 156.0-158.0' - light olive brown, (5Y 7/2), very weak (R1), voids over	R26: 7 minutes
165 -124.2 -	165.0		10	163.7-163.85' - Fractures 163.85' - Fractures, horizontal, rough, undulating, open		25-30% of surface, cavities — (3/16"x3/16"), some black organic material throughout No Recovery 158.0-160.0'	-
-			0	165.1-165.75' - Fracture zone, 0-90 deg, rough, undulating, open		Limestone 160.0-160.2' - light olive brown, (5Y 7/2), very weak (R1), voids over	SC-9 collected at 165.7- 167.0'
- -	R27-HQ 5 ft 100%	26	>10	167.0-168.3' - Fracture zone, 90-0 deg, rough, undulating to stepped, open		 25-30% or surface, cavities (3/16"x3/16"), some black organic material throughout 160.2-162.15' - yellowish gray, (5Y 	-
-			>10	168.3' - Fracture zone, horizontal, smooth, undulating 168.7' - Fracture zone, vertical, stepped,		7/2), mild HCl reaction, weak to medium strong (R2 to R3), voids < <1/16" over <1% of surface, < 5 cavities (3/16"x3/16")	- R27: 9 minutes
-170_ -129.2	170.0		3	open 168.85' - Fracture zone, horizontal, rough, undulating, open 169.1-169.65' - Fractures, horizontal, rough,		162.15-164.0' - yellowish gray to — dusky yellow, (5Y 7/2 to 5Y 6/4), fine to very fine grained, extremely weak	-
- -			10	undulating, open 170.1' - Fractures, <5 deg, rough, undulating, open		to medium strong (R0 to R3), laminated, void percentage from <1% up to 30-40%, cavities (3/8"x3/16"), primarily in upper 1.0' of	-
-	R28-HQ 5 ft 92%	30	10	170.35' - Fractures, 10 deg, smooth, planar 170.9' - Fractures, rough, undulating, open 171.3' - Fractures, rough, stepped, open 171.45' - Fractures, smooth, planar, open		Section No Recovery 164.0-165.0' Limestone	-
- -	32,3		5	172.0-172.2' - Fractures, <5-90 deg, rough, undulating to stepped, open 172.25-173.0' - Fractures, horizontal, intersecting angles	Ħ	 165.0-168.0' - yellowish gray, (5Y 7/2), fine to very fine grained, mild HCl reaction, weak to very weak (R2 to R1), voids <1/16" over 10-15% of 	-
175	175.0		1 NR	173.2-173.8' - Fractures, rough, undulating, vertical fracture along face of core, open	Ħ	surface, >5 cavities 3/8"x 1/16", fossils (mold/cast)	R28: 7 minutes
					L		



338884.FL A-23

SHEET 10 OF 13

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723141.4 N, 458146.5 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION: Vertical

CORING	NETHOD A	ND EC	JUIPIV	MENT: CME 550X S/N 340253, mud rotary, HQ tools, HV	Casii	<u>ıg</u>	ORIENTATION: Vertical
WATER	LEVELS: 0.5	ft bgs	s on 4	/10/07 START : 4/9/2007 END : 4/	17/200	7 LOGGER : R. McComb, C. Doug	herty
300	<u></u>			DISCONTINUITIES	U	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
뿝병흔	7. A.,A	(%	N N	DEDTIL TYPE OBJECTATION BOUGHNESS	1일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YFA YFA	Ze F	Q D (%)	P. F.	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	l BC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SUF	COF	S. O	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-134.2				173.8' - Fractures, horizontal, rough,		168.0-170.0' - yellowish gray, (5Y	
-			1	undulating, open		- 7/2), very fine grained, weak (R2)	-
l _				173.9' - Fractures, smooth, planar, open	₽	170.0-174.0' - yellowish gray, (5Y	
			>10	174.3' - Fracture, <10 deg, smooth, planar, tight, slightly inclined -	Ш	7/2), light olive gray mottled, fine to	
1 7			> 10	175.2' - Fracture, smooth, undulating, open,	Н	 very fine grained, mild HCl reaction, weak (R2), voids up to 1/16" over 	1
-	R29-HQ			sand-sized grains		10-15%, cavities (>5) 3/16"x3/16",	1
-	5 ft	60	0	176.0-177.0 - Fracture zone, 0-90 deg,	Ш	 fossil (casts/mold) concentrated at 	-
-	91%			undulating, smooth to rough, open	H	171.6-172.0' Limestone	-
_			3	_	口	- 174.0-174.6' - yellowish gray, (5Y	
				178.6-178.75' - Fractures, 10 deg, smooth,	Н	7/2), moderate to strong HCl	
			3	planar, tight	Ш	reaction, weak (R2), laminated, voids	R29: 9 minutes
100	400.0		NR	178.85' - Fractures, <5 deg, rough, undulating to stepped, open	╁┼	 (<1/16") <1% of surface becoming more numerous, 5-10% is brown 	1 1
180 <u></u> -139.2	180.0		1417	179.25-179.35' - Fractures, horizontal,	口	laminae becoming thicker with depth.	⊢
			2	smooth, planar, open	₽₽	No Recovery 174.6-175.0'	-
_				179.45' - Fractures, rough, stepped, open	Ш	Limestone]
				180.8' - Fractures, rough, undulating, open 180.9' - Fractures, <5 deg, rough, stepped,	\mathbb{H}	175.0-175.3' - dusky yellow, (5Y 6/4), mild HCl reaction, extremely weak	
			0	open	Н	(R0), friable	1
-	R30-HQ			· -	口	175.3-176.9' - yellowish gray, (5Y	1
-	5 ft	54	1	-	+	7/2), very fine grained, strong HCl	-
-	100%			182.95' - Fracture, <5 deg, rough, undulating,		reaction, medium strong (R3), voids confined to cavity infilling	-
l _			>10	open - Hacture, \5 deg, rough, undulating,	Н	176.9-179.55' - yellowish brown to	
			10	183.0-184.0' - Fracture zone, 0-<5 deg,	Ш	dusky yellow, (5Y 7/2 to 5Y 6/4),	
				smooth to rough, undulating stepped, open	Н	strong HCl reaction, weak to medium strong (R2 to R3), voids 1/16" over	R30: 9 minutes
105	105.0		>10	-	ш	5-10% of surface, cavities abundant	1
185 <u> </u>	185.0			185.0-186.0' - Fracture zone, gravels, vertical		— in upper 0.5'	-
_			>10	orientation -	Ш	(1-3/16"-1-9/16'x3/8-3/4") less	-
_				<u> </u>	H	frequent with depth No Recovery 179.55-180.0'	
			. 10	186.0' - Fracture zone, 0-90 deg, rough,	Н	Limestone	
			>10	stepped, open 186.1' - Fracture zone, vertical, rough,	Ш	180.0-181.7' - yellowish brown to	1
-	R31-HQ			generally stepped to undulating	H	- dusky yellow, (5Y 7/2 to 5Y 6/4),	1
-	5 ft	26	>10	186.4' - Fracture zone, horizontal, rough,	口	strong HCl reaction, weak to medium strong (R2 to R3), voids 1/16" over	1
-	100%		_	planar, open 187.5' - Fracture zone, 60 deg, rough,	╀┼┤	- 5-10% of surface, cavities (1-3/16" to	-
_			10	undulating, open	口	1-9/16"x3/8" to 3/4") abundant in]
				188.0-188.7' - Fracture zone, 60 deg and 70	Н	upper 0.5' less frequent with depth 181.7-183.4' - yellowish gray mottled	l J
]				deg, rough, undulating to stepped, open	口	with pale greenish yellow, (5Y 7/2	R31: 8 minutes
190	190 0		3	-	₩	with 10Y 8/2), strong HCl reaction,	Stopped drilling for the day
-149.2	180.0			100.1' Fractures rough to smooth	団	 weak to medium strong (R2 to R3), voids up to 1/16", ovate cavities up to 	4/11/07 —
-			2	190.1' - Fractures, rough to smooth, undulating, open	╂┼┼	3/4"-1-3/16", fossil (cast), voids	Resume drilling 4/12/07 Water level 0.5' below
-				190.75' - Fractures, 10 deg, smooth, planar,	世	183.4-185.0' - yellowish brown to	ground surface
			10	open	Щ	dusky yellow, (5Y 7/2 to 5Y 6/4),	
			'0	190.85' - Fractures, <5 deg, rough, stepped, open	Ш	strong HCl reaction, weak to medium strong (R2 to R3), interbeds of	1
-	R32-HQ			191.0-191.2' - Fracture zone, 60 deg, rough,	口	limestone similar to 181.7-183.4'	1 1
-	5 ft	15	>10	stepped, open	╁┼┼	185.0-186.0' - light olive gray, (5Y	
-	100%			191.4' - Fractures, 10 deg, smooth, planar,	口	5/2), fine grained, mild HCl reaction,	1
-			>10	tight 191.7' - Fractures, 10 deg, smooth,	₽	extremely weak (R0), voids, cavities (up to 3/8"-3/4"x3/8") over 50-60% of	
				undulating, open	口	surface, fossils (mold/casts)	l J
1 7				192.0' - Fracture zone, 90-<5 deg, rough,	Ш	, - (R32: 6 minutes
195	105.0		>10	stepped, open	団	-	1 1
195	180.0				╁		
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PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-23

SHEET 11 OF 13

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723141.4 N, 458146.5 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 0.5	ft bg	s on 4/	10/07 START : 4/9/2007 END :	4/17/20	07 LOGGER : R. McComb, C. Doug	pherty
₹ □₽	(%)			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
ELO N (f	N, AND 3Y (%		ZES T	DESCRIPTION	O FC	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP' SURI ELE\	COR LEN(REC	RQI	FRA(PER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNES	s X	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-154.2				192.25-192.4' - Fracture zone, 60 deg, rough,	1	186.0-188.0' - yellowish gray, (5Y	
-			>10	stepped, open, horizontal 192.6' - Fracture zone, 60 deg, rough,	\perp	- 7/2), very fine grained, strong HCl reaction, medium strong (R3), voids	=
-				stepped, open	1	<1/16" over <1% of surface	-
-			>10	192.6-195.0' - Fracture zone, various orientation from subhorizontal to very vertical.	1	- 188.0-190.0' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction,	
-	R33-HQ		. 40	stepped to undulating, rough to smooth, open	1	extremely weak (R0), voids, cavities	
-	5 ft 86%	0	>10	195.0-199.5' - Fracture zone, smooth, undulating	1	- (up to 3/8"-3/4"x 3/8") over 50-60% of surface, fossils (mold/casts)	
			>10			Limestone 190.0-190.85' - light olive brown, (5Y	
					\mathbb{R}	4/4), fine grained, mild HCl reaction,	
_			>10			extremely weak to very weak (R0 to R1), laminated, voids and cavities up	R33: 12 minutes
200	200.0		NR		_	to 2"x3/8" (coating) >5 at	Stanged drilling LIO as
-159.2 -			>10	200.0-201.0' - Fracture zone	\perp	190.3-190.4' becoming smaller with depth	Stopped drilling HQ on 4/12/07
_				2010 200 21 5	\perp	190.85-191.4' - light olive brown, (5Y 4/4), fine grained, no to mild HCl	Resume drilling on 4/17/07 C. Dougherty begins
_			>10	201.0-202.0' - Fracture zone		reaction, extremely weak (R0), voids	logging _
_						1/16" or less over 3-5% of surface 191.4-195.0' - grayish yellow, (5Y	_
_	R34-HQ 5 ft	0	>10	202.0-203.0' - Fracture zone		_ 7/2), very fine to fine grained, very	_
_	64%			000 0 000 01 5	片	weak to extremely weak (R1 to R0), laminated from 191.4-191.9,	_
-			0	203.0-203.2' - Fracture zone	-	becoming massive-bedded with	_
-			NR		┵	depth (gravelly) with fossil mold/casts 195.0-199.3' - yellowish gray, (5Y	D24: 0 minutos
-			```		\perp	7/2), very fine grained, moderate to strong HCl reaction, very weak (R1),	R34: 9 minutes
205 <u> </u>	205.0			00541.5	- □	easily breaks along fracture plane,	_
-			5	205.1' - Fractures, rough, undulating, horizontal, open	-	voids over 1-3% to absent, cavities rare <5 (3/16"x3/16"), trace	_
-				205.5' - Fractures, horizontal, rough,	\pm	 laminations, trace calcareous stain 	-
-			7	undulating, open 205.8' - Fractures, horizontal, smooth,	\pm	No Recovery 199.3-200.0'	-
-	R35-HQ			stepped 205.9' - Fractures, horizontal, smooth,	+	 200.0-201.0' - pale olive, (10Y 6/2), 	_
-	5 ft 72%	8	>10	stepped, black staining	+	fine grained, moderate HCl reaction, medium strong (R3), 1/4" thick zones	-
-	1270		>10	206.0' - Fractures, horizontal, smooth, stepped, slight black staining	#	 with voids up to 1/16" 201.0-203.2' - light olive gray, (5Y 	-
-			- 10	206.2' - Fractures, 45 deg, rough, undulating,	+	6/1), fine to medium grained,	-
-			NR	black staining 206.4-206.5' - Fractures, horizontal, smooth,	\perp	- moderate HCl reaction, weak (R2), 20% voids up to 1/16", collapse	R35: 8 minutes
210 -	210.0		````	undulating, <1/16" coating of silt size particles on surface	+	breccia zone from 202.0-203.2'	1
-169.2	_ 10.0			. 206.8' - Fractures, horizontal, rough,	丌	— No Recovery 203.2-205.0' Limestone	
			>10	undulating 207.0-208.6' - Fracture zone	\perp	205.0-207.0' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction,	
			_	211.0' - Fractures, 20 deg, smooth,	1	weak (R2), voids to 1/16"x1/16" over	
			5	undulating 211.2' - Fractures, horizontal, rough,	\perp	25% of surface, few cavities 1"x1/4", poorly fossiliferous (molds/casts),	1
	R36-HQ 5 ft	40	3	undulating, brown staining, on 50% of surface	\perp	voids over 3-5% of surface	
	90%	40	٦	211.5-211.9' - Mechanical break, 35 deg,		207.0-208.6' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction,	
			3	rough, undulating 212.5' - Fractures, horizontal, rough,	<u></u>	weak (R2), moderately fossiliferous	
				undulating, fine to medium grain particles on	片	molds/casts, voids over 35% of surface	
			2	surface 213.2' - Fractures, horizontal, smooth,	\perp	No Recovery 208.6-210.0'	R36: 8 minutes
215	215.0		NR	stepped	\perp		_
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Rev. 7



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-23

SHEET 12 OF 13

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723141.4 N, 458146.5 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

				HENT : CIVIE 330A S/N 340233, Hidd Totally, Fig tools, Fiv			ORIENTATION : Vertical
WATER	LEVELS : 0.5	tt bg	s on 4		1//20		
≩ Q≨	CORE RUN, LENGTH, AND RECOVERY (%)			DISCONTINUITIES	8	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	ZAN.	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H B	JA F. F.	(%) 🛭	E S	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30L	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
LEV	ECC ECC	Ø	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	×ΜΕ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-174.2	078	<u>~</u>	ш.		S		<u> </u>
-174.2			>10	213.6' - Fractures, horizontal, smooth, planar, thin, (1/16" silt infill)		Limestone - 210.0-211.2' - yellowish gray, (5Y	
				213.8' - Fractures, horizontal, rough.	ш	7/2), mild to moderate HCl reaction,	
			. 40	undulating, silt to fine grained particles	Ш	weak (R2), some iron staining on	
-			>10	214.1' - Mechanical break, horizontal, rough, undulating	Н	 fracture planes 211.2-213.2' - light olive gray, (5Y 	1
-	R37-HQ			215.0-216.0' - Fracture zone		5/2), fine grained, mild HCl reaction,	SC-10 collected at 217.0-
-	5 ft	17	1	216.9' - Fracture zone, iron staining on some	ш	 weak (R2), highly fossiliferous 	217.8'
-	70%		_	surfaces 217.8' - Fracture, 45 deg, rough, undulating,	団	(molds/casts) Limestone	-
_			1	brown iron staining	\vdash	 213.2-214.5' - yellowish gray, (5Y 	-
_				218.2' - Fracture, horizontal, rough,		7/2), mild to moderate HCl reaction,	
			NR	undulating	Н	weak (R2), some iron staining on fracture planes	R37: 9 minutes
220	220.0				Д	No Recovery 214.5-215.0']
-179.2				220.0-221.8' - Fracture zone, fracture zone,	Н	Limestone	
-			>10	brown iron, staining on some partings, fractures appear to be mainly along bedding	П	 215.0-215.7' - light olive gray, (5Y 5/2), fine to medium grained. 	1 1
-				planes	Н	moderate HCl reaction, weak (R2),	1 1
-			>10	, ·	田	 15% voids up to 1/16", moderately fossiliferous 	1
-	R38-HQ				Н	215.7-216.9' - yellowish gray, (5Y	-
-	5 ft	35	1	223.3-223.0' - Mechanical break, rough,	H	_ 7/2), fine grained, moderate HCl	
l _	86%			uneven	Ш	reaction, weak (R2), carbonate derived silt zone from 216.0-216.6' is	
			2		Щ	laminated	
			_	223.5' - Fractures, horizontal, smooth,	Ш	216.9-217.8' - yellowish gray, (5Y	1
1 7			>10	undulating, iron staining	1 + 1	7/2), weak (R2), uneven bedding plane, laminated, black staining	R38: 6 minutes
225	225.0		NR		Ħ	along bedding planes, <5% voids	1 1
-184.2	220.0			225.0-227.5' - Fracture zone, no fragments	Н	217.8-218.5' - yellowish gray, (5Y	
-			>10	larger than 3" on the longest direction, about	田	_ 7/2), weak (R2), 10% voids, fractured, poorly fossiliferous	1
-				50% of volume is fragments 1" or less	\Box	 No Recovery 218.5-220.0' 	1 -
-			>10		Ħ	Limestone	-
	_				Ш	220.0-221.3' - yellowish gray, (5Y – 7/2), moderate HCl reaction, weak	
	R39-HQ 5 ft	0	>10		Д	(R2), laminated bedding some are	
	50%	J			Ш	uneven, voids over 20% of surface,]
1 7					\mathbb{H}	 iron staining on bedding plane, poorly fossiliferous, fractures are along 	1
-			NR			bedding plane	1 1
-					╨	 221.3-223.5' - light olive gray, (5Y 5/2), fine grained, mild to moderate 	R39: 13 minutes
-					口	HCl reaction, weak (R2), voids 1/16"	-
230 -189.2	230.0			230.0-232.0' - Fracture zone, rock fragments,	\vdash	— over 20% of surface, cavities	⊢
.55.2			>10	with some 1-3" long sections of core	F	3/8"x3/4" over 5% highly fossiliferous (molds/casts)	-
				Ĭ	Н	 223.5-224.3' - light olive gray, (5Y 	
_			>10		Д	5/2), fine grained, moderate HCl]
			10			reaction, weak (R2), laminated, no voids, non fossiliferous]
]	R40-HQ			232.0-233.4' - Fracture zone, carbonate	\mathbb{H}	No Recovery 224.3-225.0'	1
-	5 ft 68%	0	>10	derived fine to medium grain particles with some rock fragments	Ш	Limestone	1 1
-	0070		>10	Some rock magnificates	Ш	225.0-225.7' - light olive gray, (5Y 5/2), fine grained, moderate HCl	Sample pulverized below
-					団	reaction, weak (R2), fragments have	232.9'
-			ND		H	_ voids 15% below 225.4'	R40: Run time not
-			NR		H	<u>-</u>	recorded -
235	235.0				Н		

APPENDIX 2BB-298

Rev. 7



338884.FL A-23

SHEET 13 OF 13

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723141.4 N, 458146.5 E (NAD83)

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER LEVELS: 0.5 ft bgs on 4/10/07 START: 4/9/2007 END: 4/17/2007 LOGGER: R. McComb, C. Dougherty DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -194.2 235.0-236.1' - Fracture zone, rock fragments, 225.7-227.5' - yellowish gray, (5Y >10 irregular shape, generally 2" length or less 7/2), fine grained, moderate HCI reaction, weak (R2), voids, >10 casts/molds, iron staining on partings, voids <5% of surface, poorly fossiliferous No Recovery 227.5-230.0' R41-HQ 5 ft 0 Limestone 230.0-231.9' - light olive gray, (5Y 22% NR 5/2), fine grained, moderate HCI reaction, weak (R2), zone of voids over 40% of surface from 230.7-231.1' R41: 5 minutes Limestone 231.9-233.4' - dusky yellow, (5Y 6/4), 240 240.0 fine grained, moderate HCI reaction, -199 2 240.0-243.0' - Fracture zone, mostly rock very weak (R1) >10 fragments 240.0-243.0', with 2 pieces of core No Recovery 233.4-235.0' about 3" long Limestone 235.0-236.1' - yellowish gray, (5Y >10 7/2), fine grained, mild to moderate HCl reaction, weak (R2), fragments R42-H0 have 10% voids, poorly fossiliferous >10 0 5 ft No Recovery 236.1-240.0' 68% 242.7-245.9' - Fracture zone, top and bottom Limestone 2 are 10 to 20 degrees from horizontal, 240.0-241.3' - Same as 235.0-236.1' 241.3-242.0' - yellowish gray, (5Y respectively 243.0-243.1' - Fractures, horizontal, smooth, 7/2), fine grained, very weak (R1), undulating, carbonate derived fine grain NR R42: 6 minutes poorly fossiliferous particle on faces of fracture, bedding plane 242.0-242.5' - light olive gray, (5Y 5/2), fine grained, medium strong 245 245.0 204.2 245.0-248.0' - Fracture zone, rock fragments (R3), poorly fossiliferous, iron >10 staining along bedding planes, bedding planes are uneven and undulating 242.5-243.4' - yellowish gray, (5Y >10 7/2), fine grained, mild to moderate R43-HQ HCl reaction, weak (R2), voids over >0 0 5 ft 50% of surface, moderately 60% fossiliferous (casts/molds) No Recovery 243.4-245.0' Limestone 245.0-248.0' - yellowish grey, (5Y NR R43: 4 minutes 7/2), fine to medium grained, mild to moderate HCl reaction, very weak 250 250.0 (R1), fractures, massive, poorly -209.2 fossiliferous (casts) No Recovery 248.0-250.0' Bottom of Boring at 250.0 ft bgs on 4/17/2007



PROJECT NUMBER:	BORING NUMBER:						
338884.FL	A-24	SHEET	1	OF	9		

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723114.5 N, 458174.3 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 4.0 ft bo	gs on 04/2	20/07	START : 4/18/2007 END : 4/20/2007 LOGGER : C. Dougherty	_
				STANDARD	SOIL DESCRIPTION 5 COMMENTS	
LOW AND N (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		
ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND	
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	
40.6	0.0			(14)	Poorly Graded Sand With Silt (SP-SM)	┥
-		1.1	SS-1	2-2-3	0.0-1.1' - medium light gray, (Nè), moist, loose, fine grained, no HCl reaction, 5% nonplastic fines,	┨
-	1.5			(5)	organics roots decreasing with depth, sand is silica	1
-	1.0				-	1
-					1 1	1
-					1	1
					1	1
					1	1
]]
5	5.0					
35.6				2-2-2	Silty Sand (SM) 5.0-6.1' - yellowish gray, (5Y 7/2), wet, very loose, fine	4
_		1.1	SS-2	(4)	grained, no HCl reaction, 25% low to nonplastic fines,	4
_	6.5				trace iron nodules, trace roots, sand is silica	4
_						4
-						4
_					-	\exists
-					-	┪
-						Ⅎ
	40.0				- 1	\exists
10 <u> </u>	10.0				Silty Sand And Limestone (SM)	\exists
-		1.0	SS-3	3-5-4	10.0-10.95' - light gray, (N7), wet, loose, very fine to fine grained, moderate to strong HCl reaction, mixed	1
-	11.5			(9)	│ \ with yellowish gray (5Y 8/1) fine to medium sand sized /	1
_					\ carbonate grains, 24% fines, 30% fine to coarse \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	1
					bottom of sample, sand is silica	٦
_					<u> </u>	
]	
-]]	4
15 <u> </u>	15.0				SiH (ML)	\dashv
20.0			06 /	40-49-17	15.0-16.5' - very pale orange, (10YR 8/2), wet, hard,	4
-		1.5	SS-4	(66)	rapid dilatancy, moderate HCl reaction, 5% gravel,	4
-	16.5				nonplastic, all carbonate	-
-					-	+
-						\dashv
-						+
-						1
-					1	1
20					1	1
						\dashv
						- 1



SOIL BORING LOG

SHEET 2 OF 9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723114.5 N, 458174.3 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION : Vertical

						ry, auto hammer, AWJ roc			ORIENTATION: Vertical
WATER	LEVELS	: 4.0 ft bo	gs on 04/2		START : 4/18/2007	END: 4/20/2007	LOGGEF	{ : C.	Dougherty
≥Q⊋	CAMPIE	INTERVA	1 (4)	STANDARD PENETRATION		SOIL DESCRIPTION		90	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE		. ,	TEST RESULTS	SOIL NAME.	USCS GROUP SYMBOL,	. COLOR.	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
TH B		RECOVE	<u> </u>		MOISTURE C	ONTENT, RELATIVE DE	NSITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND
LEVEN I			#TYPE	6"-6"-6" (N)	CONSISTENCY	/, SOIL STRUCTURE, MII	NERALOGY	SYM	INSTRUMENTATION
20.6	20.0			(. 1)		ments And Silt (ML)			Casing set at 20' below ground surface
-		1.5	SS-5	39-20-13	20.0-20.5' - dusky	y yellow, (5Y 6/4), fine to e to strong HCl reaction	o coarse	Ш	
-	21.5			(33)	limestone fragme		i, arigular,	1111	1
-	21.5				Silt (ML)	45 0 40 51		Ш	-
-					strong HCl reaction	e as 15.0-16.5' except n on, 1/2" fragments of co	parse sand to	1	-
-					fine limestone gra	avel at 20.6 and 21.0, a	all carbonate	1	-
-							-	t	1
-							-	l	1
-							-	1	1
25	25.0						-	1	1
25 <u> </u>	20.0				Sandy Silt (ML)			Ш	7
-		1.1	SS-6	10-10-4	25.0-26.1' - yellov dilatanov modera	wish gray, (5Y 7/2), wet, ate HCl reaction, 31% fi	stiff, rapid - ne to medium	1	1
-	26.5			(14)	grained sand, nor			₩	1
-	20.0				1		-	1	1
-							-	1	1
-							-	1	1
-							-	1	1
-							-	1	1
							-	1	1
30	30.0						-	1	
10.6					Silt With Sand (M	ML) e as 25.0-26.1' except 2	10. 25% fine to	\prod	Drilling ends 4/18/07 Drilling resumes 4/19/07 at 07:35 hrs
		1.1	SS-7	5-6-25 (31)	coarse grained sa		.0-25 % IIIIe to		Drilling resumes 4/13/07 at 07.33 files
	31.5			(- /			_	Г	
							_		
_							_		_
_							_		_
_							_		_
									_
							-		_
35	35.0			00.70/7	0:15:0 !! 0	(OM)	_	l _{arr}	
5.6	35.6	0.6	SS-8	22-72/7 (72/7")	Silty Gravelly Sa 35.0-35.6' - pale	vellowish brown, (10YR	6/2), wet.	Ш]
-					\ very dense, mild	to moderate HCI reaction	on, 30% fine]
-					carbonate	gravel, 30% low plastic	innes, all		
-									Duillania Damania Organia
-							-		Driller's Remark: Organic material in cuttings at about 37' below ground surface
-							-		
-							-	-	
-							-	-	-
-							-	-	-
40								\vdash	
		L						1	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-24	SHEET	3	OF	9

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723114.5 N, 458174.3 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 4.0 ft bo	gs on 04/2	20/07	START : 4/18/2007 END : 4/20/2007 LOG	GER	: C.	Dougherty
>				STANDARD	SOIL DESCRIPTION		ဗ္	COMMENTS
N (#	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
TH BE		RECOVE			MOISTURE CONTENT, RELATIVE DENSITY OR		BOL	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		SYM	INSTRUMENTATION
0.6	40.0				Sandy Silt (ML)	一	Ш	
-]	1.5	SS-9	20-35-34 (69)	40.0-41.5' - pale yellowish brown, (10YR 6/2), wet, hard, rapid dilatancy, moderate HCl reaction, 25-30%	. 1		<u> </u>
	41.5			(00)	fine to medium grained sand, low plastic, trace organics, all carbonate]	Ш	
l -					organios, an oarbonate			_
-						4		_
-	-					4		-
-	_					\dashv		-
-						-		-
45	45.0					-		-
-4.4	45.0				Silty Sand (SM)		П	
-	-	1.5	SS-10	3-9-27	45.0-46.5' - palé yellowish brown, (10YR 6/2), wet, dense, moderate HCl reaction, 40% low plastic fines,	-		⁻
-	46.5			(36)	fine to coarse grained sand, trace fine gravel, all	1		-
-					carbonate	-1	111	⁻
								_
_						4		_
-						4		_
-	-							-
-						-		-
50 -9.4	50.0				Sandy Silt (ML)	\dashv	Ш	
-		1.4	SS-11	47-32-49	50.0-51.4' - light olive gray, (5Y 5/2), trace black iron	-		-
-	51.5		00 11	(81)	mottling, moist, hard, rapid dilatancy, moderate HCl reaction, 30% fine to medium grained sand, 50%	Ⅎ		-
-	31.3				coarse grained sand in last 3.6" of sample, all carbonate	/1		⁻
-	-				(Caroniala	_ 1		-
]		
								_
_						4		_
-						4		-
55 <u> </u>	55.0	0.4	SS-12	50/5	Sandy Silt (ML)	\dashv	П	
'''-	55.4	0.4	33-12	(50/5")	¬ 55.0-55.4' - pale to moderate vellowish brown. (10YR)	ſŦ	Ш	-
-	-				6/2 to 5/4), wet, hard, moderate HCI reaction, 35% fine to medium grained sand, nonplastic, trace	/-		-
-					organics in lenses <1/16", all carbonate	╛┪		-
-	-					\exists		-
-	-					1		-
1 -	1					1		·
]		
60								



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-24

SHEET 4 OF 9

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723114.5 N, 458174.3 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical

						tary, auto naminer, AVVJ ro			_	Onientation : vertical
WATER	LEVELS	: 4.0 ft bg	gs on 04/2		START : 4/18/2007	END: 4/20/2007 SOIL DESCRIPTION	LOGG	EK:	<u>(; </u>	Dougherty COMMENTS
≥ Ω€	044451	INTERVI	1 (4)	STANDARD PENETRATION		GOIL DEGONIF HON		\dashv	5	CONINICIALO
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,				SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H B		RECOVE	ERY (ft)		MOISTURE	CONTENT, RELATIVE DE	NSITY OR		젊	DRILLING FLUID LOSS, TESTS, AND
EPT SURF			#TYPE	6"-6"-6" (N)	CONSISTENC	CY, SOIL STRUCTURE, M	INERALOGY		S.Y.W	INSTRUMENTATION
-19.4	60.0	0.4	CC 10	34-50/2	Silt (ML)			+		
-	60.7	0.4	SS-13	(50/2")	60.0-60.4' - mod	derate yellowish brown, (10YR 5/4),	ſΪ	П	-
-						dilatancy, moderate HC medium grained sand, 1/		H	١	-
-					organic materia	l at top 3.6" of samples,	trace iron	1	١	-
-					laminated, all ca	bedded appearance, irre arbonate	guiariy	+	١	Driller's Remark: Organics in cuttings at
-								+	١	about 62' below ground surface -
-								+	١	-
-								+	١	-
-								+	١	-
								+		-1
65 <u> </u>	65.0				Silty Sand (SM))		+	П	\dashv
		1.1	SS-14	13-15-13	65.0-65.7' - yello	owish gray, (5Y 7/2), wet	, medium	\perp		-
-		'.'	33-14	(28)	dense, fine to m	nedium grained, moderat ow plastic fines, trace co	e HCI arse grained	/ ‡	Щ	-
-	66.5				\sand at 65.4', al	Il carbonate		/-	١	-
-					Silt With Sand	(ML) owish gray, (5Y 7/2), wet	hard rapid	-	١	-
-					dilatancy, mode	erate HCI reaction, 26% f	ine to medium	-	١	-
-					grained sand, lo	ow plastic fines, all carbo	nate	+	١	-
-								-	١	-
-								+	١	-
-	70.0							+	١	-
70 <u> </u>	70.2	0.1	SS-15	50/2	_ Limestone Fraç	gments		7	П	
	70.2			(50/2")	\ 70.0-70.1' - light \staining	t olive gray, (5Y 5/2), bla	.ck iron /	/	١	-
-					Begin Rock Cor	ring at 70.0 ft bgs		+	١	-
-					See the next sh	eet for the rock core log		4	١	-
-								4	١	-
-								-	١	-
-								+	١	-
-								+	١	-
-								+	١	-
-								+	١	-
75 <u> </u>								+	١	-
								+	١	-
_								+	١	-
_								+	١	-
-								+		-
-								+		-
-								+		-
-								+		-
-								4		-
-								4	1	-
80								+	4	
			l		I .					



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-24

SHEET 5 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723114.5 N, 458174.3 E (NAD83)

ELEVATION: 40.6 ft (NAVD88)

DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS: 4.0	ft bgs	s on 0	4/20/07 START : 4/18/2007 END : 4/2	20/20	07 LOGGER : C. Dougherty	
> O :=	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH BE	E RU STH, OVEF	(%) _Q	TUR	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
E SER	SORI	RO	-RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-29.4	70.0				<u> </u>	Limestone	Driller's Remark: Tools
-			0	-	╁	 70.0-73.0' - light olive gray, (5Y 5/2), moderate HCl reaction, very weak 	were bouncing when - hammering, also chatter
-				- 71.2-71.6' - Fracture zone, rock fragments	F	(R1), voids over 70% of surface from	when drilling to 70' below
-			3	, ,	厈	- 70.5' to 73.0', organics at 72.0'	ground surface. Driller - switches to rock coring at
-	R1-HQ			71.9' - Fracture, 20 deg, rough, undulating, open, coating of carbonate derived silt	Ħ	=	11:25 hrs
-	5 ft 60%	35	1	72.6' - Fracture zone	片	-	Begin rock coring at 13:18 - hours
-				_	H	No Recovery 73.0-75.0'	Split Spoon sample SS-15 actually advanced 70.0-
			NR		├		70.2'
_			INIX	_	F	_	R1: 6 minutes
75	75.0			_	尸	L., ,]
-34.4			0		H	Limestone - 75.0-76.6' - Same as 70.0-73.0'	SC-1 collected at 75.0- 75.9'
-				75.9-76.6' - Fracture zone	口	except cavities (2) up to 1/2" wide and 1/2" deep	75.9
_			2	-	士	<u>.</u>	-
-	R2-HQ			-	┢	No Recovery 76.6-80.0'	-
-	5 ft	18		-	\vdash	_	-
-	32%		ND	-	F	_	-
-			NR	-	F	-	-
-				-	岸	-	R2: 6 minutes
80	80.0			-	1		
-39.4	00.0			_	世	Limestone	-
-			0	80.7, 80.8, 80.9, 81.4, 81.5, 81.6, 82.0, 82.3' Mechanical break (8)	世	 80.0-85.0' - light olive gray, (5Y 5/2), very fine grained, moderate HCl reaction, very weak (R1), voids 1/16" or less over 20-30% of surface. 	1
			0				1
			U		${\mathbb P}$	cavities 3/8" in diameter over 5%,]
	R3-HQ 5 ft	65	0		F	moderately fossiliferous, 1/8" organic layers at 83.2' and 84.1'	
_	100%	00		-	厂	-	
-			>10	83.0-83.3' - Fracture zone	口	<u>-</u>]
-				84.0-84.3' - Fracture zone	世	-	R3: 5 minutes
-			>10	04.0-04.3 - Flaciule 20118 -	\vdash	-	No. 9 minutes
85 <u> </u>	85.0			_		Limestone	-
-			0	-	\vdash	- 85.0-91.0' - Same as 80.0-85.0'	
-				-	厈	except weak to medium strong (R2 to R3)	
-			0	-	Ħ	,	-
-	R4-HQ			-	Ħ	-	
-		83	>10	- 87.6-88.2' - Fracture zone	H	<u> </u>	1
-	- 100%			-	世	<u> </u>	1
-			0	-	尸	-	1
			0	_	尸		R4: 9 minutes
90	90.0		U		oxdot		



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-24

SHEET 6 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723114.5 N, 458174.3 E (NAD83)

ELEVATION: 40.6 ft (NAVD88)

DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS: 4.0	ft bg	s on 04	4/20/07 START : 4/18/2007 END : 4/	20/20	07 LOGGER : C. Dougherty	
≩Q⊋	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	<u></u>	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
TH B	RE RU GTH.	(%) _Q	FOCTU	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BOL	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SUR ELE	COF	S Q	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-49.4					ш		SC-2 collected at 90.0-
_			0		Ш	-	90.9'
			>10	90.9-91.8' - Fracture zone, rock fragments, some fragmens have partial (10%) coating of	Ш	Limestone - 91.0-93.0' - light olive gray, (5Y 5/2),	
_			-10	grayish brown (5YR 3/2) clay	Ы	fine grained, mild HCl reaction,	
_	R5-HQ 5 ft	35	1	92.1' - Joint, smooth, undulating, possible cavity, open	H	medium strong to strong (R3 to R4), voids <1/16" over 20% of surface,	Driller's Remark: Lost circulation at 92'
_	60%			cavity, open	Н	solution cavity 1/2"x1.5"x3/4" deep at 92.5', 1/16" wide weathered area	
_					H	 around edges of cavity 	
-			NR		H	No Recovery 93.0-95.0'	R5: 9 minutes
-					Ħ	-	Tto. o minutos
95 <u> </u>	95.0			_	Ħ	Limestone	-
-			>10		Ħ	 95.0-99.2' - Same as 80.0-85.0' except trace organics at 97.6' 	
-					Ħ	_ cxcept trace organics at o7.5	
_			1	96.8' - Joint, 60 deg, smooth, undulating,	╙	-	
	R6-HQ 5 ft	57	1	coating of carbonate derived silt, tight	Н		
_	100%	31		97.2-98.0' - Fracture, vertical, rough, undulating	Н	_	
_			0		+++	_	
-					₽	-	DC: 40 minutes
-			>10		H	_ 99.2-99.6' - medium light gray, (N6), very fine grained, moderate HCl	R6: 10 minutes
100 <u> </u>	100.0			_	厈	reaction, medium strong to strong	_
-			>10	100.4-100.8' - Fracture zone	囯	R3 to R4) 99.6-104.0' - Same as 95.0-99.2'	
-					口	_	
-			>10	101.5-101.9' - Fracture zone	口	-	
_	R7-HQ			400 OL Leigh OF des recent conductions	Ш	=	
_	5 ft 80%	48	1	102.3' - Joint, 35 deg, rough, undulating, black iron staining, open	Ш	_	
			1		Н	_	
			Ľ	103.8' - Joint, horizontal, rough, undulating,	H		
-			NR	open	H	No Recovery 104.0-105.0'	R7: 8 minutes
105_ -64.4	105.0			_	F	Limestone	-
-			2	105 6 105 0' Frontures (2) havinantal	Ħ	 105.0-108.7' - light olive gray, (5Y 	
-			\vdash	105.6, 105.9' - Fractures (2), horizontal, rough, undulating, open	Ħ	5/2), very fine grained, weak to medium strong (R2 to R3), <1/16"	
-			0		Ħ	 voids over 40% of surface, moderately fossiliferous (cast and 	
-	R8-HQ			107.0' - Fracture or mechanical break,	Ħ	molds), color change to yellowish	
-	5 ft 74%	40	>10	horizontal 107.0-107.4, 107.7-107.9' - Fracture zone	Ħ	 gray, (5Y 7/2), at 108.3' and very weak (R1) 	
_	, 3		1	(2), horizontal, coating of carbonate derived	⊞		
_	-		\vdash	silt 108.4' - Fracture or mechanical break,	\square	No Recovery 108.7-110.0'	
			NR	horizontal, loose	H		R8: 5 minutes
110	110.0				囯		
							l .



PROJECT NUMBER:

338884.FL

BORING NUMBER:

A-24

SHEET 7 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723114.5 N, 458174.3 E (NAD83)

ELEVATION: 40.6 ft (NAVD88)

DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING	NETHOD A	ND E	JUIPIV	IENT: CME 550X S/N 340253, mud rotary, HQ tools, HV	v casi	ng	ORIENTATION : Vertical
WATER	LEVELS: 4.0	ft bg	s on 0	4/20/07 START : 4/18/2007 END : 4/2	20/20	07 LOGGER : C. Dougherty	
				DISCONTINUITIES	(,	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
	COF	a Q	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-69.4 - -			0		Ė	Limestone 110.0-114.0' - Same as 105.0-108.7' except poorly fossiliferous	-
-			0		Ħ	_	SC-3 collected at 111.4-
-	R9-HQ 5 ft 100%	78	0	- 112.6-112.9' - Mechanical break	F	_	
_			2	113.3' - Joint, 20 deg, smooth, undulating, dark staining, loose		_	_
	115.0		1	113.7' - Joint, 60 deg, smooth, undulating, dark staining, loose 114.0, 114.9' - Mechanical break (2)	Ė	114.0-115.0' - dusky yellow, (5Y - 6/4), fine to very fine grained, strong _ HCl reaction, very weak (R1), 1/16"	R9: 8 minutes
-74.4 -			1	114.3' - Fracture zone or mechanical break 115.0-115.4' - Joint, 80 deg, rough, undulating, black iron staining on 25% of the	E	voids over 15% of surface, poorly fossiliferous 115.0-117.0' - Same as 110.0-114.0'	
_			0	surface 115.5' - Mechanical break 116.3-116.5' - Mechanical break		except <1/16" voids over 20% of surface	
-	R10-HQ 5 ft 90%	40	>10	117.0-118.1' - Fracture zone - -	Ħ	117.0-118.2' - moderate olive brown, - (5Y 4/4), moderate HCl reaction, very weak (R1), zone of carbonate	
-			0		H	derived silt at 117.0-117.4' and - 117.8-118.0' 118.2-119.5' - light olive gray, (5Y	
- 120	120.0		>10 NR	119.0-119.5' - Fracture zone -	H	5/2), moderate HCl reaction, weak - (R2), voids (1/16") over 20% of surface, larger voids (up to 3/8") over	R10: 8 minutes
-79. 4		3 120.4-120.7' - Fracture zone		5% of surface, moderately fossiliferous (molds) No Recovery 119.5-120.0'	Fragments from 120.4- 120.4' appear to have been		
-			3 121.3' - Fracture, 20 deg, smooth, planar, coating of carbonate derived fine sand	Limestone 120.0-120.5' - Same as 118.2-119.5' 120.5-123.6' - light olive gray, (5Y 5/2), moderate HCl reaction, weak to	cored at two different angles indicating they were loose in borehole		
-	R11-HQ 5 ft 72%	20	1	121.5-121.8' - Fracture zone 121.7' - Fracture, 20 deg, smooth, planar, along bedding plane	Ħ	medium strong (R2 to R3), voids <1/16" over 30% of surface, few large voids (3/8"x1"), moderately	
-			0			 fossiliferous, voids oriented parallel to bedding plane at about 20 degrees, large cavity (3/8"x1-3/16") 	R11: 6 minutes
125 <u> </u>	125.0		NR	- -	臣	_ present at 122.0', laminated bedding (1/16"-1/4") below 122.5' — No Recovery 123.6-125.0'	
-	-		1	- 125.8' - Fracture, horizontal, rough, undulating, coating of carbonate derived silt	H	Limestone 125.0-127.8' - Same as 118.2-119.5' except zone of larger (3/4"x3/8")]
-	R12-HQ		1	on faces, loose 126.3' - Joint or mechanical break, horizontal, rough, undulating		cavities from 125.8-126.3' over 30% of surface, voids (<1/16") over 25% of surface]
-	5 ft 56%	38	0		Ħ	- - No Recovery 127.8-130.0']
- -			NR			-	R12: 5 minutes
130	130.0				\vdash		-
					\perp		



PROJECT NUMBER:

33884.FL

BORING NUMBER:

A-24

SHEET 8 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723114.5 N, 458174.3 E (NAD83)

ELEVATION: 40.6 ft (NAVD88)

DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

00.1			2011 11	TENT . CIVIE 330X 3/N 340233, Mud Totally, Fig tools, Fiv		5	ORIENTATION . Vertical
WATER	LEVELS: 4.0	ft bgs	s on 0	4/20/07 START : 4/18/2007 END : 4/	20/200	7 LOGGER : C. Dougherty	
				DISCONTINUITIES	U	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표원한	H, A	(%	FRACTURES PER FOOT		임	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
I ∓X¥	E R OVI	(%) Q	FS	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
F R F	E E E	Ø	RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	074	α.	шп		o l		
-89.4			NA	130.0-130.7' - Fracture zone, mostly carbonate derived fine sand and silt size	$\mathbf{H}\mathbf{H}$	Carbonate Derived Silty Sand (SM)	End drilling 4/19/07, 17:20
-				fragments	\mathbf{H}	· 130.0-130.7' - light olive gray, (5Y	hrs - Resume drilling 4/20/07,
I -				130.7-132.0' - Fracture zone, only rock	╁┼┤	moderate to strong HCl reaction,	07:45 hrs
l -			>10	fragments, 2"x3", breakage is mostly along	┅	staining, 25% silt	Driller's Remark: Water -
l _				bedding planes	Н	Limestone	level 4' below ground
	R13-HQ				Н	130.7-132.0' - light olive gray and	surface
I -	5 ft	0			口	dusky yellow, (5Y 5/2 and 5Y 6/4),	1
-	40%				+	fine grained, mild to moderate HCl reaction, medium strong to strong	-
I -			NR			(R3 to R4), gray and yellow areas	_
					ш	interbedded in 1-inch beds, grey	
					Н	areas are medium to strong (R3 to	R13: 7 minutes
1 405					\Box	R4) with few (1/16" or less) voids,	1
135 <u> </u>	135.0			_	╂┴╂	dusky yellow areas are weak (R2) with 30% voids, light olive gray	-
-54.4			>10		┦┼	limestone increases with depth,]
			"			bedding oriented from 0-10 degrees	
-					14	No Recovery 132.0-135.0'	1
-			1	126 Cl. Inint havinantal rough undulation	╆	Limestone	l -
-	544110			136.6' - Joint, horizontal, rough, undulating, iron staining, open	\blacksquare	135.0-137.7' - moderate olive brown, (5Y 4/4), fine grained, mild HCl	l -
l _	R14-HQ 5 ft	57	1	non staining, open	\mathbb{H}	reaction, medium strong (R3),]
	88%	31	'	137.5' - Fracture zone or mechanical break,	Ш	moderately fossiliferous, (1/16")	
-				horizontal	╁	voids over 20% of surface, cavities	1
-			0		╂╫	(>3/16") and fossil molds over 10%	1
-					\Box	of surface, <3/16" fragments of gray limestone included in matrix at about	l
			0		Н	2-3% from 136.3-137.5', 1"	R14: 11 minutes
140	140.0		NR			fragments 137.5'-137.7'.	
-99.4				_	╙	137.7-139.4' - medium gray mottled	1 7
-			0		╂╥╂	yellowish gray, (N5, mottled 5Y 7/2),	l -
-					口	fine to very fine grained, mild HCI reaction, medium strong (R3),	l -
_			1		Щ	coloration surroundings and within	<u> </u>
			'	141.5' - Joint, horizontal, rough, undulating,	Ш	cavities, highly fossiliferous (cavities	
-	R15-HQ			iron staining, coating of carbonate derived	П	and molds), few (<1/16") voids,	1
-	5 ft	70	0	fine sands on 15% of surface	╀┤	cavities (up to 1.5"x2.5") over 15%	
I -	92%				Ш	No Recovery 139.4-140.0' Limestone	-
			0		Щ	140.0-142.0' - Same as 137.7-139.4'	
I -			'		Ш	except yellowish gray (5Y 7/2) at	SC-4 collected at 143.5-
-			0		口	140.7-142.0'	144.6' –
-					+	142.0-143.0' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction,	R15: 9 minutes
145_	145.0		NR	_	₽	— medium strong to strong (R3 to R4),	-
-104.4			0		Щ	thinly laminated (crenelated in top]
			'		H	2.4" of section), few (<1/16") voids	1
-					口	above 142.5', 15% voids from	1
-			0		╁┼┤	142.5-148.0', few voids to 3/16" 143.0-144.6' - light olive gray to	-
-					Ш	yellowish gray, (5Y 5/2 to 5Y 7/2),	-
	R16-HQ 5 ft	68	0		\Box	moderate HCl reaction, weak (R2),	
I -	5 π 76%	00	'		H	laminated bedding, areas of voids	1
I -					団	(1/16") correspond to bedding No Recovery 144.6-145.0'	1
-			0		╂┼┼	140 Recovery 144.0-145.0	-
-					낻	-	
			NR		Щ		R16: 5 minutes
150	150.0				H		1
1.00					\Box		



PROJECT NUMBER:	BORING NUMBER:		
338884 FI	Δ-24	SHEET	9 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723114.5 N, 458174.3 E (NAD83)

ELEVATION: 40.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS : 4.0) ft bg:	s on 0	4/20/07 START : 4/18/2007 END : 4/	20/20	D7 LOGGER : C. Dougherty	
>∩≎	(%			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BI	E RU STH, OVEF	(%) Q	TE S	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SURF	SOR	RQI	-RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMI	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-109.4	0	_				Limestone	
-			0		╁	 145.0-145.4' - olive gray to yellowish gray, (5Y 3/2 to 5Y 7/2), fine grained, 	-
-					F	mild to moderate HCl reaction,	-
-			0		片	 medium strong to strong (R3 to R4), very fossiliferous, voids (<1/16") over 	-
-	R17-HQ				Ħ	30% of surface, larger (up to	SC-5 collected at 151.9- 152.9'
-	5 ft 100%	92	0		世	 3/8"x3/8") cavities and fossil molds over 5% 	152.9
_			. 40	450.0.450.01. Franking and francische 4/401	╨	145.4-145.7' - yellowish gray, (5Y	-
			>10	153.3-153.8' - Fracture zone, fragments 1/16" - to 1-9/16"	F	 7/2), fine grained, mild HCl reaction, strong (R4), few voids (<1/16") 	-
-					Ш	145.7-148.8' - moderate olive brown, (5Y 4/4), fine grained, mild HCl	R17: 9 minutes
155	155.0		0		厂	reaction, medium strong (R3), voids	_
-114.4			1	_	\perp	(<1/16") up to 50% of surface (few from 146.0-146.4' and 146.8-147.5'),	_
			'	155.7' - Fracture, rough, undulating, iron	Н	cavities (up to 1" in diameter) over	
1]			1	staining on <5%, open	F	5% from 147.0-148.8' No Recovery 148.8'-150.0'	
_			Ŀ		片	Limestone	_
1 _	R18-HQ 5 ft	75	1		Ë	150.0-155.0' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction,	_
-	90%	. 0	L.	157.6-158.2' - Fracture zone	片	medium strong to strong (R3 to R4), thinly laminated from 152.0-153.8',	_
_			>10		₽	voids (<1/16") over 10% of surface	_
-					尸	from 150.0-152.5', 30% voids from 152.5-154.0', trace voids (up to 3	
-			0		Н	_ /16") and fossil molds	R18: 5 minutes
160 -119.4	160.0		NR		H	155.0-156.9' - Same as 145.7-148.8' → 156.9-157.3' - yellowish gray, (5Y	Total Depth at 160' at
-113.4					-	_ 7/2), fine to very fine grained, moderate HCl reaction, medium	09:45 hrs, 4/20/07 -
-					┨	strong (R3), thin (1/4") bedding, few	-
-					┨	voids, abrupt change from light olive gray with voids to yellowish gray with	-
-					┨	few voids, changes back at 157.3'	-
-					┨	(bedding, <5 degree from horizontal), tight	-
-					┨	- 157.3-159.5' - Same as 145.7-148.8'	-
-					1	except weak (R2), thinly bedded (1/2"-1") friable zone from	-
-					1	- 157.6-158.2' No Recovery 159.5-160.0'	-
-					1	Bottom of Boring at 160.0 ft bgs on	-
-				_	1		_
-					1	-	-
-					1	<u></u>	-
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PROJECT NUMBER:	BORING NUMBER:					
338884 FI	Δ-24Δ	CHEET	1	ΩE	5	

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723110.0 N, 458176.7 E (NAD83)

ELEVATION: 40.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical

						FND : 0/4 F/0007			OHENTATION: Vertical
WATER	LEVELS	: 4.0 ft bo	us on 04/2		START : 6/15/2007	END: 6/15/2007 SOIL DESCRIPTION	LOGGEF		COMMENTS
≯₽£	CALADI	INTERV	1 (4)	STANDARD PENETRATION TEST RESULTS		JOIL DEJONIF HON		SYMBOLIC LOG	OOIVIIVILIVIO
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA		TEST RESULTS	SOIL NAME	E, USCS GROUP SYMBOL	COLOR	IC L(DEPTH OF CASING, DRILLING RATE,
ASE		RECOVE	RY (ft)		MOISTURE	CONTENT. RELATIVE DE	NSITY OR	30L	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
무유			#TYPE	6"-6"-6"	CONSISTENC	CY, SOIL STRUCTURE, MI	INERALOGY	YME	INSTRUMENTATION
40.3				(N)				S	
40.5	1						-		-
l _							-]	
1 _							_		Blind drill to 25' Install SW casing to 10'
									Install SVV Casing to 10
]						-	1	_
_							-	1	-
_	-						-	1	Water level obtained from boring A-24
-	1						-	1	-
_	-						-	1	-
-							-	-	-
5 35.3								1	
33.3							-	1	-
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	A-24A	SHEET	2	OF	5

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723110.0 N, 458176.7 E (NAD83)

ELEVATION: 40.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, auto hammer, AWJ rods, 3-7/8 tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 4.0 ft bo	gs on 04/2	20/07	START : 6/15/2007 END : 6/15/2007 LOGGE	R:	J. Townes
				STANDARD	SOIL DESCRIPTION		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COLL NAME TIGOS OBSTILL SAMEDS! COLLOS		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
LEV/			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		INSTRUMENTATION
20.3				(14)		╁	
-						1	-
-						1	-
-						1	-
-						1	1
]	
_						1	_
_						4	-
-						4	-
25 <u> </u>	25.0				Silt With Sand (ML)	+	
-		1.3	SS-1	3-5-8	25 0-26 3' - gravish orange (10YR 7/4) moist stiff	\parallel	-
-	00.5	1.3	33-1	(13)	rapid dilatancy, mild to moderate HCl reaction, 15-20% fine to medium sand, 10% coarse sand to	1	-
-	26.5				fine gravel-sized limestone fragments, all carbonate	\exists	-
-						1	-
-						1	-
-						1	<u> </u>
]	
_						1	_
30	30.0				Oth Mish Cond (MI)	4	
10.3			00.0	3-4-11	Silt With Sand (ML) 30.0-30.9' - Same as 25.0-26.3'	\parallel	-
-		0.9	SS-2	(15)		╫	''
-	31.5					+	-
-						1	-
-						1	-
-						1	-
-						1	-
]	
35	35.0	0.0	\ SS-3 /	50/1	No Recovery 35.0-35.1' 7	\bot	Install HW casing to 35'
5.3	35.1	0.0	\ 33-3 /	(50/1")	Begin Rock Coring at 35.0 ft bgs See the next sheet for the rock core log	1	Install TIVY Casing to 33
-					See the next sheet for the rock core log	+	-
-						+	-
-						+	-
-						+	-
-						1	-
-						1	-
1 -						1	
40						1	
1	I	I	i l			- 1	



338884.FL A-24A

SHEET 3 OF 5

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723110.0 N, 458176.7 E (NAD83)

ELEVATION: 40.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 4.0 ft bgs on 04/20/07 START: 6/15/2007 END: 6/15/2007 LOGGER: J. Townes DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 5.3 Begin NQ coring; first run Limestone R1-NO 1 35.0-35.9' - pale reddish brown, (10R 1.5' to set stroke 33 1.5 ft 5/4), very fine to fine grained, 35.72' - Fracture, 52 deg, rough, undulating, 60% moderate HCl reaction, very weak NR R1: Run time not recorded minor recrystallization, 3/16" open, rock, 36.5 (R1), voids up to 1/16" over 85% of rubble at top of run 0.2" thick SC-1 collected at 36.1surface, 10% irregular cavities (up to 0 9/16"x3/4"), minor recrystallization, some with fossil casts/ fossil molds, moderately fossiliferous 1 37.85' - Fracture, 65 deg, rough, undulating, No Recovery 35.9-36.5 open 3/16" 36.5-40.1' - Same as 35.0-36.5 R2-NC except fewer irregular cavities, 5% 5 ft 63 1 cavities, most with fossil cast/molds. 39.0' - Fracture, 75 deg, rough, undulating, 72% cavities up to 3/16"x3/8", two larger open 1/16", minor carbonate recrystallization cavities 1-3/16"x3/8", moderately 1 40 39.75' - Fracture, 75 deg, rough, undulating, 0.3^{-} fossiliferous open 1/16" No Recovery 40.1-41.5' R2: 2 minutes NR 41.5 Limestone 41.7-42.0' - Fracture (2), horizontal, smooth, 41.5-43.0' - moderate yellowish brown, (10YR 5/4), fine to medium 3 undulating, open 3/16" 42.45' - Fractures, horizontal, rough, grained, mild to moderate HCI >10 undulating, open 3/8" reaction, extremely weak (R0), voids 42.75-43.0' - Fracture zone up to 1/16" over 40% of surface. a few subangular rock (gray) clasts up R3-NQ to 3/16"x3/16", poorly to moderately fossiliferous casts/molds, few black 8 5 ft 30% organic inclusions, most 1/16"-1/8", NR 45 one inclusion 1"x3/8" 4 7 No Recovery 43.0-46.5' R3: 1 minute 46.5 Limestone 46.6' - Fracture, 45 deg, rough, undulating, 46.5-48.0' - moderate yellowish 2 open brown, (10YR 5/4), fine to medium 46.95' - Fracture, 35 deg, rough, undulating, grained, moderate HCI reaction, open 3/4", minor carbonate recrystallization 3 extremely weak (R0), some voids 47.7' - Fracture, horizontal, rough, undulating, with fossil mold/casts, voids up to open 1/16", tight 2 1/16"x1/16" covering 100% of R4-NC 48.0' - Fracture, horizontal, rough, undulating, 5 ft surface; 5% subangular, gray, rock 15 open 3/8" 48% clasts up to 3/16"x3/16", poorly to 48.35' - Fracture, horizontal, rough, moderately fossiliferous undulating, open 1/16", slightly tight 48.55' - Fracture, 50 deg, rough, undulating, 50 48.0-48.9' - Same as 41.5-43.0' -9.7 NR except very few organic inclusions open No Recovery 48.9-51.5' R4: 1 minute 51.5 Limestone 51.5-53.0' - moderate yellowish 2 52.0' - Fracture, 30 deg, smooth, planar brown, (10YR 5/4), fine to medium 52.35' - Fracture, horizontal, smooth, planar grained, mild to moderate HCI 52.6' - Fracture or mechanical break, 5 reaction, extremely weak (R0) horizontal, rough, undulating 52.7' - Mechanical break, horizontal, rough, 53.0-54.0' - Same as 51.5-53.0' except 2% black staining R5-NQ undulating 5 ft 14 3 52.95, 53.1' - Fractures (2), horizontal, rough, 72% undulating 0 55



338884.FL A-24A

SHEET 4 OF 5

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723110.0 N, 458176.7 E (NAD83)

ELEVATION: 40.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

\\\ATED	LEVELO : 4.0			4/00/07 - OTABLE - 0/45/0007 - FAID - 0		7. LOOOFD : LT	
	LEVELS : 4.0	πogs	s on U	4/20/07 START : 6/15/2007 END : 6 DISCONTINUITIES	ТП	D7 LOGGER : J. Townes LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		(0	DESCRIPTION	SYMBOLIC LOG		CONTRICTATO
O A P	Ž,Ž,Ž		FRACTURES PER FOOT	DESCRIPTION	길	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
ATI	JA FE	(%) Q	ΪÖ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
	ORE	ø	ZAC ER I	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ΥME	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
	032	ď	# 5		Ś	CHARACTERISTICS	, , ,
-14.7				53.4' - Fractures, 50 deg, rough, undulating,	Н	Limestone	
1 7			NR	minor carbonate recrystallization, open 1/16" 53.7' - Mechanical break	Ш	 54.0-55.1' - light brown, (5YR 6/4), fine to medium grained, mild HCl 	R5: 3 minutes
1 1	50.5			54.45' - horizontal, rough, undulating, tight	₩	reaction, weak (R2), voids (<1/16")	1 1
-	56.5			54.95' - Fracture, <90 deg, rough, undulating	+	 over 85% of surface, poorly to 	1
-			3	56.7' - Fractures, horizontal, rough,	\perp	moderately fossiliferous, irregular voids up to 9/16" over 2% of surface	1 -
1 _				undulating, tight, open 1/16" 57.05' - Fractures, horizontal, rough,	\perp	- No Recovery 55.1-56.5']
				undulating, open 1/16"		Limestone	
1 7			4	57.4' - Fractures, horizontal, rough,	Ш	56.5-58.6' - moderate yellowish	1 1
-	R6-NQ		0	undulating, open 3/8", minor black organic	\pm	brown, (10Y 5/4), fine to medium	1 -
-	5 ft	27		laminae 57.6, 57.7, 57.8' - Fractures (3), horizontal,	+	grained, mild to moderate HCl reaction, very weak to weak (R1 to	1 -
_	42%			rough, undulating, abundant black organic	ᅪ	R2), voids <1/16" over 90% of	
60				laminae	Щ	surface, poorly fossiliferous. irregular	
-19.7			NR	58.0' - Fracture, horizontal, rough, undulating,	\vdash	cavities up to 3/16" over 10% of	
-				open 3/4", small black laminae	\Box	 surface, black organic inclusions, angular, up to 3/8", black laminae 	R6: 2 minutes
-					$+\!\!\!\!+\!\!\!\!\!+$	prominent from 57.8-58.7'.	-
-	61.5					No Recovery 58.6-61.5'	1 -
			0		\perp	Limestone]
			0		Н	61.5-62.0' - grayish pink, (5R 8/2), very fine to fine grained, moderate	
1 7					Ш	HCl reaction, weak to medium strong	1 1
-			3	62.8' - Fracture or bedding plane, 10 deg,	+	(R2 to R3), voids <1/16" over 50% of	1 -
-	D7.NO			rough, undulating, open 3/8" 63.15' - Fractures, horizontal, rough,	-	_ surface. irregular cavities up to 2"	1 -
1 _	R7-NQ 5 ft	63	2	undulating, open 2"	ш	over 10% of surface. poorly fossiliferous]
	97%	00	-	63.5' - Fractures, 5 deg, rough, undulating,	Н	62.0-64.3' - moderate reddish	
65				open 3/8"	\Box	orange, (10R 6/6), very fine to fine	1 1
-24.7			2	63.9' - Fractures, horizontal, rough, – undulating, minor recrystallization	╁┼┤	grained, moderate to strong HCI	-
-				64.15' - Bedding plane, horizontal, rough,		reaction, very weak to weak (R1 to R2), voids <1/16" over 50% of	R7: 4 minutes
-			2	undulating	+	surface, single black organic layer at	-
	66.5		NR.	64.8' - Bedding plane, horizontal, rough,	口	62.6', 1/16" thick; trace organics]
			-	undulating, open 3/4" 65.1' - Fractures, rough, undulating, minor	Ш	above and below.]
			1	recrystallization	\Box	 64.3-64.9' - Same as 61.5-62.0' except more cavities, up to 	1
-				65.7 - Fractures, 5 deg, rough, undulating	1	9/16"x9/16" over 20% of surface.	1
-			2	66.1' - Fracture, horizontal, rough, undulating,	╂╫	64.9-66.35' - Same as 62.0-64.3'	-
				open 1-3/16" 66.95' - Fracture, horizontal, rough,	Д	except more voids <1/8" over 70% of	-
	R8-NQ 5 ft	80	2	undulating, open 3/8", minor recrystallization	\mathbb{H}	surface No Recovery 66.35-66.5']
1]	100%	50		67.7' - Fractures, 60 deg, rough, undulating,		Limestone	1
70				minor recrystallization	14	66.5-67.0' - moderate reddish	1
-29.7			1	68.4' - Bedding plane, 5 deg, rough, _ undulating	丗	 orange, (10R 6/6), fine grained, moderate HCl reaction, very weak 	SC-2 collected at 69.78-
-				69.05' - Fracture, 30 deg, rough, undulating,	+	(R1), voids over 10% of surface,	70.58' R8: 4 minutes
			2	minor recrystallization	-11	 trace organic black material, 	1.0. 4 Hilliules
	71.5			69.3' - Fracture, horizontal, rough, undulating, open 2"	Щ	66.5-67.0' non fossiliferous layer	
]				open 2" 69.7' - Fracture, horizontal, rough, undulating,	\mathbb{H}	67.0-68.0' - Same as 66.5-67.0'	1
			2	minor recrystallization	口	 except poorly to moderately fossiliferous. mottled and layered 	1
-				70.6, 71.3' - Mechanical break (2)	+	areas with grayish pink limestone,	-
-			>10	72.2' - Fractures, horizontal, rough,	$-\Box$	weak (R2) over 5% of surface area.	-
				undulating, minor recrystallization 72.5-72.9' - Fracture zone, rubble, minor	\Box	68.0-68.4' - Same as 66.5-67.0']
	R9-NQ			recrystallization	H	68.4-69.3' - Same as 67.0-68.0' 69.3-70.85' - Same as 61.5-62.0'	1
]	5 ft 86%	51	1	73.35' - horizontal, rough, undulating, tight	Ш	70.85-71.5' - Same as 62.0-64.3'	1
	00 /0			73.5' - Fractures, 60 deg, rough, undulating,	1-1	-	-
75				minor recrystallization	井		
ldot					\perp		



338884.FL A-24A

SHEET 5 OF 5

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723110.0 N, 458176.7 E (NAD83)

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ELEVATION: 40.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER LEVELS: 4.0 ft bgs on 04/20/07 START: 6/15/2007 END: 6/15/2007 LOGGER: J. Townes LITHOLOGY DISCONTINUITIES COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -34.7 Limestone 75.3-75.7' - Fracture zone, rough, irregular, 71.5-72.1' - grayish pink to moderate >10 R9: 2 minutes reddish orange, (5R 8/2 to 10R 6/6), moderate HCl reaction, weak (R2), minor recrystallization NR 76.5 poorly fossiliferous, voids over 5% of 76.5-77.0' - Fracture zone surface >10 72.1-75.8' - moderate reddish orange, (10R 6/6), moderate HCI 77.4' - Fracture zone, 20 deg, rough, reaction, amount of voids varies in undulating, minor recrystallization >10 alternating 1' thick layers, voids 78.2-78.4' - Fracture zone range from 10-90%, irregular cavities R10-NQ throughout, up to 9/16"x9/16" over 5 ft 75% 46 >10 78.9-79.1' - Fracture zone 40% of surface, poorly fossiliferous No Recovery 75.8-76.5' Limestone 80 2 76.5-80.25' - moderate reddish $-39.\overline{7}$ 80.1' - Fractures, 60 deg, rough, undulating, orange, (10R 6/6), moderate HCI two intersecting fractures R10: 2 minutes reaction, very weak (R1), voids over NR 80% of surface, irregular cavities up 81.5 to 9/16" over 20% of surface No Recovery 80.25-81.5' 1 Limestone 82.2' - Mechanical break, horizontal, rough. 81.5-86.45' - moderate reddish undulating orange, (10R 6/6), fine to medium 2 82.8' - Fractures, 30 deg, rough, undulating, grained, moderate HCI reaction, very open 3/8", organic material weak (R1), voids <1/16" over 80% of 83.1' - Fractures, rough, undulating, surface R11-NQ surface, irregular cavities up to 3/8" 1 5 ft 44 open 1-9/16", minor recrystallization over 20% of surface, some voids and 99% 83.9-84.0' - Fracture zone, horizontal, cavities contain fossil casts/molds, undulating, organics 84.5-85.6' - Fracture zone, 3/8"-3-1/8" long trace, black organics throughout, 85 >10 fossil and organics especially -44 7 rock fragments prevalent from 83.0-84.0'. R11: 2 minutes >10 86.05' - Fracture zone, 60 deg, rough, 86.5 undulating, open 1-3/16", minor recrystallization No Recovery 86.45-86.5' NR Drilling ended at 13:00 Bottom of Boring at 86.5 ft bgs on hours; grouting completed 6/15/2007 at 17:00 hours Total depth is 86.5'



338884.FL AD-01

SHEET 1 OF 17

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

WATER	LEVELS: 5.1	7 ft b	gs on 9	9/13/07 START: 8/23/2007 END:	9/7/20	07	LOGGER: R. Bitely, C. Sump,	Т.	Borton, J. Burkard, J. Townes
≥ ∩ ⊕	(9)			DISCONTINUITIES	ڻ	L	LITHOLOGY		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG		ROCK TYPE, COLOR,	П	SIZE AND DEPTH OF CASING,
H BE ATIC	I RU	R Q D (%)	E S	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Ĭ		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	-1	FLUID LOSS, CORING RATE AND
LEV EV	SORE	ő	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	; ≝		AND ROCK MASS CHARACTERISTICS	-1	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
000	204.0	ш.	шш	204.0-204.7' - Fracture zone, multiple	0)	+	Limestone	┥	Boring AD-1 blind drilled to
			>10	intersecting fractures, gravel-sized fragments	+	7	204.0-206.5' - yellowish gray, (5Y	-1	approximately 204 feet -
205_ -163.0	R1-HQ	24	-	<3" diameter 204.7, 204.9, 205.1, 205.3' - Fractures (4),	-#	╬	_ 7/2), very fine to medium grained, mild to moderate HCl reaction,	-1	below ground surface before beginning
-	2.5 ft 100%	24	4	<10, 80, <10, and <10 deg, rough,	+	╁	extremely weak (R0), with areas of 1"	-1	sampling/logging
-			. 40	undulating, intersecting fractures 205.9-206.5' - Fracture zone, rough,	\blacksquare	7	diameter weak (R2) rock, voids over 40% of surface, trace laminations.	-1	Water level is based on Ground Water Monitoring
-	206.5		>10	undulating, fragments <2" diameter	\perp	‡	fossiliferous, medium strong to	-1	at LNP site (FSAR Table -
-			>10	206.5-207.15' - Fracture zone, rough, undulating, multiple intersecting fractures,	\pm	╁	strong (R3 to R4) from 204.0-204.2', HCl reaction 1-3 seconds	-1	2.4.12.08)" 08/22/07 HW casing set to
-	R2-HQ		>10	gravel-sized fragments <2" diameter	+	+	206.5-208.5' - yellowish gray, (5Y	-1	204.25' below ground -
-	2.5 ft 80%	0		207.3, 207.4, 207.55, 207.6, 207.9, 208.15' - Fractures or mechanical break (6), <10 deg,	\perp	‡	7/2), very fine to medium grained, extremely weak to very weak (R0 to	-1	surface 08/23/07 Begin rock coring
-			>10	undulating, smooth to rough, bedding planes		⇟	R1), 206.5-207.15': light olive gray	-1	HQWL -
-	209.0		NR	208.15-208.5' - Fracture zone, gravel-sized fragments <2" diameter	+	╁	(5Y 5/2), high organic content; slow, moderate HCl reaction, trace strong	-1	Use thick mud mix with 250-350 rpm rotation
-			NA	209.0-209.4' - Fracture zone, rough,	$-\Pi$	+	organic odor, 207.15-208.5':	Н	R1: 4 minutes
210_ -168.0			\square	undulating, gravel-sized fragments <2" diameter	411	H	laminated with trace organics in laminations, <10% voids over	П	204-204.2': Probable sluff fallen to bottom of borehole
-100.0			NA	209.4-210.6' - Sandy silt interval, friable	411	-	surface		during sonic advancement
_	B0.110				411	╟	No Recovery 208.5-209.0' Limestone		R2: 3 minutes
-	R3-HQ 5 ft	0			411	╠	209.0-209.4' - yellowish gray, (5Y	1	-
-	32%				411	I	7/2), very fine to fine grained, medium strong to strong (R3 to R4),	-1	
-			NR		411	I	voids <1/16" over <20% of surface,	-1	R3: 6 minutes
-					411	IL	poorly fossiliferous, trace laminations, trace organics	-1	
-					411	I	Sandy Silt (ML)	-1	08/26/07 Switch drill rigs and crew: Boart Longyear -
_	214.0				Щ	Ц,	209.4-210.6' - yellowish gray, (5Y 7/2), moist to dry, hard, strong HCl	Д	BL300T drill rig operated
_			>10	214.0-214.7' - Fracture zone, angular limestone fragments 2-3"	\perp	╁	reaction, >60% low to moderate	П	by Minnesota crew. Using HW casing -
215_				214.7-215.3' - Fracture zone, fragments <1"	┵	╁	plasticity carbonate fines, <40% fine to medium grained carbonate sand,	4	previously set.
-173 <u>.0</u> -			>10	diameter 215.3-217.1' - Fracture zone, fragments	Д	7	trace H ₂ S odor	-1	Using face discharge type bit.
-				range from 1/2" to >3" in zones	口	‡	No Recovery 210.6-214.0' Limestone Fragments	-1	C. Sump takes over
_	R4-HQ 5 ft	8	>10		\perp	╁	214.0-215.3' - vellowish gray. (5Y	-1	logging.
-	76%			24-2-24-1-14-1-14-14-14-14	\perp	+	7/2), slow moderate HCl reaction, weak (R2), 2-3" fragments from	-1	-
-			3	217.0, 217.5' - Mechanical break (2), rough, undulating	F	7	214.0-214.7' decreasing to <1" from		-
-			$\vdash \vdash \vdash$	217.8' - Fracture, horizontal, rough,	#	‡	214.7-215.3', voids 1/16-1/8" over 15-25% of surface		D4. 7 minutes
-			NR	undulating, possible bedding plane	\perp	╁	Limestone And Limestone		R4: 7 minutes
-	219.0		\square	240 Ol. Erneture or machanical break	\perp	+	Fragments 215.3-219' - yellowish gray, (5Y 7/2),		-
-			3	219.0' - Fracture or mechanical break, horizontal, rough, undulating	\perp	7	fine grained, slow moderate HCI		-
22 <u>0</u> -178.0				219.4' - Fracture, rough, stepped	-	1	reaction, extremely weak to very weak (R0 to R1), finely laminated		
-1/0.0			2	219.7' - Bedding plane, horizontal, rough, bedding plane fracture		╁	(<1/16"), thin zone (217.0-217.1') of		_
-	DE US		dash	220.2, 220.5' - Fractures (2), rough, undulating, ends of single full core piece	+	+	medium strong (R3) rock fragments, fine grained laminated material		-
-	R5-HQ 5 ft	13	>5	220.5-222.0' - Fracture zone	#	7	appears argillaceous		-
-	60%		\square		#	‡	No Recovery 217.8-219.0' Limestone		-
-					\perp	╁	219.0-219.7' - Same as 215.3-217.8'		-
-			NR		\Box	7			DE: 42 minutes
-					上	‡			R5: 13 minutes
<u> </u>	224.0				上	1		4	
								-1	



338884.FL AD-01

SHEET 2 OF 17

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT: Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing

ORIENTATION: Vertical

				MENT : Dietrich D-120 9/N 620, BE3001 3/N 1317, Hud 1				_	ORIENTATION : Vertical
WATER	LEVELS : 5.1	17 ft b	gs on		7/200)7 T	LOGGER: R. Bitely, C. Sump,	Τ.	
≥Q£	(%			DISCONTINUITIES	Ŋ N	L	LITHOLOGY	_	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ı	ROCK TYPE, COLOR,		SIZE AND DEPTH OF CASING,
ATI(T.H.	(%) Q		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Ιď	ı	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,		FLUID LOSS, CORING RATE AND
무유실	ORE	Ø	ZAC ER F	PLANARITY, INFILLING MATERIAL AND	Į ₩	ı	AND ROCK MASS		SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	032	ď	11 11	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	L	CHARACTERISTICS		, ,
			1	224.3' - Fracture, horizontal, rough,	Н	Ł	Limestone And Silty Sand 219.7-222.0' - mild to moderate HCl		
225			'	undulating, contact with very soft sandy silt		1	reaction, with gravel-sized limestone		
-183.0				carbonate material	╁	╀	fragments, very fine to fine grained		
-			0	224.3-225.1' - carbonate silt with gravel sized fragments (1/4-1/2")		1	fragments are fossiliferous (casts and molds up to 1/2" diameter over		-
-	R6-HQ			225.1-225.7' - Fracture zone, very weak	╫	╁	10-15% of surface), voids (1/16-1/8")		-
-	5 ft	8	0	limestone fragments 1-4"; full core piece	\Box	1	over 15-20% of surface, larger		-
-	56%			laminated, easily parted on bedding plane fractures	┢	╁	fragments and full core diameter		_
_				225.7-226.8' - Fracture zone, limestone		1	zones medium strong to very strong (R3-R5), small fragments (<1") weak		_
			NR	material with fragments	Н	1	(R2)		
					Ш	T	No Recovery 222.0-224.0'		R6: 10 minutes
-	229.0				╁	土	Limestone 224.0-226.8' - yellowish gray, (5Y		
-	223.U			229.0-229.55' - Fracture zone, limestone	F	1	7/2), fine grained, mild to moderate		-
			NA	fragments, 3/4-2", weak (R2), fine oxidation	ᡛ	+	HCl reaction, extremely weak to very		-
230 <u> </u>				staining on fracture surfaces	1	ħ	weak (R0 to R1), voids (1/16") over <a> <a< td=""><td>Г</td><td>_</td></a<>	Г	_
-100.0			NA	229.55-230.2' - Extremely weak rock fractured into sand/gravel sized carbonate		Ш	casts/molds (<1%), larger fragments		_
_				material	1111	L	tend to be more competent,	П	_
	R7-HQ	0	NA	229.8' - Mechanical break, horizontal, rough 230.2-230.4' - Fracture zone, more		П	225.6-226.1' medium strong (R3), extremely weak (R0) zones, friable,		
	5 ft 48%	U		competent limestone fragments, angular, fine	1111	П	trace bedding (laminae 1/16-1/8"),		_
-				grained, 1/4-1" diameter	1111	t	recurring sequence of thin (6") more	П	
-			NR	230.4-231.4' - Extremely weak material, same as 229.55-230.2'	1111	t	competent limestone beds separated by extremely weak very fine grained		-
-				Same as 229.55-250.2		F	silt-sized carbonate material		R7: 13 minutes
-					-	Ł	No Recovery 226.8-229.0'	П	-
_	234.0			0040004715		L	Limestone Fragments 229.0-229.2' - yellowish gray, (5Y	_	_
_			NA	234.0-234.7' - Fracture zone, limestone fragments 1/2-2" in size, weak to medium	₽	L	7/2), very fine to fine grained, mild to		_
235			14/ \	strong (R2-R3)	П	Н	moderate HCl reaction, weak (R2),	╟	
-193.0			NA	234.7' - Horizontal contact with silty, sandy	1111	П	3/4"-2-1/2" fragments, fossiliferous with fossil molds/casts over 20% of		
				fine gravel-sized limestone fragments	1111		surface, voids (1/16-1/8") over 15%		1
-	R8-HQ				1	H	of surface		-
-	5 ft	0			$\ \ $	H	229.2-229.5' - Same as 229.0-229.2' except strong (R4), thin, fine-grained		-
-	32%				$\ \ $	F	bed, trace voids (1/16"), very fine		-
-			NR		4	F	(<1/32") black inclusions (possibly		_
						L	pyrite) Limestone		
						L	229.5-229.9' - yellowish gray, (5Y		R8: 13 minutes
1 7	239.0					ľ	7/2), very fine to fine grained, weak (R2), voids (1/16") over 40-50% of		
1				239.0-239.7' - Fracture zone, limestone	Щ	\Box	surface, larger cavities up to 1/2"]
240 -			>10	fragments 1" to 2-1/2" diameter	╁	巾	over 5-10%		-
-198.0				239.7' - Fracture, horizontal, rough, undulating, chipped fracture face	广	\mathbb{H}	Silty Sand Sized Material (SM)		_
-			2	240.0, 240.4' - Mechanical break (2),	╀	╁	229.9-231.4' - with gravel-sized very weak (R1) limestone fragments		-
-	B0.115			horizontal, smooth, planar	П	1	similar to 224.0-226.5'		_
	R9-HQ 5 ft	8			\vdash	╁	No Recovery 231.4-234.0'		_
	36%				厈	1	Limestone Fragments 234.0-234.7' - yellowish gray, (5Y		
]			NR		H	1	7/2), fine grained, moderate to strong]
1			````		$oxed{\mathbb{H}}$	╀	HCl reaction, weak to medium strong		1
-					\perp	t	(R2 to R3), small voids (1/16-1/8") over 10-15% of surface, trace small		R9: 8 minutes
-	0440				╁	╁	fossil molds (<3/8")		-
	244.0				╀	╄	, ,		-
						ı			



338884.FL AD-01

ROCK CORE LOG

SHEET 3 OF 17

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

WATER	LEVELS : 5.1	17 ft b	gs on s	9/13/07 START: 8/23/2007 END: 9/	7/2007	LOGGER: R. Bitely, C. Sump, T	. Borton, J. Burkard, J. Townes
>00	(9)			DISCONTINUITIES	ŋ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
245_ -203.0			>10	244.0-244.6' - Mechanical break, 1-2" Limestone core pieces and fragments, mostly horizontal, rough, undulating fracture faces; extremely weak rock 244.6, 245.1' - Bedding plane (2), horizontal,		Silt (ML) 234.7-235.6' - yellowish gray and dark olive gray in alternating mottled bands, (5Y 7/2 and 5Y 3/2), moderate to strong HCl reaction,	244.0': Slightly improved recovery/RQD after mixing - new batch of mud
-	R10-HQ 5 ft 50%	20	>10	rough, undulating, fractures on intact core pieces 245.2, 245.9' - Fractures or mechanical break (2), rough, undulating, very weak rock 245.9-246.2' - Fracture zone, 1/4-3/4"		extremely weak (R0), finely laminated, all carbonate material No Recovery 235.6-239.0' Limestone 239.0-240.8' - yellowish gray, (5Y	- - -
-	249.0		NR	fragments (very weak) 246.2-246.5' - Fractures (2), rough, undulating, on either end of single core piece of very weak (R1) limestone		 7/2), fine grained, strong HCl reaction, extremely weak (R0), finely laminated (1/16-3/16"), <5% fine black inclusions (<1/16"), 1/4" thick more competent bed at 239.9' (very 	R10: 8 minutes
250			3	249.4' - Fracture, 10 deg, rough, undulating 249.5' - Fracture or mechanical break. 60-70	H	weak -R1) - No Recovery 240.8-244.0' Limestone	-
-208.0 -	R11-HQ		>10	deg, rough, undulating 249.6' - Fracture, horizontal, rough, undulating, contact with finer grained limestone		244.0-246.5' - yellowish gray, (5Y - 7/2), strong HCl reaction, very weak (R1), voids (1/16") over 10-20% of surface, variable in zones, trace	250.0': Not re-circulating mud
-	5 ft 58%	24	4	249.6-250.4' - Fracture zone, limestone fragments 1/2-3/4" thick up to 3" diameter 250.4, 250.9' - Fractures or mechanical break		fossil molds (<1/2"), light olive gray (5Y 5/2) thinly laminated zones up to 1/4" thick spaced 1-2" apart over	-
-	254.0		NR	(2), horizontal, rough, undulating 251.1' - Disk-shaped discontinuity with finer grained limestone below, brown staining on surface 251.2, 251.35' - Bedding plane (2),		 244.6-245.1' No Recovery 246.5-249.0' Limestone 249.0-249.4' - yellowish gray, (5Y 7/2), fine grained, strong HCl 	R11: 10 minutes -
255_ -213.0			>10	horizontal, bedding plane fractures 251.4' - Fracture, 10 deg, rough, undulating, stepped, crosses bedding planes 254.0-254.7' - Fracture zone, 30% limestone fragments 1/2-3/4" in size, single 4" half core		reaction, very weak (R1), pitted surface, <1/1/6" dark brown laminations, many with 1/2" relief 249.4-251.9' - yellowish gray, (5Y 7/2), fine grained, strong HCl	-
-	R12-HQ 5 ft 96%	35	>10	diameter with vertical rough undulating fracture or mechanical break, remaining fragments 1-2" diameter 255.1' - Fracture, horizontal, rough,		reaction, weak to medium strong (R2 to R3), voids (1/16") over surface variably <5-10% in thin zones, larger cavities/fossil molds up to 1/2"	_
-			2	undulating 255.4' - Fracture or mechanical break, horizontal, rough, undulating, stepped, 1/2" 255.6-255.8' - Fracture zone, 1/2" thick		variable from trace to 5%; thinly bedded (1/2-3/4") at 249.6-250.4', very fine grained thin beds (<2") with no voids/fossils 251.2-251.5', very	R12: 8 minutes
-	259.0		>10 NR 2	bedding plane parting 255.8, 256.2' - Bedding plane (2), horizontal, smooth, bedding plane partings 256.2-256.6' - Fracture zone, similar to		fine black inclusions (<1/16") over 1-2% No Recovery 251.9-254.0' Limestone	-
260 -218.0 -			>10	255.6-255.8' 256.9, 257.1' - Bedding plane (2), horizontal, rough, bedding plane partings 257.8' - Fracture or mechanical break, 70-80 deg		254.0-258.8' - yellowish gray, (5Y 7/2), strong HCl reaction, very weak (R1), medium density, alternating zones of very fine grained and fine grained, voids (1/16") occur in	
- - -	R13-HQ 5 ft 44%	0	NR	in length 257.9-258.4' - Fracture zone, fragments 1-2" in length 259.0-259.4' - Coarse carbonate sand 259.4-259.6' - Fractures (2), horizontal, rough, undulating, single full-core diameter, limestone, fracture faces on both ends		horizontal zones up to 25% of surface, fossil molds and casts up to 1/2" in discrete zones 1/2-1" thick No Recovery 258.8-259.0'	- - - R13: 7 minutes
-	264.0				H	-	



338884.FL AD-01

SHEET 4 OF 17

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724033.5 N, 457716.3 E (NAD83)

CORING METHOD AND EQUIPMENT: Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

WATER LEVELS: 5.17 ft bgs on 9/13/07 START: 8/23/2007 END: 9/7/2007 LOGGER: R. Bitely, C. Sump, T. Borton, J. Burkard, J. Townes DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD SYMBOLIC MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 259.6-261.2' - Fracture zone, limestone Limestone 264.0': Driller's Remark: fragments 1/2" to 1-1/2" with 20% sand and 259.0-261.2' - Same as 254.0-258.8' No loss of torque except extremely weak (R0), 265 fine gravel material Tag bottom of hole at fractured during drilling process into -223.0 268.5' silty sand/gravel-sized material Bit clear No Recovery 261.2-269.0' Mud pump on low (6 - 8 R14-HQ gallons per minute) 5 ft 0 NR Sand-sized limestone **0%** material in previous run possible washout 269.0 269.0-269.6' - Fracture zone, limestone Limestone Fragments 269.0-269.8' - yellowish gray, (5Y 7/2), mild HCl reaction, fine to >10 fragments; 1/2-2" diameter, <5% fines 270 (sand-sized) -228.0 269.6-270.1' - Fracture zone, sandy gravel medium gravel-sized fragments >10 sized material range in size from 1/4-2", fragments 270.1' - Discontinuity with competent exhibit voids (1/16-1/8") over 10-25% limestone, weak rock (R2) of surface, cavities (up to 3/4") R15-H0 270.3' - Fracture or mechanical break, variable from trace to 15% 0 5 ft 32% horizontal, undulating, bedding plane fracture Clayey Silt (ML) 270.6' - Mechanical break 269.8-270.0 - slow strong HCI NR reaction Limestone 270.0-270.6' - yellowish gray, (5Y R15: 11 minutes 7/2), fine grained, strong HCI 274.0 reaction, extremely weak (R0). 274.0-274.2' - Fracture zone, 3/4-1" medium density, thinly bedded (1-2") >10 limestone fragments with fine laminations (<1/16") between beds, voids (1/16") up to 274.2, 274.5, 274.7' - Bedding plane (3), 275 -233.0 horizontal, smooth, planar, bedding plane 30% in discrete horizontal zones 1/2" >10 fractures thick 274.7-275.1' - Fracture zone, 3/4" to 1-1/2" No Recovery 270.6-274.0' fragments Limestone R16-HQ 275.2' - Fracture or mechanical break, 274.0-275.8' - vellowish gray. (5Y 0 5 ft >10 62% vertical, rough, undulating 7/2), very fine grained, strong HCI 275.4' - Contact between fractured limestone reaction, extremely weak to very above and very weak limestone below 275.6-276.2' - Fracture zone, 1/4" to 1-1/2" weak (R0 to R1), voids (1/16") over 5% of surface concentrated in NR fragments discrete horizontal zones (bedding R16: 10 minutes 276.2-277.1' - Fracture zone, limestone plane fractures) fragments 3-4" with sandy fine gravel sized **Limestone Fragments** 275.8-276.1' - very fine grained, with 1" thick bed of greenish gray (5G 6/1) 279.0 pieces at end 279.0-280.7' - Fracture zone, 80% fragments 3/4" to 1-1/2", few larger fragments up to 3", >10 280 limestone, very strong (R5), -238.0 undulating fracture surfaces numerous cavities up to 7/8" on one >10 side of bed (cannot determine bed orientation) Limestone R17-H0 276.1-277.1' - yellowish gray, (5Y 7/2), fine to medium grained, mild 0 5 ft 34% HCl reaction, medium strong (R3), NR voids (1/16") over 15% of surface, larger cavities up to 1" over 10-15% of rock R17: 13 minutes No Recovery 277.1-279.0' 284.0



338884.FL AD-01

ROCK CORE LOG

SHEET 5 OF 17

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

WATER	LEVELS: 5.	7 ft b	gs on 9	9/13/07 START: 8/23/2007 END: 9/	7/2007	LOGGER : R. Bitely, C. Sump, T	. Borton, J. Burkard, J. Townes
≥ □ ≥	(%			DISCONTINUITIES	[ي	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS OF THE PROPERTY	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
_	00 31 32	м_	>10	THICKNESS, SURFACE STAINING, AND TIGHTNESS 284.0-285.65' - Fracture zone, 70% fragments 1-3" in size, 30% 1/2-1" in size,	S	CHARACTERISTICS Limestone Fragments - 279.0-280.7' - yellowish gray, (5Y	284.0-286.5': Note core barrel plugged after coring -
285_ -243.0			>10	thinly bedded (1/4" thick) smaller fragments; fragments exhibit bedding plane partings	Ħ	7/2), fine grained, strong HCl reaction, very weak to weak (R1 to R2), trace voids (1/16") over surface,	2.5 feet. Pulled barrel and core, then cored second 2.5 feet with clean barrel.
-	R18-HQ 5 ft	22	>10	285.65' - Fracture, 5 deg, smooth, with black staining 286.1' - Fracture or mechanical break,		fossil molds and casts over 10-15% surface of most fragments, 90% of fossil molds <3/8" in longest	Upper portion of second run indicates material fell out of 1st run (cored twice).
_	82%		3	horizontal, rough, undulating 286.1-286.4' - Fracture zone, 1/2-2" fragments 286.4' - Fractures, 45 deg, rough, undulating,		dimension, few molds up to 3/4", fragments from 279.0-279.1' contain only trace fossils (casts and molds) and exhibit smooth bedding plane	Combined cores for 5 foot interval.
_	289.0		NR	intersecting fracture set (end of full core diameter limestone) 286.85' - Fracture or mechanical break, 45	Ħ	fractures No Recovery 280.7-284.0' Limestone	R18: combined run time: 15 minutes
- 290	200.0		>10	deg, rough, undulating 287.3' - Fracture, 45 deg, rough, undulating 287.7' - Fracture, 5 deg, rough, undulating,		 284.0-284.3' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, medium strong (R3), HCl]
-248.0			>10	soft material 287.9' - Fracture, horizontal, rough, undulating, stepped (1/4" relief)		reaction on fresh (powdered) surface Limestone Fragments 284.3-284.7' - yellowish gray, (5Y	
- - - -	R19-HQ 5 ft 42%	7	NR	289.0-289.15' - Fracture zone, fragments 3/4" to 1-1/2" 289.15' - Silty sand material on fracture surface of full core diameter limestone piece 289.6' - Fracture, 10 deg, undulating, very rough 289.7-290.1' - Fracture zone, fragments 1-3"		7/2), fine grained, weak (R2), very mild HCI reaction, moderate where pulverized, 5-10% voids (1/16") over surface, fossil molds and casts 1/4-3/4" over 25% of surface 284.7-285.7' - yellowish gray with light gray mottling, (SY 7/2 and N7), for grained, 50% frogments overlied.	- - - R19: 11 minutes
_	294.0			in size 290.15-290.4' - Fractures (2), horizontal, rough, undulating, fractures on both of ends	Ħ	fine grained, 50% fragments exhibit thin bedding plane partings (1/4-1/2" thick), light gray clayey seam at	SC 1 collected at 204.0
295_			1	of single core diameter limestone 290.4-290.7' - Fracture zone, 3/4-1" fragments with soft sandy material	Ħ	284.7-285.0'	SC-1 collected at 294.0- 294.91' -
-253 <u>.0</u> -	D00 110		>10	290.7-291.1' - Fractures, undulating, partial full core diameter limestone rock; vertical fracture surfaces intersected by 45 deg	Ħ	fine to medium grained, moderate HCl reaction, very weak to weak (R1 to R2), mostly weak (R2), with thin	
-	R20-HQ 5 ft 58%	18	>10	fracture set 294.95' - Fracture, 45 deg, rough, undulating 294.95-296.9' - Fracture zone, 2-3"		zones of weaker (R1) material, voids (1/16-3/16") over 10-15% of surface, larger cavities/fossil molds up to 1/2"	
-			NR	fragments to 296.0' then rock becomes extremely weak and fractures into silt, sand , and fine gravel sized pieces (<3/4")		diameter over 15-20% of surface No Recovery 288.1-289.0' Limestone And Limestone Fragments	R20: 8 minutes
-	299.0					289.0-291.1' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction on powdered surface, weak	
300 <u>-</u> -258.0			2	299.25, 299.8' - Fractures or mechanical break (2), horizontal, rough, undulating, soft material		to medium strong (R2 to R3), voids — (1/16-1/8") over 15-25% of surface,	
_	DOLUG		1	300.3' - Fracture, horizontal, with loose material; top of dark black (organic) silt clay seam (1" thick)		trace cavities/fossil molds (up to 1/2"), extremely weak (R0) fractured soft material 290.4-290.7": silty,]
-	R21-HQ 5 ft 78%	29	>10	301.1' - Fractures (2), rough, undulating, vertical and horizontal intersecting fractures, possible mechanical break	H	sandy gravel-sized limestone material No Recovery 291.1-294.0'	-
_			>10	301.1-301.4' - Fracture zone, gravel sized limestone fragments (1/4-3/4") with silty		-	-
_	304.0		NR	sandy fines 301.7' - Fractures, vertical, rough, undulating, intersecting fracture set in 3-1/2" core piece		-	R21: 11 minutes

APPENDIX 2BB-318 Rev. 7



338884.FL AD-01

SHEET 6 OF 17

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS : 5.1	7 ft bo	gs on 9	9/13/07 START: 8/23/2007 END: 9/	7/200	7 LOGGER : R. Bitely, C. Sump,	T. Borton, J. Burkard, J. Townes
≥∩≘	. (6)			DISCONTINUITIES	၂ ၂	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A A CE	S.E.A.	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,] 	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
THE N	SNE	ø	SAC ER F	PLANARITY, INFILLING MATERIAL AND	/MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	022	ď	# #	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	
_			>10	301.9-302.9' - Fracture zone, silty sandy material with gravel sized (1/4-3/4")	Н	Limestone And Limestone Fragments	_
305			- 10	limestone fragments (25%)	Д	294.0-295.2' - yellowish gray to	
-263.0			- 10	304.0-304.7' - Fracture zone, extremely weak silt-sized material	Ш	grayish yellow, (5Y 7/2 to 5Y 8/4), strong HCl reaction, extremely weak	
			>10	305.1, 305.2, 305.35, 305.7' - Fractures or	Н	to very weak (R0 to R1), intact core	1
	R22-HQ			mechanical break (4), horizontal, slightly	Н	from 294.0-294.9': finely laminated	1
_	5 ft 91%	9	>10	rough to smooth, weak rock, possible bedding planes	ш	 with darker laminae (1/16" thick) spaced 1/2-1" apart 	1
-	0170			305.7-305.9' - Fragments (1/2-1")	Ш	Limestone Fragments	1
-			2	305.9-306.5' - Fracture zone, extremely fractured zone slightly healed (intact core	ш	295.2-296.2' - Same as 294.0-295.2' except voids (1/16-1/8") over 5-10%	-
-			1	piece)	Н	of surface, trace cavities up to 1/2"	R22: 12 minutes
-			NR	306.5-307.0' - Fracture zone, 1-3" fragments 307.3, 307.6, 307.9, 308.0' - Fractures (4),	Ħ	diameter 296.2-296.9' - Same as 294.0-295.2'	-
-	309.0		INK	horizontal, rough, undulating, partially	丗	except moderate HCl reaction,	-
-			>10	stepped (1/4" relief)	₩	extremely weak (R0), fractured into	-
310 <u>-</u> -268.0				309.0-310.3' - Fracture zone, 3/4-3"	Ш	silty sandy gravel-sized material 25% gravel / 75% coarse to fine-grained	-
-200.0			1	- Inaginorite	Ш	silt and sand-sized particles	-
_				310.9, 311.2, 311.4, 312.1, 312.4, 312.6' -	Н	No Recovery 296.9-299.0'	_
_	R23-HQ 5 ft	22	2	Fractures or mechanical break (6),	H	_ 299.0-300.3' - yellowish gray to light	_
	76%			horizontal, rough, undulating	Н	olive gray, (5Y 7/2 to 5Y 5/2),	_
			3		Ш	moderate HCl reaction, extremely weak (R0), fragments with preferred	
			$\dot{-}$		ш	horizontal orientation (yellowish gray)	
			NR		Н	with fine grained light olive gray matrix material, fragments up to 1" in	R23: 11 minutes
	314.0		IVIX		П	longest dimension, finely laminated	1
-				314.0-316.5' - Fracture zone, 1-3" limestone	\Box	Clay (CL)	1
315			>10	fragments	Н	_ 300.3-300.5' - dark black, no HCl reaction, finely laminated, organic	1
-273.0				_	Ш	Limestone	_
-			>10		ш	 300.5-301.9' - yellowish gray, (5Y 7/2), fine grained, extremely weak 	-
-	R24-HQ				Н	(R0), dark gray/black blebs covering	-
-	5 ft	20	>10		Ħ	 5-10% of surface, dark brown staining on few fracture surfaces 	-
-	94%		-	316.8' - Fracture, 45 deg, rough, undulating	Ш	301.9-302.9' - Same as 300.5-301.9'	
-			>10	317.0' - Fracture, 50 deg, rough, undulating, tight	Н	 except fractured into silt and 	-
-			-	317.5' - Fracture or mechanical break,	口	gravel-sized limestone fragments No Recovery 302.9-304.0'	R24: 8 minutes
-			2	horizontal, rough, undulating 317.5-317.8' - Fracture zone, silty material	Ш	Limestone	
-	319.0		NR	with gravel sized fragments (3/4")	H	304.0-307.8' - yellowish gray, (5Y 7/2), fine grained, slow strong HCl	-
-			5	318.1' - Fracture, 15 deg, rough, undulating 318.3' - Fracture or mechanical break,	Ħ	reaction, extremely weak to weak	-
320				horizontal, rough, undulating	世	(R0 to R2), with dark gray blebs up to 1/2" in size	
-278.0			>10	319.3, 319.4, 319.6, 319.7, 319.85' -	Ш	_ 307.8-308.55' - light olive gray, (5Y]
				Fractures (5), horizontal, rough, undulating, bedding plane partings 2-4"	Ш	5/2), strong HCl reaction, medium strong (R3), sharp contact with	
	R25-HQ 5 ft	37	>10	320.2-321.8' - Fracture zone	Н	_ yellowish gray limestone above,	
	82%	51	- 10	321.8' - Contact with competent limestone	H	finely laminated 307.8-307.9', voids	
				322.1' - Fracture, horizontal, stepped, (1/4"	H	1/16" over 30-40% of surface, few larger cavities up to 3/8" (<2%)]
1			2	relief)	Н	No Recovery 308.55-309.0'	1
1			\equiv	322.7' - Fracture or mechanical break, horizontal, rough, undulating	Ш		R25: 9 minutes
	324.0		NR		田	_	1
	0_1.0				\sqcap		†



338884.FL AD-01

SHEET 7 OF 17

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

WATER	LEVELS : 5.1	7 ft b	gs on 9	9/13/07 START: 8/23/2007 END: 9/	7/200	7 LOGGER: R. Bitely, C. Sump, 7	T. Borton, J. Burkard, J. Townes
≥0.0	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	L RUI	(%) Q	되는 문학	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	۵	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
LEV.	SORE	ROD	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	₹	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ПОШ	OJE	LL.		324.0-324.7' - Fracture zone, 1" to 1-1/2"	0)	Limestone	
-			>10	fragments; 324.0-324.2' thin very weak	仠	 309.0-311.5' - yellowish gray, (5Y 	-
325_ -283.0				fractured silty material	╬	7/2), weak (R2), very strong HCl reaction, voids (1/16-1/8") variable	Driller's Remark: No loss of
-					世	 10-30% of surface concentrated in 	torque during drilling; wash -
-	 R26-HQ				╁	zones preferentially oriented along horizontal bedding planes	out fine soft material possible
-	5 ft 14%	0	, ID		╨	- 311.5-312.1' - Same as 309.0-311.5' except pale yellowish brown, (10YR	-
-	1470		NR		屽	6/2)	-
-					世	- 312.1-312.8' - Same as 309.0-311.5' No Recovery 312.8-314.0'	1
-					世	Limestone	R26: 10 minutes
-	329.0				╁	- 314.0-318.7' - Same as 309.0-311.5' except more fragmented, color	1
-	329.0			329.0-329.4', 330.4-331.15', 331.7-331.95' -	Till	becoming pale yellowish brown (5YR	1 1
330			>10	Silt intervals 329.6, 329.95, 330.4, 331.15, 331.5, 331.7,	丌	5/2) at 317.0' No Recovery 318.7-319.0'] 1
-288.0				331.95' - Bedding plane fractures,	世	Limestone 319.0-321.8' - pale yellowish brown	
-			>10	mechanical breaks, or silt contacts (7), <10 deg, smooth to rough	1111	with zones of yellowish gray, (5Y 5/2	1
-	R27-HQ	40	. 40	3,7	Ш	with 5Y 7/2), strong HCl reaction, very weak (R1), grading to fractured	C. Sump and R. Bitely
-	5 ft 70%	19	>10		ЪЩ	material 320.2-321.8', voids (1/16")	logging -
			0		╨	over 25-30% of surface, trace cavities up to 3/8"	
					ightarrow	321.8-323.1' - yellowish gray, (5Y	
l _			NR		厂	7/2), fine grained, strong HCl reaction, very weak (R1), finely	R27: 7 minutes
_	334.0				耳	laminated (1/16") 321.8-322.2' No Recovery 323.1-324.0'	
l -			3	334.25, 334.6, 334.85, 335.15, 335.45,	世	Limestone Fragments	
335_			لسّا	335.65, 335.9, 336.25, 337.5, 338.3, 338.65' - Fractures (11), <10 deg, rough, undulating,	₽	324.0-324.2' - very light gray, (N8), fine grained, strong HCl reaction,	
-293 <u>.0</u> -			4	bedding plane fractures or mechanical	oxdot	strong to very strong (R4 to R5), voids/fossil molds (1/16-3/16") over	-
-				breaks, tight to <1/2" open	丰	- 15-20% of surface	-
-	R28-HQ		1	336.5' - Mechanical break	上	Fractured Limestone 324.2-324.7' - yellowish gray, fine	-
-	5.5 ft 100%	55		330.3 - Mechanical break	士	grained, very strong HCl reaction,	R28: 9 minutes
-			1		╁┼	extremely weak (R0), with fine gravel-sized limestone fragments	SC-2 collected at 338.6-
-					+	– (1/4-1/2"), dark brown organic	339.4' -
-			2		븎	material (<2%) No Recovery 324.7-329.0'	-
-	220 5		0		岸	Sandy Silt To Gravelly Silt (ML)	6" of R29 at end of R28
240	339.5		>10		岸	7/2), moist, moderate to strong HCI	run; adjust R28 to 5.5' and R29 to 4.5' to
340 -298.0				339.9, 340.1' - Fractures (2), <10 deg,	世	reaction, >50% silt with <50% limestone fragments as sand to	accommodate
-			>5	smooth, undulating, bedding plane fractures or mechanical breaks	╀	gravel-sized fraction	-
-	Dag 1:5			340.1-340.75' - Fracture zone, rough,	\blacksquare	Limestone 329.4-330.4' - yellowish gray, (5Y	1
-	R29-HQ 4.5 ft	53	2	undulating, gravel sized fragments <3" diameter	口	7/2), very fine to medium grained,	1
-	100%			341.35, 341.5, 341.65, 343.65' - Fractures or mechanical break (4), <10 deg, rough,	世	moderate to strong HCl reaction, extremely weak to very weak (R0 to	1
-			2	undulating, bedding plane fractures or	╆	R1), trace fossil fragments, strong	1
-				mechanical breaks, tight to open <1/2" 342.25-342.3' and 343.15-343.45' - Clay	1	organic odor	R29: 7 minutes
	344.0		1	seams and silt seams	\perp		<u> </u>
					Τ		
					1		1



PROJECT NUMBER:

33884.FL BORING NUMBER:

AD-01 SHEET 8 OF 17

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

				IENT : Dietrich D-120 S/N 820; BL300 F S/N 1517, mud			ORIENTATION : Vertical
WATER	LEVELS : 5.1	7 ft b	gs on s		7/2007		
₹ Ω£	(% C			DISCONTINUITIES	<u> </u>	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%)	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YFA(RE FIGER	Q D (%)	ACTL R FO	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	/BO	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SUF	COF	A Q	FR/ PEF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
			,		Ш	Sandy To Gravelly Silt (ML)	Driller's Remark: 100%
345			1	344.4, 345.25, 345.5, 345.75, 346.0, 346.5, 346.75, 348.3' - Fractures (8), 40 deg,	ш	- 330.4-331.15' - Same as 329.0-329.4'	circulation J. Burkard and C. Sump
-303.0				bedding plane fractures or mechanical	Н	Limestone	logging
_			4	breaks, smooth to rough, undulating	Ħ	331.15-331.7' - Same as 329.4-330.4'	SC-3 collected at 344.4- 345.25'
_	R30-HQ		0		\Box	Sandy To Gravelly Silt (ML)	
	5 ft 100%	77	2		\parallel	331.7-331.95' - Same as 329.0-329.4'	
_			0		Ш	Limestone	08/29/07 16:30
_			U		Ш	331.95-332.5' - Same as - 329.4-330.4'	Stop drilling AD-1 for shift. Remove core barrel for
_			4		Ш	No Recovery 332.5-334.0'	geophysical logging
_	349.0		1		Ш	Limestone	R30: 7 minutes
_					Ы	- 334.0-339.5' - yellowish gray, (5Y 7/2), very fine to medium grained,	09/05/07 10:00
350			2	349.6, 349.8' - Mechanical break (2), 10-30	\sqcap	strong HCl reaction, very weak to	Start drilling at the beginning of the shift
-308.0				deg, rough, undulating 350.2-351.7' - Fracture zone, rough,		— medium strong (R1 to R3), voids <1/16" over <30% of surface, highly	
_			>10	undulating, multiple breaks with sharp	Ш	variable, trace bedding plane of 30	
_	R31-HQ		4.0	angular fragments, no visible orientation	Ш	 deg, trace bedding plane 40 deg, trace inclusion clasts 	
_	5 ft 94%	50	>10		Ш	339.5-340.05' - very light gray to	
_					Ш	 yellowish gray, (N8 to 5Y 8/1), very fine to medium grained, strong HCI 	
_			1	352.7' - Fracture, 70-80 deg, rough,	Н	reaction, extremely weak to weak	
-			0	undulating, tight	Ħ	 (R0 to R2), highly variable, increasing organic laminations with 	R31: 8 minutes
_	354.0		NR		Ħ	depth to mildly to moderately competent organic lens, olive gray to	
-	00 1.0				111	dark gray (5Y 4/1 to N3), very fine to	
355			1	354.6, 355.2, 356.0, 356.5, 357.5, 358.2,	111	fine grained, extremely weak (R0),	
-313.0				358.7, 358.8' - Mechanical break (8),	Ш	no apparent HCl reaction on organic material, mild reaction on limestone	_
_			2	horizontal to 10 deg, rough to smooth, undulating	ш	in section, 10-20% limestone	
-	R32-HQ				Ш	probably due to boxing, limestone same as 340.05-344.0'	
_	5 ft 100%	95	1		Н	340.05-344.0' - Same as	
-	10070				텎	_ 339.5-340.5' except strong HCI reaction, very weak to weak (R1 to	
-			1			R2), trace voids <1/16" intermittent over surface, trace laminated	
-					Ш	organics, variable hardness, variable	R32: 7 minutes
-	359.0		3		田	grain sizes, trace fossil structure, trace mottled coloration, silt seam at	
_	000.0				口	342.25-342.3' and clay seam at	
360			2	350 7 350 8 364 2 364 0 362 0 362 5	田	 343.15-343.45', carbonate derived, friable, nonplastic silts and 	
-318.0				359.7, 359.8, 361.2, 361.9, 362.0, 362.5, 363.1' - Mechanical break (7), horizontal to	+	moderately to highly plastic clays	_
_			>10	15 deg, rough to smooth, undulating 360.3-360.7' - Horizontal bedding plane	뮈	 344.0-349.0' - very light gray with yellowish gray mottling, (N8 and 5Y 	
-	R33-HQ			followed by a fracture zone composed of very	\Box	8/1), very fine grained, moderate to	
-	5 ft 90%	60	2	weak (R1) rock fragments	丗	 strong HCl reaction, very weak to medium strong (R1 to R3), trace 	
-	30 /0				14	voids <1/16" over surface, trace	
-			4	262 7 262 41 Emphison 70 00 decreed	囯	 fossil casts, few cavities <1"x1/4" 349.0-350.3' - yellowish gray, (5Y 	
-			1	362.7-363.1' - Fracture, 70-80 deg, rough, undulating, trace stain	丗	8/1), fine grained, mild to moderate	R33: 7 minutes
-	264.0		NR	5,	+	 HCl reaction, weak to medium strong (R2 to R3), few cavities <1"x1/4" 	
	364.0				Ħ	(i.e. to ixo), iow ouvilles at XIII	
					⊥ I		
					_		-

APPENDIX 2BB-321 Rev. 7



BORING NUMBER: PROJECT NUMBER: 338884.FL

AD-01

SHEET 9 OF 17

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS : 5.1	7 ft b	gs on s	9/13/07 START: 8/23/2007 END: 9/	/7/200	7 LOGGER : R. Bitely, C. Sump, T	. Borton, J. Burkard, J. Townes
				DISCONTINUITIES	O	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEDTH OF CASING
H H H H	N F.	(%) _Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	OEIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
FF.F.	NG CO	OΩ	RAC-	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	898	ŭ	FR	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Sγ	CHARACTERISTICS	BROFO, FEOT REGGETO, ETC.
			_		${\mathbb H}$	350.3-351.0' - yellowish gray, (5Y	
365			1	364.5, 365.0, 365.3, 365.6, 365.9, 366.3,	世	 7/2), very fine grained, mild HCl reaction, very weak to weak (R1 to 	1
-323.0				367.3, 367.6, 368.3' - Mechanical break (9), horizontal to 10 deg, rough to smooth,	1—	R2), <1/16" thick laminar bedding	_
-			5	undulating	1	- planes 351.0-351.7' - yellowish gray	-
-	l R34-HQ			364.6-366.5' - Silt-size particle infill	+-	transition to pale blue, (5Y 7/2 to 5B	-
-	5 ft	35	>10	366.5-367.0' - Fracture zone, angular	╂┷	- 6/2), fine grained, mild to moderate	-
-	98%			fragments up to 1/2"x1" in size	一	HCl reaction, very weak to weak (R1 to R2), visible casts and molds	Driller's Remark: loss of -
-			2		╁┼	- 351.7-353.7' - yellow gray, (5Y 8/1),	circulation at 366.8'
-					丰	fine grained, mild HCl reaction, very weak to weak (R1 to R2), no casts or	D04: 7
_			2		ᅪ	molds	R34: 7 minutes
-	369.0		NR /		$oldsymbol{\perp}$	No Recovery 353.7-354.0'	
l _			1		口	Limestone 354.0-358.4' - very pale orange to	
370			'	369.7, 370.3, 371.4' - Fractures (3),	┰	pale yellowish brown, (10YR 8/2 to	
-328.0				horizontal to 40 deg, rough to smooth,		10YR 6/2), fine to medium grained, mild to moderate delayed HCl	
-			>10	undulating, no stain, no infill 370.7-370.9' - Fracture zone, with clay size	1	reaction, very weak to weak (R1 to	1
-	R35-HQ			particle infill	11	R2), moderately fossiliferous (casts	1
-	5 ft 96%	55	1		世	and molds), <1/16" voids cover 20-50% of surface, solution cavities	-
-	3070				╂┯		-
-			>10	372.4-373.4' - Fracture zone, top of zone	-	_ 358.4-359.0' - yellowish gray, (5Y 7/2), fine to very fine grained,	-
-				along a smooth bedding plane, bottom section is rough and undulating	世	moderate to strong delayed HCl	R35: 7 minutes
-			>10	section is rough and undulating	₩	reaction, weak to medium strong (R2 to R3), <1/16" voids covering <5% of	-
-	374.0		NR		\perp	surface	T. Borton and J. Burkard
-			>10	374.2-374.5' - Fracture zone, no visible	-	359.0-361.3' - very pale orange,	logging –
375_				orientation, gravels 1/2", angular to subangular –	╁┼	(10YR 8/2), very fine to fine grained, — moderate HCl reaction, very weak to	_
-333.0			3	375.3-376.1' - Fracture, 80 deg, rough,	片	weak (R1 to R2), trace voids 1/16" on	_
l _				undulating, 9-9/16" length visible	╨	surface, mildly fossiliferous (casts – and molds), 360.4' undulating	_
_	R36-HQ 5 ft	67	2	375.5, 375.7, 376.1, 377.6, 378.3' - Fractures or mechanical break (5), horizontal, rough,	厂	bedding plane 1/4" thick, dark	
	100%	01	_	undulating		yellowish brown (10YR 4/2) - 361.3-362.4' - yellowish gray, (5Y	
				376.8' - Fracture or mechanical break,	┰	7/2), very fine to fine grained,	1
Ι -			1	horizontal, smooth		moderate to strong delayed HCI	1
I -						 reaction, contains silt-sized particles between breaks 	R36: 5 minutes
-	379.0		1		\top	362.4-363.5' - grayish yellow, (5Y	-
-	01 0.0			270 2 270 41. Expetitive ====================================	世	 8/4), fine to medium grained, strong HCl reaction, solution cavities 	1
			>10	379.2-379.4' - Fracture zone, subangular fragments, 1" length or less	+-	1/8"x1/2"	-
380 <u> </u>				379.9' - Fracture or mechanical break,	-	No Recovery 363.5-364.0' Limestone	
-			>10	horizontal, smooth	+	Limestone 364.0-364.6' - very pale orange to	-
-	D07.130			380.1-380.6' - Fracture zone, subangular fragments, 1" length or less, no visible	╀┼	grayish orange, (10YR 8/2 to 10YR	-
-	R37-HQ 5 ft	60	3	orientation between fractures	\perp	7/4), fine to medium grained, delayed HCl reaction, very weak to weak (R1	
-	82%	-		380.1' - Fracture, horizontal, rough, undulating		to R2), 1/16" voids cover 10-20% of]
I -			1	380.6' - Fracture, 35 deg, rough	_	surface, few cavities 1/4"x1/2"	SC-4 collected at 381.7- 382.8'
			L'	381.0' - Fracture, <5 deg, rough, undulating	上	364.6-366.5' - dusky yellow, (5Y 6/4), very fine to fine grained, delayed mild	552.0
			VID.	381.2, 381.7' - Fractures (2), horizontal, rough, undulating	\vdash	to strong HCl reaction, very weak to	R37: 5 minutes
	384.0		NR	382.7' - Fracture, 50 deg, rough, undulating	\top	weak (R1 to R2), laminar bedding 1/8" planes throughout the section	1
						no plante unoagnout the section	

APPENDIX 2BB-322 Rev. 7



PROJECT NUMBER: BORING NUMBER: 338884.FL

AD-01

SHEET 10 OF 17

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS : 5.1	17 ft bo	gs on 9	9/13/07 START: 8/23/2007 END: 9/	7/200	7 LOGGER: R. Bitely, C. Sump, T	. Borton, J. Burkard, J. Townes
≥0≘	(%)			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ACE ATIC	TH.	(%) Q	F.0	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	٦ ق	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
THE N	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	×ΜΒ	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
□∞⊡	OIR	ď	正品		Ś		
_			>10	384.0-385.0' - Fracture zone, rough, undulating, no visible orientation, angular	世	366.5-368.9' - yellowish gray, (5Y – 7/2), fine to medium grained, strong	_
385				fragments up to 1" length	₽	HCl reaction, very weak to weak (R1	
-343.0			1	385.3' - Fracture or mechanical break,	╨	to R2), highly fossiliferous (molds and casts), two casts at 368.4'	_
_			·	horizontal, rough, undulating, 20% of	Ш	(bivalve crinoids, 1"), solution	_
	R38-HQ 5 ft	13	>10	fractured plane stained black 385.8-387.7' - Fracture zone, no visible	\bot	cavities 1/4"x1" No Recovery 368.9-369.0'	
	74%	13	710	orientation, angular fragments up to 2" in		Limestone	
			>10	length	H	369.0-372.3' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine	
					\vdash	to very fine grained, strong HCl	1
_			NR		ш	reaction, very weak to weak (R1 to	R38: 6 minutes
-	389.0		' ' '	·	\vdash	R2), moderately fossiliferous (casts and molds), 369.0-370.2': 1/16" voids	1
-	000.Ų				F	20-40% of surface, 370.2-372.3':	1
200 -			>10	389.4' - Fracture zone, no visible orientation,	世	1/16" voids covering up to 0-10% of surface	-
390 <u> </u>			\vdash	subangular fragments up to 1/2" length 389.9' - Fracture or mechanical break.	╨	372.3-373.8' - yellowish gray, (5Y	-
-			1	horizontal, rough, undulating	┲	7/2), fine to medium grained, moderate to strong HCl reaction,	-
-	R39-HQ			390.5' - Fracture, horizontal, smooth, possible mechanical break	世	very weak to weak (R1 to R2),	-
-	5 ft	48	4	391.0, 391.1' - Fractures (2), horizontal,	╁╌	moderately fossiliferous (casts and molds), solution cavities 1/2"x1" in	-
-	90%			smooth, bedding plane parting 391.5, 391.8, 392.0, 392.3, 392.4' - Fractures	岸	moids), solution cavities 1/2 x1 in	-
_			3	(5), horizontal, smooth, undulating		No Recovery 373.8-374.0'	-
_					₽	Limestone 374.0-378.5' - transitions from	D20: 7 i t
_			3	393.1, 393.2' - Fractures (2), horizontal, smooth, undulating, bedding plane parting	厂	grayish yellow to dusky yellow, (5Y	R39: 7 minutes
_	394.0		NR	393.3' - Fracture or mechanical break,	上	8/4 to 5Y 6/4), fine to medium grained, mild to moderate HCl	
_			3	horizontal, rough, undulating 394.3, 394.4, 394.7' - Fractures (3),	╁	reaction, very weak to weak (R1 to	0.2' of core believed to be recovered from R39
395				horizontal, smooth, bedding plane parting	F	R2), voids to <1/16" over 10-20% of surface, moderately fossiliferous	
-353.0			>10	395.0, 395.2' - Fractures (2), horizontal,		(casts and molds)	_
			- 10	rough, undulating 395.4-395.7' - Fracture zone, no visible	Н	378.5-379.0' - bluish white, (5B 9/1), - fine grained, delayed strong HCl	_
	R40-HQ	43	2	orientation, subangular fragments up to 1"	Щ	reaction, weak (R2), voids to <1/16"	
	5 ft 100%	+3		395.9' - Fracture, horizontal, rough 396.2' - Fracture, <5 deg, rough, undulating	」	over 30-50% of surface - 379.0-380.6' - yellowish gray, (5Y]
			2	396.6, 396.8, 397.8' - Fractures (3),	\vdash	8/1), fine to medium grained, delayed]
1 1			2	horizontal, rough, undulating	F	moderate to strong HCl reaction,	1
1					Ľ	- very weak to weak (R1 to R2), planar laminations, trace fossils	R40: 7 minutes
	399.0		3	398.4' - Fracture, horizontal to 10 deg, smooth, undulating	₽	380.6-383.1' - Same as 378.5-379.0'	1
1				399.2, 399.4, 399.6' - Fractures (3), <10 deg,	Ш	except yellowish gray, (5Y 7/2)No Recovery 383.1-384.0'	1
400			4	rough, undulating	世	Limestone	1
-358.0				399.9' - Fracture, horizontal, smooth,	╁	384.0-385.0' - yellowish gray, (5Y 7/2), fine to medium grained,	
-			3	undulating 400.1, 400.2' - Fractures (2), horizontal,	厈	moderate HCl reaction, weak (R2),	-
-	R41-HQ			rough, undulating, bedding parting	廿	voids to <1/16" over 20-30% of surface	-
-	5 ft	37	2	400.6' - Fracture or mechanical break, horizontal, rough, undulating	╨	385.0-386.0' - light bluish gray, (5B	
-	74%		\vdash	401.0' - Fracture or mechanical break,	仜	7/1), fine grained, moderate to strong HCl reaction, weak to medium strong	-
-			1	horizontal, smooth, undulating 401.8, 402.1' - Fractures (2), horizontal,	士	(R2 to R3), trace organics	-
-				smooth, undulating	╁┼	+	R41: 5 minutes
-			NR		厈	-	-
<u> </u>	404.0				\vdash		
						l .	

APPENDIX 2BB-323 Rev. 7



338884.FL AD-01

SHEET 11 OF 17

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

WATER	LEVELS : 5.1	7 ft b	gs on	9/13/07 START: 8/23/2007 END: 9/	7/200	7 LOGGER : R. Bitely, C. Sump, T	. Borton, J. Burkard, J. Townes
≥∩ <i>⊊</i>	(9)			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
DEPTH SURF/ ELEV#	CORE LENG RECO	RQD	FRAC PER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
405			2	404.3' - Fracture, <5 deg, rough, undulating		386.0-387.7' - yellowish gray, (5Y - 7/2), fine to medium grained, delayed mild to moderate HCl reaction, weak	0.3' of core placed in box with R41 - Mechanical break at
-363.0			1	404.9, 405.7' - Fractures or mechanical break (2), horizontal, smooth 406.4' - Fracture, <10 deg, rough, undulating		(R2), layered organics, laminae visible, voids to 1/16" over 20-30% of surface, possible cross bedding	bottom of 0.3' is horizontal and smooth -
-	R42-HQ			406.7' - Fracture, 20 deg, rough, undulating	H	No Recovery 387.8-389.0' Limestone	SC-5 collected at 404.75-
-	5 ft 100%	60	2	407.0' - Fracture, horizontal, smooth, undulating		389.0-391.5' - very pale orange,	405.55' –
-			3	407.2' - Fracture, horizontal, smooth 407.7-407.9' - Fracture, horizontal, rough,	崫	(10YR 8/2), fine to medium grained, delayed mild to moderate HCl reaction, very weak (R1), voids to	-
-			5	undulating, fine to very fine grained 408.0' - Fracture, <5 deg, rough, undulating	H	<1/16" over 0-10% of surface 391.5-393.5' - yellowish gray, (5Y 8/1), fine to medium grained, delayed	R42: 10 minutes
-	409.0		>10	408.3' - Fracture, 10 deg, rough, undulating 408.7' - Fracture, horizontal, rough, undulating	Ħ	mild to moderate HCl reaction, very weak (R1), trace surface voids]
410_ -368.0				408.9' - Fracture or mechanical break, <10 deg, rough, undulating, bedding plane parting	扞	(<1/16"), 393.1': chert lens 0.05" No Recovery 393.5-394.0'	-
-			1	409.0' - Fracture or mechanical break, <10 deg, smooth, undulating	H	Limestone 394.0-395.2' - pale greenish yellow, (10Y 8/2), fine grained, strong HCl]
-	R43-HQ 5 ft 72%	40	>10	409.3' - Fracture zone, horizontal orientation of fragments up to 1-3/16" 409.6' - Fracture, horizontal, smooth, bedding		reaction, very weak (R1), <1/16" voids over 0-5% of surface	-
	72%		1	plane parting 410.4' - Fracture or mechanical break,	囯	395.2-396.8' - Same as 394.0-395.2' except fine to medium grained,]
_				horizontal, rough, undulating 411.1-411.5' - Fracture zone, no visible	F	moderate to strong HCl reaction, voids to <1/16" over 10-20% of	D42: 40 minutes
-	414.0		NR	orientation, one fragment 2-3/8", most <1-3/16", subangular, silty clay size, fine to	H	_ surface 396.8-399.8' - yellowish gray, (5Y	R43: 10 minutes
415			>10	very fine fill 411.9' - Fracture, horizontal, smooth, undulating	Ē	 8/1), strong HCl reaction, very weak to weak (R1 to R2), voids to <1/16" over 20-30% of surface]
-373.0			1	412.5' - Fracture or mechanical break, 5 deg, rough, undulating		── 399.8-402.7' - Same as 395.2-396.8' ☐─ except yellowish gray, (5Y 8/1), fine	
-	R44-HQ		'	414.3-414.6' - Fracture zone, no visible orientation, fragments up to 2-3/8",		grained, delayed strong HCl reaction No Recovery 402.7-404.0' Limestone	-
-	5 ft 88%	18	>10	subangular, silt/clay intermixed with limestone fragments 414.9-415.0' - Fracture zone, no visible		404.0-407.4' - yellowish gray, (5Y - 8/1), fine to medium grained, delayed	
-			>10	orientation, fragments up to 5/8", subangular 415.4' - Fracture, horizontal, rough,	崫	strong HCl reaction, very weak (R1), voids up to <1/16" over 0-5% of surface	-
				undulating, lithologic discontinuity 416.0, 416.05, 416.1, 416.2, 416.35' -	Н	407.4-409.4' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine	R44: 8 minutes
-	419.0		NR	Fractures (5), horizontal, rough, undulating, bedding plane partings	Ħ	to medium grained, mild to moderate HCl reaction, weak (R2), trace voids	-
420 -378.0			>10	416.5' - Mechanical break 416.8-416.9' - Fracture zone, no visible orientation, fragments up to <5/8"',	H	<1/6", fine scale laminar and planar bedding	Driller did not note a change in drilling patterns —
-576.0			>10	subangular to angular 417.4' - Fracture, <5 deg, rough, undulating,	崫	409.4-410.45' - yellowish gray with undulating laminae of olive gray, (5Y 8/1 and 5Y 4/1), fine to medium	(no given reason for low recovery)
-	R45-HQ 5 ft	17		trace fill 417.8-418.1' - Fracture zone, no visible orientation, fragments up to 1-7/8", trace fine	H	grained, mild HCl reaction, extremely weak to very weak (R0 to R1), voids]
-	42%			to very fine grained fill 419.0-419.9' - Fracture zone, no visible	H	to <1/16" over 0-5% of surface, delayed HCl reaction but strong	-
-			NR	orientation, fragments up to 2-3/8", subround, fine to very fine fill	╠	reaction when pulverized, undulating laminations]
-				419.9' - Fracture, 10-20 deg, smooth	H	-	R45: 10 minutes
	424.0				F		-
							1



338884.FL AD-01

SHEET 12 OF 17

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

				NENT . DIEUICH D-120 3/N 620, BL3001 3/N 1317, Illud I			
WATER	LEVELS : 5.1	7 ft b	gs on		7/2007		Г. Borton, J. Burkard, J. Townes
>00	(9)			DISCONTINUITIES	ا يِ ا	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S.	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
出병은	A.H.	(%) Q	I R C	DEDTIL TUDE ODJENITATION DOLLOUNEGO	1 ∺ [MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
F X X	SGE) <u> </u>	25	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	J BC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	SOF	a Q	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	l X N	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
		_		420.2-420.6' - Fracture zone, <10 deg at	╫	410.45-412.6' - yellowish gray, (5Y	424.4': Man-made break
-			>10		₽	7/2), fine to medium grained, delayed	
425_				fragments up to 2-3/8", mostly smaller	1//	mild HCl reaction, very weak (R1),	
-383.0			۱.,	varying sizes, trace dark brown-black staining		trace voids <1/16"	1
-			>10	424.7-424.9' - Fracture zone, no visible orientation, subangular fragments up to	Y	No Recovery 412.6-414.0'	-
-	R46-HQ			<5/8", fine to very fine grained fill		414.0-414.5' - Same as	_ -
-	5 ft	30	>10	425.3-425.5' - Fracture zone, no visible	 	410.45-412.6'	-
l _	88%			orientation, fragments up to 1-3/16", angular,	П	414.5-415.3' - yellowish gray to	_
			,	trace very fine fill 425.8-426.2' - Fracture zone, large fragments	Н	dusky yellow, (5Y 7/2 to 5Y 6/4), medium grained, mild to moderate	1
-			1	up to 3", possible multiple mechanical breaks	ш	HCl reaction, very weak (R1), voids	1 1
-			>10	426.4-427.0' - Fracture zone, fragments up to	╁	to <1/16" over 10-20% of surface	R46: 12 minutes
-			NR	4", subangular to angular, multiple	╁┼	Silty Clay (CL-ML)	-
-	429.0		INIX	mechanical breaks during extraction 427.2' - Mechanical break	ш	415.3-415.9' - dark greenish gray	
l _			1	427.2 - Mechanical break 427.5' - Fracture, horizontal, smooth, bedding	Н	transition to greenish gray, (5GY 4/1 to 5GY 6/1), very fine to fine grained,	429.5' and 429.8': Man- made breaks -
430			'	plane parting	П	no HCl reaction, extremely weak	made breaks
-388.0				427.8-428.4 - Fracture zone or mechanical	╨	(R0)	Only able to obtain 4.0' run
-	R47-HQ		>10	break, fragments up to 3", trace dark . gray/blue staining		Limestone	due to core blockage -
-	4 ft	46		429.5' - Fracture, horizontal, smooth,	Y //4	415.9-418.4' - yellowish gray, (5Y	- -
l -	100%		>10	undulating, bedding plane parting	H	8/1), fine to medium grained, very weak (R1), moderate to strong HCl	_
				430.1-430.2' - Fracture zone, no visible		reaction where pulverized	_
				orientation, fragments up to 1-3/16", trace fine to very fine infill		No Recovery 418.4-419.0'	R47: 12 minutes
-	400.0		>10	430.7' - Fracture, horizontal, smooth,		Limestone	1
-	433.0			undulating, bedding plane parting	///	419.0-419.9' - yellowish gray, (5Y 7/2), fine to medium grained, weak to	-1
-			2	430.85' - Fracture, 80 deg, rough, undulating	口	medium strong (R2 to R3), strong	-
l -				431.0' - Fracture, horizontal, smooth, bedding plane parting	Н	HCl reaction when pulverized, clays	_
1			2	431.5' - Fracture, 45 deg, rough, undulating,	ш	are very fine to fine grained, extremely weak (R0), no HCl	1
435			-	fragments of quartz up to 1/2", angular to	Н	reaction, medium plasticity	1
-393.0				subangular —	ш	Limestone	SC-6 collected at 435.3-
-	R48-HQ		1	431.9-433.0' - Fracture zone, no visible orientation, fragments up to 2", angular, trace	₩	419.9-421.1' - yellowish gray to light	436.2'
-	6 ft	56		fine to very fine fill	╁┼┼	olive gray, (5Y 7/2 to 5Y 5/2), fine grained, slightly delayed strong HCl	-
l _	100%		3	433.4, 433.6' - Fractures or mechanical break	П	reaction, weak to medium strong (R2	<u> </u>
				(2), horizontal, bedding plane parting, trace	Н	to R3), <1/16" voids on 10-20% of	1
-				black staining 434.0' - Fracture, horizontal, smooth,	ш	surface	1 1
I -			>10	undulating	╁┼┼	No Recovery 421.1-424.0' Limestone	1 -
-				434.5' - Fracture or mechanical break, <10	⇈	424.0-424.7' - yellowish gray to light	R48: 20 minutes
1 -			2	deg, smooth	μ	olive gray, (5Y 7/2 to 5Y 5/2), fine to	1370. 20 Hilliutes
I _	439.0			435.1-435.5' - Fracture or mechanical break, 45-50 deg, rough, stepped	Ш	medium grained, moderate HCI	_ _
				436 3' - Fracture horizontal smooth trace fill		reaction, weak to medium strong (R2 to R3), voids <1/16" on surface	1
440			>10	436.5, 436.6' - Fractures (2), 20-30 deg,		10-20%	7 1
-398.0			<u> </u>	rough, undulating, large solid fragment — 1-3/16" in between	╂┯╂	Clayey Gravel (limestone	
-			>10		丗	Fragments) (GC)	
-	_		10	orientation, fragments up to 2-3/8", angular to	₩	424.7-425.55' - yellowish gray, (5Y 8/1), moderate to mild HCl reaction,	1
I _	R49-HQ 5 ft	0	<u> </u>	subangular, trace amounts of very fine fill	Ш	extremely weak (R0), fine to medium	
1 -	5π 46%	U		437.6-438.1' - Fracture, 80 deg, rough, undulating		grained limestone gravels, <1/2"	1
-				438.1' - Fracture, horizontal, smooth, bedding	╀	Limestone	1
-			NR	plane parting	口	425.55-426.2' - yellowish gray, (5Y	-
1 -				438.4' - Fracture or mechanical break, 40	╂┼┼	8/1), fine grained, very weak (R1), strong HCl reaction where pulverized	R49: 10 minutes
1			I	deg, rough, undulating	\Box	outong From reaction where purveillzed	1148. TO HIMBURS
-			ı	<u> </u>	_		
_	444.0				oxdiv		
-	444.0				H		



338884.FL AD-0

AD-01

SHEET 13 OF 17

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

00111110	METHODA	VD L	ZOII IV	IENT . DIELICI D-120 3/N 620, BL3001 3/N 1317, Illud I	otal y,	y, na tools, nivitasing Orientation . Vertical
WATER	LEVELS: 5.1	7 ft b	gs on		7/200	07 LOGGER: R. Bitely, C. Sump, T. Borton, J. Burkard, J. Townes
>	<u> </u>			DISCONTINUITIES	G	LITHOLOGY COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		Ś	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,
표원한	Z, A	(%	FRACTURES PER FOOT		음	MINERALOGY, TEXTURE, SIZE AND DEPTH OF CASING,
F ¥ ¥	GTEN	(%) Q	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS, AND BOOK MASS WEATHERING, HARDNESS, AND BOOK MASS
989	E E E	Ø	RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	AND ROCK MASS CHARACTERISTICS DROPS, TEST RESULTS, ETC.
ΔОШ	0716	22	шп		S	
l _			>10	439.0-439.6' - Fracture zone, no visible	Н	Clayey Gravel (limestone
445			- 10	orientation, weak fragments <1/2", angular to subangular		Fragments) (GC)
-403.0				439.6' - Bedding plane, horizontal		424.7-425.55' except slightly delayed
-			2	439.8' - Fracture, <5 deg, clay and gravels	╂┷	strong HCl reaction, clay, low to
l _				<1/2" fill		medium plasticity
	R50-HQ			440.0-441.3' - Fracture zone, no visible		Limestone Manual break above 446.5'
-	5 ft	53	2	orientation, fragments up to 2", mostly <1",	╨	426.4-428.4' - Same as to fit in box
-	94%			subangular, possibly fine grained fill 444.0-444.8' - Fracture zone, fragments up to	\Box	425.55-426.2' except very fine to fine
l _			2	1-3/16", subround, including quartz		grained, slightly delayed moderate to strong HCl reaction, medium strong
			-	fragments	\vdash	to strong (R3 to R4), laminations
-			1	444.8' - Fracture, horizontal		No Recovery 428.4-429.0' R50: 14 minutes
-			1	445.6, 445.9' - Fractures or mechanical break	1	Limestone
I -	449.0		NR	(2), horizontal, rough, undulating 446.6, 446.8' - Fractures or mechanical	╀	429.0-430.2' - alternating yellowish
			3	break, 10-20 deg, rough, undulating,	Ш	gray and very light gray, (5Y 8/1 and N8), fine grained, delayed mild HCl
450			٦	fractures same direction	Н	reaction, very weak to weak (R1 to
-408.0				447.5, 447.7' - Fractures, 10-20 deg,		R2), laminar planar bedding with
-			>10	fractures angled in opposite directions: 447.5'	厂	some variation
l _				angled toward ground surface, 447.7' angled	\vdash	430.2-430.7' - yellowish gray, (5Y
	R51-HQ			away from horizontal 448.3' - Fracture, horizontal, smooth,		8/1), very fine to fine grained,
-	5 ft 44%	13		undulating		delayed mild HCl reaction, medium strong to strong (R3 to R4), trace
-	44 70			449.3' - Fracture, horizontal, smooth,	₩	+ voids <1/16"
l -			ND	undulating, bedding plane parting	┢	Clay (CL)
			NR	449.7' - Fracture, 30-40 deg, rough,		430.7-431.0' - dark greenish gray,
-				undulating	Т	(5G 4/1), very fine grained, low to R51: 14 minutes
-				449.7-450.0' - Fracture or mechanical break, >80 deg, rough, undulating		medium plasticity, no HCl reaction,
-	454.0			450.0-450.9' - Fracture zone, fragments up to	-	extremely weak (R0)
l _			>10	2-3/8", angular to subangular, trace black	\vdash	Limestone 431.0-431.5' - yellowish gray, (5Y
455			10	staining		7/2), fine to medium grained,
-413.0				454.0-454.3' - Fracture zone, no visible	1—	extremely weak (R0)
-			2	orientation, fragments up to 1-3/4", subangular		431.5-431.9' - Sàmé as 429.0-430.2'
-				454.3-454.9' - Fracture, rough, gradually	ш	except yellowish gray, (5Y 7/2), weak
	R52-HQ		>10	undulating	Н	to medium strong (R2 to R3),
_	5 ft 86%	0	1 10	454.6, 454.8' - Fractures or mechanical break		
1 -	0070			(2), horizontal to <10 deg	仜	Tagments) (GC)
-			>10	454.9' - Fracture, 45 deg, rough, undulating 455.2, 455.3' - Fractures or mechanical break	厂	431.9-433.0' - yellowish gray, (5Y
I -			10	(2), horizontal to <10 deg, rough, undulating,	\vdash	-L
			<u> </u>	large angular gravels, 1-3/4"		medium strong (R2 to R3), very fine R52: 17 minutes
I -	450.0		NR	455.7-456.9' - Fracture zone, no visible	Ш	to fine grained gravel, low to medium
-	459.0			orientation, fragments up to 4", mostly		plasticity clay
-			>10	<1-3/16", including quartz - no HCl reaction 457.0' - Fracture, 20-30 deg, rough,		_ Limestone 433.0-436.2' - light olive gray, (5Y
460_	R53-HQ 2 ft	0		undulating —	\vdash	5/2), fine to medium grained, weak to
-418.0	95%	U		457.3-457.5' - Fracture zone, fragments	\Box	medium strong (R2 to R3), strong R53: 8 minutes
-			1	<1-3/16", including quartz		HCl reaction when pulverized,
-	461.0		NR.	457.9-458.3' - Fracture zone, angular	₩	undulating lamination
I -			2	fragments up to 2-3/8", horizontal bedding	\vdash	436.2-437.5' - yellowish gray, (5Y 7/2), fine to medium grained,
1			_	plane at 457.9' 459.1-460.4' - Fracture zone, no visible		moderate to strong LCI reaction
I -	R54-HQ			orientation, fragments up to 2-3/8",	\coprod	weak to medium strong (R2 to R3),
-	3 ft	39	>10	subangular, including quartz	+	voids <1/16" over 20% of surface
-	100%			460.7' - Fracture, <10 deg, rough, undulating,		ᠯ║
				fragments of quartz infill	\vdash	R54: 10 minutes
1 -	464.0		2	461.1' - Fracture or mechanical break, horizontal, rough, undulating	ЪП	<u></u>
	TUT.U			Honzontal, rough, undulating	Г	

APPENDIX 2BB-326 Rev. 7



338884.FL AD-01

SHEET 14 OF 17

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

				IENT . Dietiich D-120 S/N 620, BL3001 S/N 1317, Illuu					ORIENTATION : Vertical
WATER	LEVELS : 5.1	7 ft b	gs on		7/200)7	LOGGER : R. Bitely, C. Sump,	Τ.	
≥∩ ₽	. (9			DISCONTINUITIES	٥	L	LITHOLOGY		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S.	DESCRIPTION	SYMBOLIC LOG		ROCK TYPE, COLOR,		OIZE AND DEDTH OF GAOING
出병은	RUN H, 4	(%) Q	N N	DEDTIL TYPE OPIENTATION POLICINESS	7	ı	MINERALOGY, TEXTURE,		SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
F A S	ZE I	0	ZCT FCT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	β	ı	WEATHERING, HARDNESS, AND ROCK MASS		SMOOTHNESS, CAVING ROD
SCE	COL	S S	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S X	ı	CHARACTERISTICS		DROPS, TEST RESULTS, ETC.
				461.9' - Mechanical break, horizontal, rough,		П	437.5-438.0' - dark greenish gray		
-			>10	undulating	+-	ŁΙ	with dusky yellow, yellowish gray,		-
465_				462.2' - Fracture, horizontal, smooth, bedding		Н	very light gray, (N8 with 5Y 6/4, 5GY 8/1, 5Y 4/1), very fine to fine grained,		
-423.0			1	plane parting 462.7-463.15' - Fracture zone: at 462.7',	\perp	11	very strong delayed HCl reaction,		_
			'	20-30 deg; at 463.15', 20-30 deg (opposite		Ш	strong (R4), trace chert layers		
-	R55-HQ			directions), elsewhere no visible orientation,	7,1	П	438.0-439.0' - yellowish gray, (5Y		R55: 15 minutes
-	5 ft 82%	17	>10	fragments up to 1-3/4", angular to subangular 463.4' - Fracture, horizontal, rough,	1	H	7/2), moderate to strong delayed HCI reaction, strong (R4), <1/16" voids		_
-	0270			undulating, bedding plane parting	+	H	over <5% of surface, trace organics		Milky white quartz found on
-			>10	463.7' - Fracture, horizontal, rough,	+	╂╢	(peat or coal)		table after core was boxed; -
l -				undulating	\perp	11	Coal		possibly from fracture
l _				464.3-465.0' - Fracture zone, no visible orientation, angular fragments up to 1-13/16"	\perp	LI	439.0-439.5' - black, (N1), very fine to fine grained, extremely weak (R0),		zone, not found somewhere in run (after –
	469.0		NR	465.3' - Fracture, horizontal, rough,	Ш	11	trace amounts of limestone		boxed)
I -	. 30.0			undulating	1	$\ \cdot\ $	fragments: dusky yellow (5Y 6/4),		
			>10	465.7-466.8' - Fracture zone, (465.7-466.1': fine to medium infill with limestone	#	1-1	fine to medium grained, mild HCl		
470_ -428.0				fragments); fragments up to 1-3/4", black	╫	Н	reaction, trace calcite crystals to 1/8"		
-420.0			4	staining, mostly infill at 466.6-466.8'	\perp	11	Limestone Fragments 439.5-441.3' - moderate olive brown,		_
l _				467.4-467.9' - Fracture zone, rough,	\bot	╁║	(5Y 4/4), fine to medium grained,		
	R56-HQ			undulating, horizontal at 467.4', no visible orientation elsewhere, fragments up to		11	extremely weak (R0), fine grains		SC-7 collected at 470.85 to
-	5 ft 90%	42	0	2-1/16", angular to subangular, similar infill to	1	H	have strong HCl reaction, gravels have moderate HCl reaction, 20-30%		472.05' -
-	00,0			465.7-466.8', fine to medium grained, <10%		1	voids on gravel, some weak (R1)		_
-			>10	black staining 469.0-470.0' - Fracture zone, rough,	+-	+	gravel		-
-				undulating, fragments to 2-3/8", horizontal	+	$ \cdot $	No Recovery 441.3-444.0'		R56: 10 minutes
l -				plane at 470.0'; possible bedding plane	\perp	H	Limestone 444.0-447.4' - yellowish gray, (5Y		R36. 10 Illinutes
Ι.	474.0		NR	parting		11	7/2), fine to medium grained, very		
				470.6, 470.7, 470.75, 470.85' - Fractures (4), horizontal, rough, undulating	Н	$\ \cdot \ $	weak to weak (R1 to R2), strong HCI		
475			1	472.0, 472.3' - Fractures or mechanical break		Ħ	reaction where pulverized, voids to <a> <1/16" over <5% of surface		
-433.0				(2), 20 deg, rough, undulating, opposite	┰	H	Limestone		
-			3	directions 472.6' - Fracture, horizontal, rough,	世	╊╽	447.4-448.7' - grayish orange, (10YR		-
-	DE7.110			undulating	+	+	7/4), fine grained, medium strong (R3), strong HCl reaction where		_
_	R57-HQ 5 ft	65	3	472.6-473.3' - Fracture zone, no visible		11	pulverized		_
Ι.	100%			orientation, fragments up to 4", mostly <2-3/8"	\perp	Łl	No Recovery 448.7-449.0'		
Ι -				474.3-474.5' - Fracture, horizontal to <10		1	Limestone		
1 -			1	deg, open with fragment 2-3/8"	1	1	449.0-450.0' - yellowish gray with light gray laminations, (5Y 8/1 and		
-				475.0' - Fracture or mechanical break,	+	f l	N7), fine to medium grained, mild to		R57: 13 minutes
-			3	horizontal to <10 deg, rough, undulating 475.3' - Fracture, 20-30 deg, rough, with	$+$ \square	╊╽	moderate HCl reaction, alternating		
-	479.0			fragment 1-3/16", subangular	\pm	<u>f-</u>	very weak (R1) and weak (R2)		-
1 -			>10	475.9' - Fracture or mechanical break,	\Box	Į.∣	Limestone Fragments 450.0-451.2' - transition from		_
480			L	horizontal, rough, undulating, bedding plane parting	┵		yellowish gray to moderate yellowish		
-438.0				476.3, 476.4' - Fractures (2), horizontal to	\coprod	П	brown, (5Y 7/2 to 10YR 5/4), fine to		
-			>10	<10 deg, rough, undulating	1	f l	medium grained, moderate to strong HCl reaction, medium strong (R3) in		
-	R58-HQ			476.5' - Fracture, 40-50 deg, rough, undulating, with large fragments		1-1	yellowish gray fragments, strong (R4)		-
-	5 ft	22	>10	477.4' - Fracture or mechanical break, 10-20	++	 	in moderate yellowish brown gravels		-
-	96%			deg, rough, undulating	\perp	1	No Recovery 451.2-454.0'		
I -			1	478.2, 478.5' - Fractures or mechanical break (2), <10 deg, rough, undulating, black	_	L			
				(2), <10 deg, rougn, undulating, black staining		1			
			2	478.8' - Mechanical break, horizontal, rough,	1	ſ			R58: 10 minutes
-	184.0			undulating	世	1			_
	484.0				+	t	<u> </u>	_	-
						1			



BORING NUMBER: PROJECT NUMBER: 338884.FL

AD-01

SHEET 15 OF 17

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS : 5.1	7 ft b	gs on 9	9/13/07 START : 8/23/2007 END : 9	/7/200)7	LOGGER: R. Bitely, C. Sump,	Т.	Borton, J. Burkard, J. Townes
300	<u>-</u>			DISCONTINUITIES	(J	Γ	LITHOLOGY		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	- 100	Γ	ROCK TYPE, COLOR,	П	
밀병	R H H	(%) Q	URE	DEDTIL TYPE OPIENTATION POLICUNESS	SYMBOLIC	l	MINERALOGY, TEXTURE,		SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H A A	RE I) [ACT R FC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	ABC	l	WEATHERING, HARDNESS, AND ROCK MASS		SMOOTHNESS, CAVING ROD
SCIE	SHR	S Q	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	l	CHARACTERISTICS		DROPS, TEST RESULTS, ETC.
			NR)	478.9' - Fracture or mechanical break, 40-50	\top	T	Limestone		
105			>10	deg, rough, undulating 479.4-479.7' - Fracture zone, horizontal at	+	ł	454.0-456.8' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine		_
485 <u></u> -443.0				479.4-479.7 - Fracture Zone, nonzontal at 479.7', no visible orientation elsewhere,	+	₽	to medium grained, strong HCl		
-	R59-HQ		2	fragments up to 1-3/4"	╁	╁	reaction, medium strong to strong		-
-	4 ft	0		479.7-480.0' - Fracture or mechanical break,	\perp	1	(R3 to R4), <1/16" voids on 0-10% of surface		_
l _	88%		>10	80-90 deg, rough, undulating 480.0' - Fracture, 30-40 deg, rough,	\perp	L	456.8-457.3' - moderate yellowish		_
			10	undulating		L	brown, (10YR 5/4), medium grained,		
			3	480.0-480.4' - Fracture zone, fragments up to	\top	ſ	moderate HCl reaction, very weak		R59: 13 minutes
-	488.0		NR	1-3/4", angular 480.4' - Fracture, horizontal, rough,	\blacksquare	Ŧ	(R1), trace organics Limestone Fragments		_
-	400.0			undulating, bedding plane parting	\perp	t	457.3-458.3' - Same as 454.0-456.8'		-
-			3	480.9-481.3' - Fracture zone, no visible	F	╁	except more fragmented		-
-			\vdash	orientation, fragments up to 1-3/4", angular to subangular	世	1	No Recovery 458.3-459.0'		-
-			>10	481.7' - Fracture, 30 deg, slightly rough,	\perp	╀	Limestone 459.0-460.0' - white to very light gray,		-
490_				slightly undulating	上	L	(N9 to N8), fine to medium grained,		
-448.0			>10	481.9-482.2' - Fracture zone, no visible orientation, fragments up to 1-3/16"	\vdash	ł	mild to moderate HCl reaction,		
	R60-HQ		/10	482.9' - Fracture, horizontal to <10 deg,		ſ	medium strong to strong (R3 to R4), voids to <1/16" over 10-20% surface		
-	6 ft 70%	38		rough, undulating	1	ł	area, laminations		SC-8 collected at 490.35-
-	10,0		>10	483.3' - Fracture, <5 deg, rough, undulating 483.6-483.7' - Fracture, horizontal, rough,	\pm	t	460.0-460.4' - Same as 456.8-457.3'		491.25' -
-			>10	large fragment in between 1-3/16"	+	╁	except yellowish gray, (5Y 7/2), fine to medium grained		-
-				484.0-484.1' - Fracture zone, no visible orientation, fragments up to 1-5/8", mostly	-	₽	460.4-460.9' - Same as 459.4-460.0'		-
-			NR	<5/8", subangular	╨	╁	except moderate HCl reaction		D00: 00it
l _			INIX	484.3, 484.5 - Fractures (2), horizontal,	耳	1	No Recovery 460.9-461.0'		R60: 20 minutes
l _	494.0			slightly rough, slightly undulating, bedding	\bot	L	461.0-462.2' - Same as 459.0-460.0'		
				plane partings 484.7, 484.8' - Fractures or mechanical break		1	except fine grained, strong HCI reaction		
495			3	(2), horizontal, rough, undulating	1	ſ	462.2-463.0' - Same as 460.0-460.4'		_
-453.0				484.9-485.2' - Fracture zone, fragments up to - 2-3/8", rough, angular; horizontal fractures at	\perp	┞	except yellowish gray with olive gray		_
-			>10	484.9' and 485.2': rough, undulating	\perp	t	laminations, (5Y 7/2 with 5Y 3/2) 463.0-464.0' - Same as 461.0-462.2'		=
-				485.4, 485.5' - Fractures or mechanical break	+	ł	except very light gray with light bluish		-
-	R61-HQ		1	(2), <10 deg, rough, undulating, possible bedding partings	士	1	gray, (N8 with 5B 7/1), fine to		-
-	6 ft	22		485.8-486.3' - Fracture zone, fragments up to	#	╁	medium grained, strong to very strong HCl reaction, <10% voids on		_
_	62%		>10	3", mostly <5/8", subangular to angular	\perp	1	surface		_
l _				486.6' - Fracture or mechanical break, horizontal, rough, undulating	_	L	Limestone		
				486.8, 487.0, 487.2' - Fractures or		1	464.0-465.7' - pale greenish yellow, (10Y 8/2), fine to medium grained,		
			NR	mechanical break (3), horizontal, rough,	7	ſ	strong HCl reaction, very weak to]
_			' '' \	undulating 487.2-487.5' - Mechanical break, >80 deg,	\blacksquare	1	weak (R1 to R2), long voids to 1-1/2",		R61: 18 minutes
E00 -	E00.0			rough, undulating	\pm	t	mostly <1/16", over 20-30% of surface, possible dissolution features		-
500 <u> </u>	500.0			488.0-488.3' - Fracture, 70 deg, rough,		Н	Silty Limestone Fragments (GM)	Н	
-				undulating 488.3' - Fracture or mechanical break,	-	$ \mathbf{f} $	465.7-466.8' - dusky yellow, (5Y 6/4),	Ш	-
-				horizontal, rough, undulating	-		medium grained, moderate to strong HCI reaction, extremely weak (R0)	Ш	-
-				488.9' - Fracture or mechanical break,	1		Limestone		_
				horizontal, rough, undulating, bedding plane parting			466.8-467.4' - vellowish gray. (5Y		
Ι -				489.3' - Fracture, horizontal, rough,			7/2), fine to medium grained,]
l -				undulating, open with large rock fragment	1		moderate to strong HCl reaction, weak (R2), <10% voids to <1/16" on	П	
l -				1-3/4", angular 489.8-490.3' - Fracture zone, horizontal	1		surface, undulating laminations		=
-				fragments, two large <4", mostly <1-3/16",	1	H	transition to planar, trace organics		-
				trace silty infill	+	╀		Ц	-
						1			
						_			



338884.FL AD-01

SHEET 16 OF 17

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT: Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

DISCONTINUITIES DESCRIPTION DEPTH. TYPE, GRIENTATION, ROUGHNESS, THICKNESS, SUFFACE STANNICO, AND TICHTNESS,	WATER LEVELS : 5	17 ft bgs on	9/13/07 START: 8/23/2007 END: 9/	7/200	07	LOGGER : R. Bitely, C. Sump, T	. Borton, J. Burkard, J. Townes
### dept. ### de	>000		DISCONTINUITIES	ß	L	LITHOLOGY	COMMENTS
### dept. ### de	DEPTH BELOV SURFACE AND ELEVATION (IT CORE RUN, LENGTH, AND	R Q D (%) FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LO		MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
			491.2-492.2' - Fracture zone, or multiple mechanical breaks, fragments up to 2-1/2".5", mostly <2-3/8", angular with variable orientation 494.2' - Fracture, horizontal, smooth, undulating 494.6' - Fracture or mechanical break, 20-30 deg, rough, undulating 494.7-495.7' - Fracture zone, horizontal at 494.7', elsewhere no visible orientation, fragments up to 3", angular 496.2' - Fracture, horizontal, rough, undulating, possible bedding plane parting 497.1' - Fracture or mechanical break, horizontal, rough, undulating 497.4-497.7' - Fracture zone, subangular			467.4-468.1' - grayish black and dusky yellow, (N2 and 5Y 6/4), medium grained, dusky yellow has moderate to strong HCl reaction, extremely weak to very weak (R0 to R1), prevalent organics No Recovery 468.1-469.0' Limestone Fragments 469.0-469.5' - yellowish gray, (5Y 7/2), with milky white quartz fragments, fine with medium coarse gravels, weak to medium strong (R2 to R3) gravels, extremely weak (R0) fines, fragments up to 4", limestone gravels mild HCl reaction, quartz no HCl reaction Limestone 469.5-473.5' - transition from yellow gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine to medium grained, moderate to strong HCl reaction, medium strong to strong (R3 to R4), variable voids, mostly <30% up to 1/4" diameter, 470.4-<470.85': calcite crystals in voids up to 1-1/2", mostly <1/4" for 50-60% voids, at 470.8' linear features - possible burrows or dissolution features 1-1/2" to 2" long, 1/4" wide No Recovery 473.5-474.0' Limestone 474.0-479.0' - from light olive gray to yellowish gray with depth, (5Y 5/2 to 5Y 7/2), fine to medium grained fining with depth, moderate to strong HCl reaction, vida (R2), at 478.2' <1-3/16" zone of extremely weak to very weak (R0 to R1) with strong HCl reaction, voids <1/116" on 10-20% of surface 479.0-483.8' - yellowish gray, (5Y 7/2), fine to medium grained, moderate to strong HCl reaction, weak (R2), voids to <1/16" on 25% of surface, fossiliferous (casts and molds), 479.5-480.3': coarse pebble size fragments, very pale orange (10YR 8/2), hardness and reactivity same as surrounding lithology, 481.6-481.9': silty gravels, same as surrounding lithology, 482.4-483.1': quartz in voids, crystalline growth	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	AD-01	SHEET	17	OF	17

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724033.5 N, 457716.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT: Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS : 5.	7 ft bo	gs on 9	9/13/07 START : 8/23/2007	END : 9/7	/200	LOGGER: R. Bitely, C. Sump, 1	. Borton, J. Burkard, J. Townes
30₽	(%			DISCONTINUITIES		၅	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROL PLANARITY, INFILLING MATERI, THICKNESS, SURFACE STAINING, ANI	AL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
							Limestone 484.0-487.5' - yellowish gray, (5Y 7/2), fine to medium grained, weak (R2), moderate to strong HCI reaction where pulverized, voids to <1/16" on 20-30% of surface, at 485.1': silty clay zone, <2-3/8" wide, extremely weak (R0), strong HCI reaction, all other properties same as surrounding lithology, very similar to 474.0-479.0' and 479.0-483.5' No Recovery 487.5-488.0' Limestone 488.0-492.2' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCI reaction (slightly weaker with depth), weak (R2), voids to <1/16" cover 15-25% surface, voids to 1/2" with crystals that strongly react to HCI, very similar to 474.0-479.0' and 484.0-487.5' No Recovery 492.2-494.0' Limestone 494.0-497.7' - yellowish gray, (5Y 7/2), fine to medium grained decreasing with depth (fining down), moderate to strong HCI reaction increasing with depth, very weak (R1) to weak (R2) slightly increasing with depth, <1/16" voids on 0-10% surface No Recovery 497.7-500.0' Bottom of Boring at 500.0 ft bgs on 9/7/2007	
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338884.FL AD-02

SHEET 1 OF 15

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723982.5 N, 457716.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 3.0 ft bgs on 9/08/07 START: 9/8/2007 END: 9/12/2007 LOGGER: J. Burkard, R. Bitely, T. Borton, J. Townes DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT DESCRIPTION ROCK TYPE, COLOR. SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -157.7 200.1, 200.3, 200.7, 201.7' - Mechanical Limestone Boring AD-2 blind drilled to 200.0 >10 break (4), 0-30 deg, rough, undulating 200.0-201.9' - yellowish gray, (5Y approximately 200 feet 7/2), fine grained, moderate HCI below ground surface 200.9-201.6' - Fracture zone, angular reaction, weak to medium strong (R2 before beginning fragments up to 2" in diameter sampling/logging. Start Drilling at 08:45 09/08/07, Water level 3.0' to R3), sand to gravel-sized broken fragments, infill in section, trace >10 R1-HQ 4 ft 0 voids (<1/16") over surface >10 63% 202.1-202.5' - Mechanical break 201.9-202.5' - yellowish gray, (5Y 7/2), fine to medium grained, below around surface Logger is J. Burkard moderate to strong HCl reaction, R1: 7 minutes NR very weak (R1)
No Recovery 202.5-204.0' 204.0 Limestone 204.0-204.7' - Fracture zone, broken 204.0-204.7' - very pale orange, (10Y 8/2), fine to medium grained, moderate to strong HCI reaction, >10 fragments 205 204.9, 205.4, 205,7, 206.0, 206.8, 207.2, $-162\overline{7}$ 207.6' - Mechanical break (7), 0-20 deg, 3 very weak (R1), voids <1/16" over rough, undulating 15-30% of surface 204.7-205.6' - yellowish gray, (5Y R2-HQ 7/2), fine to medium grained, mild to >10 5 ft 15 moderate HCl reaction, very weak to weak (R1 to R2), trace voids less 207.2-207.8' - Fracture, vertical, rough. >10 than 1/16" of surface undulating, split core in two halves Silty Sand (SM) 207.5' - Mechanical break 205.6-206.4' - silty sand sized particles with broken limestone R2: 9 minutes 207.8-208.0' - Mechanical break NR fragments up to 1/2" in diameter 209.0 Limestone 209.3-210.3' - Fracture zone, angular 206.4-207.8' - pale greenish yellow, >10 fragments up to 2" in diameter 210 (10Y 8/2), very fine to fine grained, -167.7 moderate to strong HCI reaction, >10 210.4-210.8' - Mechanical break weak to medium strong (R2 to R3), laminar bedding planes <1/16" 207.8-208.0' - yellowish gray, (5Y 7/2), strong HCl reaction, very weak to extremely weak (R1 to R0) R3-HQ 7 5 ft 36% No Recovery 208.0-209.0' NR Limestone 209.0-209.7' - yellowish gray, (5Y 7/2), fine grained, moderate HCI R3: 11 minutes reaction, weak to medium strong (R2 to R3), voids (<1/16") over 10-20% of 214.0 214.0-214.4' - Fracture zone, rough, surface 209.7-210.3' - pale greenish yellow, (10Y 8/2), very fine to fine grained, undulating, broken fragments up to 2" in 8 215 strong HCl reaction, very weak (R1), -172.7 214.6, 214.7, 214.9, 215.2, 216.6, 216.8, 5 217.0, 217.4, 217.7, 218.8' - Mechanical <1/16" horizontal bedding planes 210.3-210.8' - very pale orange, (10Y 8/2), fine grained, strong HCl break (10), 0-30 deg, rough to smooth, undulating, minor black organic staining R4-HQ 215.7-216.4' - Fracture zone, rough, reaction, very weak (R1), silt infill >10 40 5 ft undulating, rock fragments up to 3" in No Recovery 210.8-214.0' 100% Limestone diameter 214.0-219.0' - yellowish gray to pale 3 217.5-217.7' - Mechanical break greenish yellow, (5Y 7/2 to 10Y 8/2), SC-1 collected at 217.8fine to medium grained, moderate to 218.9' strong HCl reaction, very weak to 1 R4: 9 minutes weak (R1 to R2), fossil casts and 219.0 molds, voids (<1/16") throughout from 214.0-214.4' and 215.0-216.5' 4 220



338884.FL AD-02

SHEET 2 OF 15

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723982.5 N, 457716.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

WATER	LEVELS: 3.0	ft bgs	s on 9/		12/20		T. Borton, J. Townes
₹ □₽	(((((((((((((((((((DISCONTINUITIES	l g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-177.7 -	R5-HQ		4	219.3, 219.4, 219.9, 220.0, 200.2, 200.4, 200.5, 200.9, 221.3, 222.5, 222.8, 223.0' - Mechanical break (12), 0-15 deg, rough, undulating		Silty Limestone Fragments - 219.0-219.3' - yellowish gray, (5Y 7/2), mild HCI reaction, with broken limestone fragments up to 1/8" in	-
-	5 ft 82%	22	>10 4	219.9, 223.0' - Fractures, 60-90 deg, rough, undulating 221.5-221.8' - Fracture zone, fragments up to 1/2" in diameter		 diameter Limestone 219.3-220.0' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCl reaction, weak to medium strong 	- -
-	224.0		NR	224.1, 225.1, 225.5, 226.1, 226.7, 227.1,		(R2 to R3), laminar bedding planes 220.0-223.1' - pale greenish yellow, (10Y 8/2), moderate to strong HCI reaction, weak (R2), fossil molds and casts, surface cavities (trace	R5: 9 minutes
225_ -182.7 -			>10 3	227.6, 228.3' - Mechanical break (8), rough to smooth, undulating — 224.4-224.8' - Fracture zone, multiple breaks, angular fragments up to 1" in diameter		amounts) up to 1/4" wide and 1/4" in height, pitting on surface No Recovery 223.1-224.0' Limestone	_
-	R6-HQ 5 ft 98%	43	1			224.0-228.9' - pale greenish yellow, (10Y 8/2), very fine to fine grained, moderate to strong HCI reaction, very weak to weak (R1 to R2), wavy bedding plane up to 1/16" in	-
- -	229.0		>10	227.7-228.0' - Fracture zone, smooth to rough, along bedding planes, horizontal along bedding planes to 40 deg 228.6' - Bedding plane, horizontal, smooth		thickness throughout section - some black organic material, surface pitting is present throughout the section	R6: 9 minutes
230_ -187.7			(NR) 6	230.0-230.3' - Fracture zone, rough, angular		No Recovery 228.9-229.0' Limestone 229.0-233.0' - yellowish gray, (5Y 7/2), fine to medium grained,	- -
-	R7-HQ 5 ft	60	1	rock fragments 230.5, 231.8, 232.6, 232.8' - Mechanical break, 0-30 deg, rough, undulating		moderate HCl reaction, very weak to weak (R1 to R2), surface pitting throughout sample, 1/16" voids on surface throughout section, fossil	SC-2 collected at 230.5- 231.55' -
- -	80%		2	231.5' - Mechanical break 232.5' - Mechanical break		casts - -	
-	234.0		NR	234.0, 234.6, 235.5-235.8, 236.1-236.7,		No Recovery 233.0-234.0' Limestone	R7: 12 minutes
235_ -192.7			>10	237.1-237.5, 237.8-238.8' - Fracture zone (6)		234.0-236.7' - yellowish gray, (5Y 7/2), fine to medium grained, moderate HCl reaction, extremely weak to very weak (R0 to R1),	- -
-	R8-HQ 5 ft 96%	0	>10			surface pitting throughout entire section	-
- -	3070		>10			Silt (ML) 236.7-237.1' - yellowish gray, (5Y 7/2), mild HCl reaction, mottling present	
- -	239.0		>10 NR 1			- - -	
240			'		H		



338884.FL AD-02

SHEET 3 OF 15

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723982.5 N, 457716.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 3.0	ft bgs	s on 9	/08/07 START: 9/8/2007 END: 9/	12/20	07 LOGGER : J. Burkard, R. Bitely,	T. Borton, J. Townes
≥∩ ∷	(9)			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
ANE NO A	ZAN ZAND ⊗		ES	DESCRIPTION	2.0	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) _Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
E S	SECO	ROL	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-197.7	036	ш		239.5, 240.1, 241.6, 241.8, 242.3, 242.7,	0)	Limestone	
-			2	243.0, 243.3' - Mechanical break, 0-10 deg,	H	 237.1-238.8' - yellowish gray, (5Y 	-
-	R9-HQ			rough, undulating	Ħ	7/2), fine to medium grained, moderate HCl reaction, extremely	-
-	5 ft	53	>10	241.1-241.3' - Fracture zone	世	 weak to very weak (R0 to R1), with 	-
-	88%			-	₽	1/4" sections of very fine grain limestone	
-			3	-	Ш	- No Recovery 238.8-239.0'	
-				-	ш	Limestone 239.0-243.4' - pale greenish yellow,	R9: 7 minutes
-			1 NR	-	Ш	- (10Y 8/2), fine to medium grained,	-
-	244.0		INK	244.0-244.7' - Fracture zone	╁┤	moderate to strong HCl reaction, very weak (R1), surface pitting	-
			>10	-	Ħ	 throughout section, trace voids (1/16") throughout section 	-
245_ -202.7					Ħ	No Recovery 243.6-244.0'	-
-			3	246.9, 247.3, 247.5, 247.8, 247.9' -	H	Limestone 244.0-249.0' - pale greenish yellow,	-
-	l R10-HQ			Mechanical break (11), 0-10 deg, rough, undulating	Н	(10Y 8/2), fine to medium grained,	-
-	5 ft 100%	22	4	-	田	 moderate to strong HCl reaction, very weak (R1), surface pitting 	-
-	100%			-	囯	throughout section, very brittle rock	-
-			4	-	団	-	-
-				- 248.1-248.5, 248.7-250.0' - Fracture zone	Н	-	R10: 6 minutes
-	040.0		>10	(2), rough, undulating	H	-	-
-	249.0			-	Ħ	249.0-254.0' - yellowish gray to pale	-
250			3	249.4, 249.6, 250.1, 250.5, 251.6, 252.7' -	Ш	greenish yellow, (5Y 7/2 to 10Y 8/2),	-
250_ -207.7				Mechanical break (6), 0-30 deg, rough, — undulating	Н	medium grained, moderate to strong HCl reaction, very weak to weak (R1	-
-			4		囯	 to R2), with fine grained interbeds at 250.7-251.1' and at 253.0 to 254.0', 	-
-	l R11-HQ			250.8-251.1' - Bedding plane, horizontal, smooth, undulating	口	wavy bedding planes throughout	-
-	5 ft 100%	23	4	Smooth, undulating	ш	section	-
-	10070			-	Н	-	-
-			6	252.3-252.4, 253.1-253.2' - Fracture zone (2), rough, undulating	H	-	
-				253.0' - Bedding plane, horizontal, smooth	Ħ	-	R11: 9 minutes
-	254.0		3	-	H	-	
-	EUT.U			254.2, 254.3, 255.1, 255.2, 255.8, 256.3,	Ш	254.0-259.0' - yellowish gray, (5Y	
255			2	256.9, 257.2, 257.4, 257.7, 258.3, 258.8' -	Щ	 7/2), fine to medium grained, moderate to strong HCl reaction, 	1
-212.7				Mechanical break (12), smooth to rough, — undulating to stepped	囯	very weak to weak (R1 to R2), wavy	
-			3	and adding to stopped	Ħ	 bedding planes 1/16" thick throughout the section, densely 	
-	R12-HQ			-	\Box	concentrated section of fossil casts	
-	5 ft 100%	73	2	-	H	 and molds from 255.4-255.5' 	_
-				-	Ħ	<u> </u>	
-			3		Ħ		1
-				-	Ш	<u> </u>	R12: 9 minutes
-	259.0		7	258.4-258.5' - Fracture zone, angular rock fragments	14	-	1
-				nagmonto -	囯		1
260			2		H		1



FRACTURES PER FOOT

2

2 50 5 ft

>10

8

>10

5

4

5

1

NR

>10

>10

4

NR

>10

>10

>10

NR

NA

13

RQD(%)

WATER LEVELS: 3.0 ft bgs on 9/08/07

CORE RUN, LENGTH, AND RECOVERY (%)

R13-HO

96%

R14-HQ

5 ft 40

94%

R15-HQ

5 ft

82%

R16-HQ

5 ft

46%

33 1

264 0

269.0

274.0

279 0

DEPTH BELOW SURFACE AND ELEVATION (ft)

-217.7

265

-2227

270

-227 7

275

-232.7

280

PROJECT NUMBER: BORING NUMBER: 338884.FL **AD-02** SHEET 4 OF 15

90

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ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723982.5 N, 457716.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

START: 9/8/2007

DESCRIPTION

DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND

THICKNESS, SURFACE STAINING, AND TIGHTNESS

259.1, 259.5, 260.1, 260.7, 261.3, 261.4,

0-10 deg, rough, undulating

2" in diameter

fragments

fragments

stepped

undulating, tight

to 1-3/16" in diameter

1-3/16" in diameter

rough, undulating

261.8, 263.2, 263.6' - Mechanical break (9),

262.1-262.2' - Fracture zone, angular rock

undulating, 10 angular rock fragments up to

undulating, up to 1" in length angular rock

265.5, 265.7, 266.0, 266.1, 266.3, 266.6.

267.4, 267.7, 268.4' - Mechanical break (9),

undulating, up to 1" in length angular rock

271.3, 272.3, 272.7, 273.0' - Mechanical

break (4), 0-30 deg, rough, undulating to

274.3' - Fracture, horizontal, rough,

275.4' - Fracture, horizontal, rough,

279.25' - Mechanical break, horizontal,

274.55-274.8' - Fracture zone, multiple

274.45' - Fracture, 85 deg, rough, undulating,

intersecting fractures with rock fragments up

undulating, open (3/8"), organic layering 275.7-276.3' - Fracture zone, fragments up to

275.0' - Bedding plane, horizontal, smooth,

fragments up to 1/2" 262.5-263.1' - Fracture zone, rough,

264.3-265.0' - Fracture zone, rough,

267.0-267.2' - Fracture zone, rough,

0-20 deg, rough, undulating

269.0-271.0' - Fracture zone

269.8-269.9' - Fracture zone

DISCONTINUITIES

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

ORIENTATION: Vertical END: 9/12/2007 LOGGER: J. Burkard, R. Bitely, T. Borton, J. Townes LITHOLOGY COMMENTS ROCK TYPE, COLOR. SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS 259.0-263.8' - pale greenish yellow, (10Y 8/2), fine to medium grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), surface cavity at 259.7 up to 3/4" wide and up to 1/4" in height, wavy bedding planes less than 1/16" in thickness throughout intact sections. voids to 1/16" over 5-10% of surface R13: 8 minutes No Recovery 263.8-264.0' Limestone 264.0-266.9' - pale greenish yellow, (10Y 8/2), fine to medium grained, moderate to strong HCl reaction, very weak (R1), wavy bedding plane from 265.0-265.5' <1/16" in thickness, 1/16" voids over 0-5% of 266.9-267.5' - pale greenish yellow, (10Y 8/2), fine grained, moderate HCI reaction, very weak to weak (R1 to R2), wavy bedding planes 1/16" in R14: 8 minutes thickness 267.6-268.7' - pale greenish yellow, (10Y 8/2), fine to medium grained, moderate to strong HCI reaction, very weak to weak (R1 to R2) No Recovery 268.7-269.0' Limestone 269.0-271.9' - light olive gray, (5Y 5/2), fine to medium grained, SC-3 collected at 270.95moderate HCl reaction, very weak to 272.35 weak (R1 to R2), with angular gravel-sized rock fragments 271.9-272.3' - yellowish gray, (5Y 7/2), fine grained, moderate to strong HCl reaction, very weak to weak (R1 R15: 7 minutes to R2), trace voids 272.3-273.1' - yellowish gray, (5Y 8/1), moderate to strong HCl End drilling for the day at 16:43, 09/08/07 reaction, very weak to weak (R1 to Continue drilling 09/09/07, R2), bedding planes transition from Water level 3' below wavy to laminar ground surface No Recovery 273.1-274.0' Limestone 274.0-276.3' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, very weak (R1), solution cavities up to 1-3/8" by 3/8" over 1-2% of rock surface. bedding laminations with trace organics from 275.2-275.7 R16: 11 minutes No Recovery 276.3-279.0' R. Bitely begins logging



338884.FL AD-02

SHEET 5 OF 15

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723982.5 N, 457716.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

WATER	LEVELS: 3.0	ft bgs	on 9/	08/07 START: 9/8/2007 END: 9/	12/20	D7 LOGGER : J. Burkard, R. Bitely,	T. Borton, J. Townes
200				DISCONTINUITIES	Ŋ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A B B C C C C C C C C C C C C C C C C C	DA F,	(%) _Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	۵ ا	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FR.F.	NG C	ο	AC.	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	898	œ	뜐뮙	THICKNESS, SURFACE STAINING, AND TIGHTNESS	ŝ	CHARACTERISTICS	BROI 6, 1261 R266216, 216.
-237.7			5	279.45' - Fracture, 60 deg, rough, undulating, tight	Н	Sandy Silt (ML) -\ 279.0-280.0' - yellowish gray to light	
			5	279.65-280.0' - Fracture zone, multiple	ш	olive gray, (5Y 7/2, 5Y 5/2), fine to	
1 1	R17-HQ			intersecting fractures with rock fragments up	Ή	medium grained, mild to moderate	1
1 1	5 ft 82%	0	>10	to 1-3/16" in diameter 280.3' - Fractures (2), 60 deg, rough,	F	HCl reaction, trace laminated bedding	1
1 1	0270			undulating, tight	Ľ	Limestone	-
			7	280.5' - Fracture, 30 deg, rough, undulating - 280.7-280.8' - Fracture zone, slight brown	╨	- 280.0-283.1' - yellowish gray, (5Y	-
				staining, fragments up to 3/4" in diameter	口	7/2), very fine to fine grained, moderate HCl reaction, very weak	R17: 9 minutes
-			NR	280.95' - Fracture, 60 deg, rough, undulating,	╁┼	(R1), voids up to 9/16" diameter over	-
1 +	284.0			tight 281.3' - Fracture, horizontal, rough,	\vdash	3-4% of rock surface, poorly fossiliferous, bedding plane	-
-			>10	undulating, slight brown-black staining, open		- laminations from 282.0-283.1'	_
285				1-3/16" calcite crystallization 281.55-281.8' - Fracture zone, fragments up	⊬	No Recovery 283.1-284.0'	
-242.7			>10	to 3/4" in diameter	ш	Limestone - 284.0-289.0' - yellowish gray, (5Y	_
				281.9, 282.05, 282.25, 282.45, 282.8, 282.85'		7/2), very fine to coarse grained,	_
	R18-HQ 5 ft	46	3	- Bedding plane (6), horizontal, smooth 282.65' - Fracture, rough, undulating, open	\vdash	moderate HCl reaction, extremely weak to very weak (R0 to R1), voids	
	100%	40	٥	284.25-284.4' - Fracture zone, multiple	Ė	up to 3/8" diameter over 5% of rock	
1 7				intersecting fractures with rock fragments up to 3/4" in diameter		surface, solution cavities up to	1
1 1			1	284.75' - Fracture, 60 deg, rough, undulating,	Ш	 1-3/16" in diameter over 5% of rock surface, poorly fossiliferous, trace 	1
1 1				open to 3/8"	世	bedding plane laminations, trace	R18: 9 minutes
	200 0		1	285.2' - Fracture, horizontal, rough, undulating, open from 1/2" to 1"	Н	– organics	
1 +	289.0			285.3' - Mechanical break	亡	_ 289.0-291.6' - yellowish gray, (5Y	-
-			>10	285.4' - Mechanical break or fracture, horizontal, rough, undulating	╀	- 7/2), very fine to coarse grained,	-
290 <u>-</u> -247.7				285.7-285.9' - Fracture zone, rock fragments —	匚	moderate HCl reaction, extremely weak to very weak (R0 to R1), voids	SC-4 collected at 289.75-
			>10	up to 1-3/16" 286.4, 286.45, 286.7' - Bedding plane (3),	世	 up to 3/32" over 10% of rock surface, 	290.55'
-	D40 HO			horizontal, smooth	\vdash	poorly fossiliferous, trace organics	-
1 4	R19-HQ 5 ft	22	>10	287.4' - Mechanical break, horizontal, rough,		-	_
	52%			undulating, open to 3/8" 288.1' - Fracture, horizontal, rough,		No Recovery 291.6-294.0'	_
				undulating, tight	₽	_	_
<u> </u>			NR	289.0-289.3' - Fracture zone, multiple intersecting fractures with rock fragments up	Д		
				to 1-3/16" in diameter	\vdash		R19: 10 minutes
]	294.0			289.8' - horizontal, rough, undulating, open to 3/8"	H]
1				290.6-291.6' - Fracture zone, rock fragments	片	Limestone]
295			>10	up to 1-9/16" in diameter	\vdash	- 294.0-297.9' - yellowish gray, (5Y 7/2), very fine to fine grained,	1
-252.7				294.0-294.9' - Fracture zone, rock fragments — up to 1-3/16" in diameter	匚	moderate HCl reaction, extremely	
			>10	295.6-297.0' - Fracture zone, rock fragments	世	 weak to very weak (R0 to R1), 60% carbonate sandy silt 	
	R20-HQ			up to 1-3/16" in diameter	\vdash	_ Garbonate sarray silt	
-	5 ft	14	>10	-	广	-	-
	78%			-	世	-	-
-			>10	297.3' - Fracture, horizontal, rough,	oxdot	_	-
-				undulating, tight	口	No Recovery 297.9-299.0'	R20: 19 minutes
			NR	-	\vdash		1\20. 19 Hilliules
	299.0			-	F	 -	_
			3	299.3' - Fracture, 45 deg, smooth, trace black	Ľ	_	
300				organic staining, tight	oxdot		



338884.FL AD-02

SHEET 6 OF 15

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723982.5 N, 457716.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing
ORIENTATION : Vertical

WATER	LEVELS: 3.0	ft bgs	s on 9	/08/07 START: 9/8/2007 END: 9/	12/20	007	7 LOGGER : J. Burkard, R. Bitely	/, T	. Borton, J. Townes
≥∩ <i>⊊</i>	(%)			DISCONTINUITIES	ပ္ခ		LITHOLOGY	\rfloor	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	5010	l	ROCK TYPE, COLOR,	1	SIZE AND DEPTH OF CASING,
H BI	E RU STH, SVEF	(%) Q	TUF	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30	l	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	1	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
E SUR	SORI	RQ	-RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC	l	AND ROCK MASS CHARACTERISTICS	1	DROPS, TEST RESULTS, ETC.
-257.7	034			299.5, 299.6, 300.2, 300.3' - Fractures (4),	Ü	t	Limestone	╅	
-			3	horizontal, rough, undulating, trace black	H	Ł	299.0-300.3' - yellowish gray, (5Y	Д	_
-	R21-HQ			organic staining, tight 301.0' - Fracture zone, rock fragments up to	Ш	ŀ	7/2), very fine to medium grained, moderate HCl reaction, extremely		_
-	5 ft	11	NA	3/4" in diameter	Ш	ŀ	weak (R0), black organic mottling	П	_
-	74%			301.2' - Mechanical break, 20 deg 301.8-301.9, 302.2-302.7' - Fracture zone	Ш	ŀ	over 20% of rock surface 300.3-300.7' - olive gray to yellowish	П	_
-			NA	(2), rock fragments up to 3/4" in diameter	Ш	ŀ	gray, (5Y 3/2, 5Y 7/2), very fine grained, extremely weak (R0),		_
-			NR		1111	ŀ	organic content decreasing with		R21: 12 minutes
-	204.0		NK		1111	ŀ	depth from 1-3/16" lens of organic silt at 300.3' below ground surface, faint	1	-
-	304.0				1111	ŀ	to mild organic odor, fossiliferous,	1	-
305			>10	304.65, 305.4, 305.7, 306.35, 306.75' -	₩	ŧ	transition to a carbonate silt with depth	Н	=
-262.7				Bedding plane or mechanical break (5), <10	m	ŧ	Sandy Silt (ML)	Н	
-			10	deg, smooth to rough, planar to undulating	F	F	300.7-302.7' - yellowish gray, (5Y 7/2), low to medium plasticity, >50%	П	-
-	R22-HQ			305.95-306.35' - Fracture zone, rough,	口	†	silt, <50% limestone fragments as		_
-	5 ft 90%	40	>10	undulating to planar, rock fragments <2" in diameter	世	t	sand sized fraction No Recovery 302.7-304.0'	П	_
-			_	306.9-307.0' - Fracture zone, rough, undulating, rock fragments <1" in diameter	Ш	f	Silt (ML)	П	_
-			0	undulating, rock fragments < 1 in diameter	Н	ł	304.0-304.6' - yellowish gray, (5Y 7/2), low to medium plasticity, mild to	П	=
-			4	308.3-308.5' - Fracture zone, rough,	H	ŧ	moderate HCl reaction, limestone fragments as sand sized fraction	П	R22: 12 minutes
-	309.0		NR	undulating, rock fragments <1-1/2" in	Ħ	1	>50%		=
-			>10	diameter	世	1	Limestone 304.6-305.1' - yellowish gray, (5Y		_
310			/10	309.5-309.75' - Fracture zone, rough, undulating, silt lenses, rock fragments <2" in —	\vdash	£	7/2), very fine to fine grained,	1	
-267.7			3	diameter	Н	Ŧ	moderate to strong HCl reaction, extremely weak to weak (R0 to R2),	1	
l _			J	310.25, 310.9' - Fractures or mechanical break (2), rough, undulating	厂	1	light gray mottling over 40% of	1	_
l -	R23-HQ 5 ft	58	>10	310.5' - Fracture or mechanical break, 30	Д	1	surface, moderately fossiliferous casts and molds (1/8-1/4"), laminated	1	_
-	100%			deg, rough, undulating	口	1	organics	1	_
_			6	312.0, 312.05, 312.1, 312.2' - Fractures (4), 0-90 deg, rough, undulating	上	╁	Silt (ML) 305.1-305.4' - Same as 304.0-304.6'	1	=
-				312.45, 313.05, 313.45, 313.95' - Fractures	\vdash	╁	Limestone		DOOL 7 minutes
-			3	or mechanical break (4), <10 deg, rough, undulating	F	1	305.4-308.5' - Same as 304.6-305.1' No Recovery 308.5-309.0'		R23: 7 minutes
-	314.0				Ħ	1	Limestone		-
-			2		Ħ	1	309.0-314.0' - yellowish gray, (5Y 7/2), fine to medium grained,		=
315 <u>-</u> 272.7				314.9, 315.2' - Fractures or mechanical break —	世	╁	_ moderate to strong HCl reaction, extremely weak to medium strong		_
			2	(2), 10 deg and 40 deg, rough, undulating	╀	╁	(R0 to R3), highly variable trace		-
-	R24-HQ			315.7-316.75' - Fracture zone, rough, undulating, silt lenses, rock fragments <3" in	F	ł	voids 1/16", poorly fossiliferous, trace organic lamination, laminated silty		-
-	5 ft	30	>10	diameter	厂	1	intervals from 311.35-311.5 and		-
-	98%			317.1, 317.5' - Fractures or mechanical break	世	1	311.65-311.8'		-
-			>10	(2), 70 deg and 50 deg, rough, undulating	世	╁			=
-				317.5-317.9' - Fracture zone, rough, undulating, rock fragments <3" in diameter	\vdash	ł			R24: 9 minutes
-	210.0		>10	318.2' - Fractures or mechanical break, <10	F	1			-
-	319.0		NR/	deg, rough, undulating	片	‡			=
320			>10		Ħ	†			-
320					1	t		+	



>10

>10 8

>10

>10

NR

2

R28-HC

5 ft

88%

339 0

340

undulating, sandy silt lenses with rock

mechanical break (3), <10 deg, rough,

335.45, 335.7, 335.95' - Bedding plane or

fragments <2" in diameter

undulating

WATER LEVELS: 3.0 ft bgs on 9/08/07

PROJECT NUMBER: BORING NUMBER:

338884.FL **AD-02**

END: 9/12/2007

SHEET 7 OF 15

ORIENTATION: Vertical

LOGGER: J. Burkard, R. Bitely, T. Borton, J. Townes

ROCK CORE LOG

moderately fossiliferous, trace

No Recovery 333.6-334.0

laminated organics

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723982.5 N, 457716.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

START: 9/8/2007

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 318.65-318.9' - Fracture zone or mechanical 314.0-318.9' - yellowish gray, (5Y >10 break, rough, undulating, rock fragments <2' 7/2), fine to medium grained, moderate to strong HCl reaction, 319.3-319.8, 320.1-320.4, 320.6-320.8, extremely weak to medium strong R25-HQ 313.732.1, 322.35-322.65, 323.2-323.3' - Fracture zone (6), undulating, rock fragments <1" in diameter, friable (R0 to R3), highly variable trace voids <1/16", poorly fossiliferous, trace organic laminations, >10 27 5 ft 100% 319.9, 321.1, 321.2, 321.3, 322.8, 323.8' interlaminated silt lenses and >10 limestone rock fragments at Fractures or mechanical break (6), 20 deg, 314.4-314.55' and 315.7-316.75' rough, undulating R25: 9 minutes No Recovery 318.9-319.0' 10 Limestone 324 0 319.0-324.0' - yellowish gray, (5Y 7/2), very fine to medium grained, 2 324.45, 324.95, 325.4, 325.8, 326.3' moderate to strong HCI reaction, 325 Fractures or mechanical break (5), <10-30 extremely weak to very weak (R0 to -2827 deg, rough, undulating R1), with friable carbonate silts with 2 <50% sand-sized limestone fragments, poorly fossiliferous 324.0-326.7' - yellowish gray, (5Y 7/2), very fine to fine grained, extremely weak to very weak (R0 to R26-HQ 2 5 ft 42 100% 326.7-329.0' - Fractures or mechanical break, smooth to rough, undulating R1), trace laminated organics NA 325.1-325.7' - Same as 324.0-326.7' except mild to moderate HCl R26: 13 minutes reaction, moderately fossiliferous, NA fossil shells to 1/2" 329.0 Sandy Silt With Limestone (ML) 329.0-329.3' - Fracture zone, rough, 326.7-329.0' - very fine to fine grained, low to medium plasticity, >10 undulating, rock fragments <1" in diameter 329.4. 329.45' - Fractures or mechanical 330 mild to moderate HCI reaction, sandy -287.7 break (2), 40 deg and 20 deg, rough, undulating 329.7, 330.4, 330.85, 331.9' - Bedding plane silt (carbonate), carbonate silt with 2 <50% limestone fragments as sand SC-5 collected at 330.85or mechanical break (4), <10 deg, rough, fraction; limestone interbeds, R27-HQ extremely weak to very weak (R0 to 331 9 67 1 undulating 5 ft R1), strong to very strong odor 92% (crude petroleum and hydrogen sulfide), poorly fossiliferous >10 332.15-332.35' - Fracture zone, rough, Limestone undulating, rock fragments <2" diameter 329.0-333.6' - yellowish gray, (5Y R27: 8 minutes 0 7/2), very fine to fine grained, moderate to strong HCI reaction, NR 334.0 extremely weak to weak (R0 to R2), voids <1/16" over 10% of surface, >10 334.4-334.5, 334.8-334.9, 335.1-335.25, 336.2-336.6, 336.6-337.0, 337.3-338.0, one cavity or fossiliferous cast 1" in 335 diameter, few cavities <1/4" in -292.7 338.25-338.4' - Fracture zone (7), rough, diameter, trace organic lenses.

R28: 12 minutes

J. Townes begins logging



338884.FL AD-02

SHEET 8 OF 15

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723982.5 N, 457716.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

WATER LEVELS : 3.0 ft bas on 9/08/07

START : 9/8/2007

END : 9/12/2007

LOGGER : J. Burkard, R. Bitely, T. Borton, J. Townes

WATER	LEVELS: 3.0	ft bgs	s on 9/	08/07 START: 9/8/2007 END	: 9/12/20	007	LOGGER : J. Burkard, R. Bitely	T. Borton,	J. Townes
≥ □₽	(%)			DISCONTINUITIES	დ	L	LITHOLOGY		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ı	ROCK TYPE, COLOR,	SIZE AI	ND DEPTH OF CASING.
FH B	E RU STH, OVEI	(%) O	ES	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOLI	ı	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LO	OSS, CORING RATE AND THNESS, CAVING ROD
SURF SURF	COR	ROI	ER PER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNE.	SS 🗏	ı	AND ROCK MASS CHARACTERISTICS		S, TEST RESULTS, ETC.
-297.7	014			339.4' - Mechanical break, horizontal, silt	- 1 o	╁	Limestone		
-			>10	lens with angular rock fragments up to 3/4" in		7-1	334.0-338.4' - yellowish gray, (5Y		-
-	R29-HQ			diameter 339.6' - Mechanical break, horizontal, rough,	+	#1	7/2), very fine to medium grained, moderate to strong HCl reaction,		-
-	5 ft	62	2	undulating, along bedding plane	╌	+1	extremely weak (R0), silt lenses		_
_	94%			340.25-340.4' - Fracture zone or mechanical break, silt lens	\Box	7	interbedded with extremely weak rock, 80% of core is sandy silt		_
_			0	341.35, 341.7' - Bedding plane (2),	-	1	carbonate material of low to medium		_
-				horizontal, fractures along contact of silt lens		+	plasticity, >50% limestone fragments as sand fraction, trace decomposing	D20: 7	minutes _
-			1	343.25' - Fracture, horizontal, rough,	+	╁	organic odor	1129.71	-
-	344.0		NR	undulating, tight	\perp	7	No Recovery 338.4-339.0' Limestone		-
-			1		+	‡	339.0-339.85' - yellowish gray, (5Y		-
345 <u> </u>				344.8, 345.55, 345.9, 346.4, 346.6, 346.9,		╁	7/2), very fine to medium grained, moderate HCl reaction, extremely		
-			2	347.45, 348.9' - Bedding plane (8), horizontal, rough, undulating, tight	+	╁	weak to very weak (R0 to R1),		-
-	R30-HQ			g, ag.i.	$-\Box$	7	limestone fragments up to 3/4" in diameter, calcite crystals, moderate		-
-	5 ft	71	3		-	‡	yellow		-
-	100%					╁	Organic Material (OH) 339.85-340.0' - dark brown to black,		_
-			1		+	╁	mild HCl reaction, organic layer,		_
-					-	1	bedding laminations Limestone		ollected at 347.8-
-			1		-	‡	340.0-340.4' - Same as	348.8' R30: 7	minutes _
-	349.0				+	╁	339.0-339.85' 340.4-343.7' - light gray, (N7), very	Comple	te drilling at 17:00
			0		╌	╁	fine to medium grained, moderate to	on 09/0	9/07, water level at -
350 <u> </u>					$-\!\Box$	╊	strong HCl reaction, very weak (R1), black organic mottling over 20% of	surface	
-			2	350.35, 350.9, 351.85, 352.4' - Bedding plane	; 	╊	rock surface		-
-	R31-HQ			or mechanical break (4), horizontal, rough, undulating, tight	廿	⇟	No Recovery 343.7-344.0' Limestone		-
-	5 ft	76	1	3,13	\pm	t	344.0-349.0' - light gray, (N7), very fine to medium grained, moderate to		-
-	97%					╁	strong HCl reaction, very weak to		-
-			2		-	1	weak (R1 to R2), black and blue mottling over 20% or rock surface,		-
-			\vdash	352.9, 353.6' - Mechanical break (2), 0-90	廿	‡	trace laminations	R31: 10	minutes
-	354.0		1	deg, rough, undulating		士	349.0-353.85' - yellowish gray, (5Y 7/2), very fine to fine grained,		-
-	354.0		NR.		+	╁	moderate HCI reaction, weak to		-
355			1	354.4, 357.0, 357.9' - Fractures (3),	尸	+	medium strong (R2 to R3), trace laminated bedding with organics,		-
-312.7				horizontal, rough, undulating, open up to 3/8"	中	†	cavities up to 3/8" in diameter are		
-			0		廿	†	surface from 351.0-352.0' bgs.		_
-	R32-HQ				+	╁	No Recovery 353.85-354.0'		_
-	5 ft 100%	94	1	356.3, 356.5' - Mechanical break (2)	F	+	354.0-359.0' - yellowish gray, (5Y		-
-	10070				片	‡	7/2), very fine to fine grained, moderate HCl reaction, weak to		-
-			1		#	‡	medium strong (R2 to R3), voids up		-
-					\pm	╁	to 3/16" over 50% of rock surface and are fossil molds, cavities up to 2"	R32: 11	minutes
-	359.0		0		F	╁	in diameter over 1-2% of rock		-
-					口	‡	surface, fossiliferous		_
360			2		力	‡			_
					1	T			
						\perp			

APPENDIX 2BB-338



338884.FL AD-02

SHEET 9 OF 15

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723982.5 N, 457716.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

WATER LEVELS: 3.0 ft bgs on 9/08/07 START: 9/8/2007 END: 9/12/2007 LOGGER: J. Burkard, R. Bitely, T. Borton, J. Townes DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -317.7 359.6' - Mechanical break, horizontal, rough, Limestone 2 undulating, 3/4" relief 359.0-363.9' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate to strong HCl reaction, 359.8' - Mechanical break, vertical, rough, undulating R33-HQ weak to medium strong (R2 to R3), voids up to 3/16" over 10% of rock 360.2' - Bedding plane, horizontal, rough, 62 1 5 ft 98% undulating, bedding plane fracture along organic laver surface and are fossil molds, cavities 360.5, 361.3, 362.5, 362.9, 363.55' up to 3/4" in diameter over 1-2% of 2 rock surface, trace organics, Mechanical break, horizontal, rough, moderately fossiliferous undulating R33: 8 minutes 1 361.5' - Mechanical break 364 0 NR No Recovery 363.9-364.0' Limestone 1 364.0-366.55' - yellowish gray, (5Y 364.6, 365.45' - Bedding plane, horizontal, 365 7/2), very fine to fine grained, rough, undulating -3227 moderate HCI reaction, weak to 1 medium strong (R2 to R3), voids up to 3/16" over 10% of rock surface R34-HC and are fossil molds, trace organic 5 ft 82 >10 366.5-366.65' - Fracture zone, rock laminations, fossiliferous 98% fragments up to 3/4" in diameter 366.55-368.55' - white to very light gray, (N9 to N8), very fine to fine 367.3, 368.3' - Mechanical break (2), SC-7 collected at 367.3-1 grained, strong HCl reaction, horizontal, rough, undulating 368.3' medium strong (R3), voids up to 3/8" R34: 9 minutes over 20% of rock surface and are 1 fossil molds, cavities up to 1-3/16" 369.0 over 5% or rock surface, fossiliferous NR 368.55-368.9' - Same as 2 369.45, 369.85' - Fractures (2), horizontal. 364.0-366.55' 370 No Recovery 368.9-369.0' rough, undulating, tight -327 7 Limestone 1 369.0-373.55' - yellowish gray, (5Y 370.5' - Bedding plane, horizontal, smooth, tight, fracture along organic layering 7/2), very fine to fine grained, R35-HQ moderate HCI reaction, medium 66 >10 371.4-371.5' - Fracture zone, rock fragments strong (R3), voids up to 3/8" over 91% up to 3/4" in diameter 20% of rock surface and are fossil 372.1' - Fracture, horizontal, rough, molds, trace organic layering, >10 moderately fossiliferous undulating, tight 372.8-373.1' - Fracture zone, rock fragments 0 R35: 8 minutes up to 1-9/16" in diameter No Recovery 373.55-374.0' NR 374.0 Limestone 374.25, 374.4, 374.75, 374.95, 375.3, 375.5, 376.45, 377.7, 378.15' - Mechanical break or 374.0-378.5' - yellowish gray, (5Y 7/2), very fine to fine grained, 4 375 bedding plane (9), horizontal, rough, -332.7 moderate HCI reaction, medium undulating, tight 2 strong (R3), voids up to 3/8" over 10% of rock surface and are fossil molds, trace organic layering, R36-HQ fossiliferous, cavities up to 9/16" over 1 46 5 ft 1-2% of rock surface and are 90% dissolution fossil molds 377.1, 377.35' - Mechanical break or bedding 3 plane (2), horizontal, rough, undulating, tight R36: 8 minutes 1 NR No Recovery 378.5-379.0' 379 0 379.0-379.3' - Fracture zone, rock fragments >10 up to 1-9/16" in diameter 380

APPENDIX 2BB-339 Rev. 7



338884.FL AD-02

ROCK CORE LOG

SHEET 10 OF 15

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723982.5 N, 457716.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

WATER	LEVELS: 3.0	ft bg	s on 9	/08/07 START: 9/8/2007 END: 9	/12/20		T. Borton, J. Townes
≥O.⊋	<u> </u>			DISCONTINUITIES	_ g	LITHOLOGY	COMMENTS
BELO SE AN ION (f	UN, H, AND ERY (9	(9)	JRES OT	DESCRIPTION		ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-337.7 -			3	379.6, 379.8, 380.0' - Fractures (3), horizontal, smooth, tight	+	Limestone - 379.0-383.1' - yellowish gray, (5Y	_
-	R37-HQ			380.2-380.4' - Fracture zone, rock fragments up to 1-9/16" in diameter	#	7/2), very fine to fine grained, moderate HCl reaction, medium	-
-	5 ft 82%	36	1	380.8, 381.4' - Fractures (2), horizontal, rough, undulating, open to 3/4"	廿	 strong (R3), voids up to 3/8" over 20% of rock surface and are fossil 	-
-	5_,7		>10		井	molds, fossiliferous	
-			0 /	382.7-382.9' - Fracture zone, rock fragments			R37: 8 minutes
-	0040		NR	up to 1-9/16" in diameter	\pm	No Recovery 383.1-384.0'	K37. 6 minutes
-	384.0		4.0	384.0-384.5' - Fracture zone, rock fragments	\pm	384.0-384.5' - yellowish gray, (5Y	-
385			>10	up to 1-9/16" in diameter 384.7, 384.95' - Fractures (2), horizontal,	上	 7/2), very fine to fine grained, moderate HCl reaction, weak to 	
-342.7			>10	rough, undulating, 3/4" relief	上	medium strong (R2 to R3), voids up to 3/16" over 20% of rock surface	_
-	R38-HQ			385.6-385.75' - Fracture zone, rock fragments up to 3/4" in diameter	+	and are fossil molds, moderately fossiliferous	-
-	5 ft 88%	53	2	386.2, 386.55, 387.15' - Fractures (3), horizontal, rough, undulating, 3/8" relief	\pm	 384.5-385.75' - light gray, (N7), very fine to coarse grained, strong HCl 	-
			1	386.4-386.8' - Mechanical break	1	reaction, medium strong to strong (R3 to R4), voids up to 3/32" over	
-			10% of rock surfa	10% of rock surface and are fossil molds, cavities up to 3/8" over 3-5%	R38: 8 minutes		
-			NR		#	- of rock surface 385.75-385.95' - Same as	R36. 6 Hilliules
-	389.0			389.0-389.9' - Fracture zone, rock fragments	茾	384.5-385.75' except organic	-
390			>10	up to 1-9/16" in diameter	茾	laminated limestone 385.95-388.4' - Same as	
-347.7			>10	390.0' - Fracture, vertical, rough, undulating, tight	\pm	384.0-384.5' No Recovery 388.4-389.0'	_
-	R39-HQ		- 10	390.1, 390.3' - Fractures (2), horizontal, rough, undulating, tight	\pm	Limestone 389.0-391.7' - yellowish gray, (5Y	-
-	5 ft 54%	9	>10	390.5-390.6' - Fracture zone, rock fragments up to 3/4" in diameter	\pm	 7/2), very fine to fine grained, moderate HCl reaction, very weak 	-
				390.8, 391.95, 391.2' - Fractures (3), horizontal, rough, undulating, tight	上	(R1), voids up to 1/16" over 1-2% of rock surface, poorly fossiliferous,	
-			NR	391.5' - Mechanical break	F	trace organic laminations No Recovery 391.7-394.0'	R39: 8 minutes
-	204.0				\blacksquare	-	-
-	394.0				H	Limestone	-
395_			1		1	- 394.0-399.0' - yellowish gray, (5Y 7/2), very fine to fine grained,	
-352.7			3	395.0, 395.4, 395.75, 396.0, 396.4' - Fractures (5), horizontal, rough, undulating,	#	moderate HCl reaction, very weak to - weak (R1 to R2), voids up to 3/16"	_
-	R40-HQ			tight to open	井	over 10% of rock surface and are fossil molds, moderately	-
-	5 ft 100%	46	>10	396.7-397.1' - Fracture zone, rock fragments	Ħ	 fossiliferous, trace laminations 	-
			4	up to 1-3/16" in diameter	E	-	
-			<u> </u>	397.45, 397.65, 397.9' - Fractures (3), horizontal, rough, undulating, tight	上	-	R40: 6 minutes
-	399.0		>10	398.3-399.0' - Fracture zone, rock fragments up to 1-9/16" in diameter	士	-	-
-	JJJ.U		4	ap to 1 0,10 in didition	T	-	
400			4		F	_	
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APPENDIX 2BB-340 Rev. 7



338884.FL AD-02

SHEET 11 OF 15

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723982.5 N, 457716.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING	METHOD A	ND E	QUIPM	IENT : BL300T S/N 1517, mud rotary, HQ tools, HW casi	ng		ORIENTATION : Vertical
	LEVELS : 3.0					07 LOGGER : J. Burkard, R. Bitely, 1	Γ. Borton, J. Townes
				DISCONTINUITIES	П	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-357.7 - - - - -	R41-HQ 5 ft 69%	31	4 2 1 NR	399.2, 399.6, 399.8, 400.0, 400.2, 400.4, 400.6, 400.9, 401.05, 401.45, 402.05' - Fractures (11), horizontal, rough, undulating, tight, to 3/8" relief		Limestone 399.0-402.45' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, weak (R2), voids up to 3/32" over 20% of rock surface and are fossil molds, moderately fossiliferous No Recovery 402.45-404.0'	R41: 6 minutes
-405 -362.7 - - - -	404.0 R42-HG 5 ft 86%	25	3 >10 >10	404.5, 404.75, 404.9, 405.15, 405.35, 405.95, 406.1, 406.2, 406.4, 406.7, 406.85, 407.1' - Fractures (12), horizontal, rough, undulating, tight, open 406.0' - Fracture zone, fragments up to 1-9/16" in diameter		Limestone 404.0-408.3' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCI reaction, weak to medium strong (R2 to R3), voids up to 3/8" over 10% of rock surface and are fossil molds, secondary quartz mineralization found in fractured material near bottom of run, trace organic laminations near top of run	- - - - - -
-	409.0		2 NR	1-9/16" in diameter, quartz grains up to 3/8" found as infill material		- - No Recovery 408.3-409.0'	R42: 8 minutes
410 -367.7 - - - -	R43-HC 5 ft 100%	58	>10 1 1	409.1, 409.25, 409.45, 410.85, 411.35, 412.85, 413.2, 413.7, 413.9' - Bedding plane or mechanical break (9), <10 deg, rough, undulating, tight to open 1/2" 409.7-410.05' - Fracture zone, rough, undulating, rock fragments with carbonate silt matrix, fragments <1" in diameter		Limestone 409.0-414.0' - yellowish gray, (5Y 7/2), very fine to medium grained, strong HCI reaction, extremely weak to very weak (R0 to R1), laminated organics over 20% of rock surface, voids <1/16" over <10% of rock surface especially along bedding planes, trace cavities up to 1" diameter, carbonate silt and limestone fragments at 409.7-410.5',	Complete drilling at 15:15 on 09/10/07 due to proximal lighting, water level at surface R. Bitely begins logging
-	414.0		3 >10	-		carbonate clay/silt with limestone fragments at 412.8-413.0' 414.0-416.6' - yellowish gray, (5Y 7/2), very fine to medium grained,	R43: 8 minutes - -
41 <u>5</u> -372.7 - - -	R44-HQ 5 ft 94%	26	10 NA	414.5-415.0' - Fracture zone, rough, undulating, rock fragments <2" in diameter — 415.2, 415.4, 416.35, 416.5, 418.35, 418.45, 418.55' - Bedding plane or mechanical break, <10 deg, rough, undulating, tight to open 1/2" 415.6-415.85' - Fracture zone, rough, undulating, rock fragments <2" in diameter 416.55-416.7, 417.1-417.15, 417.4-417.45,		moderate to strong HCl reaction, extremely weak to very weak (R0 to R1), voids <1/16" over 30% of surface, few cavities 1/2" in diameter, moderately fossiliferous Organic Elastic Silt To Organic Fat Clay (MH-CH)	
- - - - 420	419.0		NA 3 NR >10	417.65-418.05' - Fracture zone (4), rough, undulating, organic silt and rock fragments <2" in diameter with carbonate silt lenses interbedded.		416.6-417.4' - dark greenish gray, (5G 4/1), no HCl reaction, extremely weak (R0), laminated, poorly fossiliferous, moderate hydrogen sulfide odor	- R44: 10 minutes - - -
720							-



338884.FL AD-02

SHEET 12 OF 15

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723982.5 N, 457716.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

DISCONTINUTIES DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DEPTH_TYPE_ORIENTATION_ROUGHNESS, PLANARTY, INFILLING MATERIAL AND COMMENTS. CAVE MINERALOSY, LEXTURE, WEATHERGE, MANS, AND TIGHTNESS, CAVE MARACTERISTICS THE PLANARTY, INFILLING MATERIAL AND COMMENTS. CAVE MARACTERIAL AND CAVE MARACTERIAL A	
377.7	;
377.7	CASING
377.7	RATE AND
377.7	
21	
R45-HO 5 ft 13 >10	_
13 13 10 149.5, 420.6, 420.9, 421.65 - Bedding plane or mechanical break (4), <10 deg, rough, undulating, tight, open <1/2" 17 18 18 18 18 18 18 18	-
undulating, tight, open <1/2" 210	-
Second Process of Strands	_
August A	_
424.0	_
424.0 NR 425 -382.7 -382.7 -382.7 R46-HQ -5 ft 80% -387.7 R47-HQ -5 ft 92% -387.7 R48-HQ -5 ft 92% -387.7 R48-HQ -5 ft 92% -387.7 R49-HQ -5 ft 92% -387.7 R47-HQ -6	_
425 - 382.7 -	_
425 -382.7	_
### A24.4 ### A25.6 ### A26.6 ### A26.6 ### A26.6 ### A26.7 ### A2	
427.1-428.0 - Fracture zone (4), rough, undulating, rock fragments <2" in diameter 425.9, 426.75 - Fractures or mechanical break (2), <10 deg, rough, undulating, tight, open <1/2" A29.0 NR 429.0 NR 429.0 NR 429.3, 429.6' - Mechanical break (2), 50 deg and 60 deg 429.85-430.15, 430.6-431.0, 431.8-432.7, 433.0-433.6' - Fracture zone (4), rough, undulating, rock fragments <2" in diameter 425.9, 426.75' - Fracture zone (4), rough, undulating, rock fragments <2" in diameter 425.9, 426.75' - Fracture zone (4), rough, undulating, rock fragments <2" in diameter 425.9, 426.75' - Fracture zone (4), rough, undulating versions from 424.0-424.5', trace voids, <1/16" of remaining core, laminated organics from 424.0-424.5', trace voids, <1/16" of remaining core, laminated organics from 424.0-424.5', trace voids, <1/16" of remaining core, laminated organics from 424.0-424.5', trace voids, <1/16" of remaining core, laminated organics from 424.0-424.5', trace voids, <1/16" of remaining core, laminated organics from 424.0-424.5', trace voids, <1/16" of remaining core, laminated organics from 424.0-424.5', trace voids, <1/16" of remaining core, laminated organics from 424.0-424.5', trace voids, <1/16" of remaining core, laminated organics from 424.0-424.5', trace voids, <1/16" of remaining core, laminated organics from 424.0-424.5', trace voids, <1/16" of remaining core, laminated organics from 424.0-424.5', trace voids, <1/16" of remaining core laminated organics from 424.0-424.0' over 20%, trace voids, <1/16" of remaining core voids, <1/16" of remain	_
Ads. 1 16 5 ft 80% 16 5 ft 80% 16 5 ft 80% 5 ft 80	_
break (2), https://doi.org/10.250% Solid Street (2), https://doi.org/10.250% So	_
Section Sect	_
7/2), very fine fo medium grained, moderate HCI reaction, extremely weak to medium strong (R0 to R3), variable voids <1/16" over 20% of rock surface from 424.0-424.5'; trace voids < 1/16" over 20% of rock surface from 424.0-424.5'; trace voids < 1/16" over 20% of rock surface from 424.0-424.5'; trace voids < 1/16" over 20%, trace grayish blue (5PB 5/2) mothing over core from 425.6-427.0'; all poorly fossiliferous No Recovery 428.0-429.0' Limestone 431.2, 431.7' - Bedding plane or mechanical break (2), horizontal and 30 deg, smooth to rough, undulating, intersection at 431.2' 7/2), very fine fo medium grained, moderate HCI reaction, extremely weak to medium strong (R0 to R3), variable voids < 1/16" over 30% of rock surface from 424.0-424.5'; trace voids < 1/16" over 20%, trace grayish blue (5PB 5/2) mothing over core from 425.6-427.0'; all poorly fossiliferous No Recovery 428.0-429.0' Limestone 429.0-433.6' - yellowish gray to grayish black, (5Y 7/2 to N2), strong HCI reaction, extremely weak to medium strong (R0 to R3), organic lenses, organics as laminae and lenses up to 1" thick comprising 20% of core especially 432.0-432.6', mothed coloration along bedding planes, especially in stronger limestone, poorly fossiliferous, trace voids <1/16" No Recovery 433.6-434.0'	_
weak to medium strong (R0 to R3), variable voids <1/16" over 30% of rock surface from 424.0-424.5', trace voids, <1/16" over 30% of rock surface from 424.0-424.5', trace voids, <1/16" of remaining core, laminated organics from 424.5-424.8' over 20%, trace grayish blue (5PB 5/2) mottling over core from 425.6-427.0', all poorly fossiliferous No Recovery 428.0-429.0' Limestone 430. R47-HQ 5 ft 92% 8 > 10 92% 10 11 12 13 14 15 16 17 18 18 18 18 19 18 18 18 18 18 18 18 18 18 18 18 18 18	_
variable voids <1/16" over 30% of rock surface from 424.0-424.5', trace voids, <1/16" over 30% of rock surface from 424.0-424.5', trace voids, <1/16" over 20% of rock surface from 424.0-424.5', trace voids, <1/16" over 30% of rock surface from 424.0-424.5', trace voids, <1/16" over 30% of rock surface from 424.0-424.5', trace voids, <1/16" over 30% of rock surface from 424.0-424.5', trace voids, <1/16" over 30% of rock surface from 424.0-424.5', trace voids, <1/16" over 30% of rock surface from 424.0-424.5', trace voids, <1/16" over 30% of rock surface from 424.0-424.5', trace voids, <1/16" over 30% of rock surface from 424.0-424.5', trace voids, <1/16" over 30% of rock surface from 424.0-424.5', trace voids, <1/16" over 30% of rock surface from 424.0-424.5', trace voids, <1/16" over 30% of rock surface from 424.0-424.5', trace voids, <1/16" over 30% of rock surface from 424.0-424.5', trace voids, <1/16" over 30% of rock surface from 424.0-424.5', trace voids, <1/16" over 30% of rock surface from 424.0-424.5', trace voids, <1/16" over 30% of rock surface from 424.0-424.5', trace voids, <1/16" over 30% of rock surface from 424.0-424.5', trace voids, <1/16" over 30% of rock surface from 424.0-424.5', trace voids, <1/16" over 30% of rock surface from 424.0-424.5', trace voids, <1/16" over 30% of rock surface from 424.0-424.5', trace voids, <1/16" over 30% of rock surface from 424.0-424.5', trace voids, <1/16" over 30% of rock surface from 424.0-424.5', trace voids, <1/16" over 30% of rock surface from 424.0-424.5', trace voids, <1/16" over 30% of rock surface from 424.0-424.5'. 1	
230 - 387.7	_
and 60 deg 429.85-430.15, 430.6-431.0, 431.8-432.7, 433.0-433.6' - Fracture zone (4), rough, undulating, rock fragments <2" in diameter 431.2, 431.7' - Bedding plane or mechanical break (2), horizontal and 30 deg, smooth to rough, undulating, intersection at 431.2' A34.0 NR NA NA NA A35 -392.7 A30.6-431.0, 431.8-432.7, 433.6-431.0, 431.8-432.7, 431.8-432.7, 431.8-432.7, 431.8-432.7, 432.8-430.15, 430.6-431.0, 431.8-432.7, 432.9-433.6' - Fracture zone (4), rough, undulating, rock fragments <2" in diameter 431.2, 431.7' - Bedding plane or mechanical break (2), horizontal and 30 deg, smooth to rough, undulating, intersection at 431.2' Limestone 429.0-433.6' - yellowish gray to grayish black, (5Y 7/2 to N2), strong HCI reaction, extremely weak to medium strong (R0 to R3), organic lenses up to 1" thick comprising 20% of core especially 432.0-432.6', mottled coloration along bedding planes, especially in stronger limestone, poorly fossiliferous, trace voids <1/16" No Recovery 433.6-434.0'	
R47-HQ 5 ft 92% S10	
undulating, rock fragments <2" in diameter 431.2, 431.7' - Bedding plane or mechanical break (2), horizontal and 30 deg, smooth to rough, undulating, intersection at 431.2' >10 >10 >10 >10 >10 >10 >10 >1	
431.2, 431.7' - Bedding plane or mechanical break (2), horizontal and 30 deg, smooth to rough, undulating, intersection at 431.2' >10 >10 >10 >10 >10 >10 >10 >1	
break (2), horizontal and 30 deg, smooth to rough, undulating, intersection at 431.2' >10 >10 >10 >10 >10 >10 >10 >1	
S10	
medium strong (R0 to R3), organic lenses, organics as laminae and lenses up to 1" thick comprising 20% of core especially 432.0-432.6', mottled coloration along bedding planes, especially in stronger limestone, poorly fossiliferous, trace voids <1/16" NA NA NA NA NA NA NA NA NA N	
Sense up to 1" thick comprising 20% of core especially 432.0-432.6', mottled coloration along bedding planes, especially in stronger limestone, poorly fossiliferous, trace voids <1/16" No Recovery 433.6-434.0' No Recovery 433.6-434.0'	_
434.0 NR NA NA 435 -392.7 NA NA NA NA NA NA NA NA NA N	
NA 435 -392.7 NA NA NA NA NA NA NA NA NA N	_
435 limestone, poorly fossiliferous, trace voids <1/16" No Recovery 433.6-434.0'	_
-392.7 No Recovery 433.6-434.0'	_
424 0 424 21 light grov (NT) year	_
- 434.0-434.3' - light gray, (N7), very fine grained, mild HCI reaction,	-
5 π 48 × 10 436.35 - Bedding plane or mechanical break, strong (R4)).35
Organic Carbonate I o Coal Seam	_
black, (N1 to 5GY 2/1), no HCl	_
reaction, laminated, friable R48: 13 minutes	_
439 0 horizontal, rough, stepped to undulating, tight	_
438.75, 438.9' - Fractures or mechanical	_
>10 break (2), 50 deg and 80 deg, rough, undulating	_



338884.FL AD-02

ROCK CORE LOG

SHEET 13 OF 15

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723982.5 N, 457716.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 3.0	ft bgs	s on 9/	/08/07 START: 9/8/2007 END: 9/	12/20	LOGGER : J. Burkard, R. Bitely,	T. Borton, J. Townes
≥∩≎	(9)			DISCONTINUITIES	ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ACE	TH.	(%) O	T.O.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Ĭ	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
LEV.	ECC	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ĭ,	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-397.7	075	α.	шФ	439.0-439.3, 439.5-440.15, 440.7-441.1,	S		
-557.7			>10	441.9-442.2' - Fracture zone (4), rough,	П	434.6-436.2' - dark greenish gray,] -
-	D40 HO			undulating, rock fragments <2" in diameter 440.35, 440.6, 441.8' - Fractures or	口	[(5GY 4/1), carbonate, varve-like	-
_	R49-HQ 5 ft	11	>10	mechanical break (3), <10 deg, rough,	╁	nodules to subhedral quartz up to	-
_	64%		>10	undulating, open <1/2"	╁	1/2" diameter at 435.2'	
_			<u> </u>	-	H	Limestone 436.2-439.0' - dark greenish gray,	-
-			NR	-	Ľ	(5GY 4/1), very fine to fine grained,	
-			INIX	_	₽	strong HCl reaction, medium strong to strong (R3 to R4), laminated,	R49: 14 minutes
-	444.0				Ш	varve-like organic laminations, trace	
-			>10	444.0-445.5' - Fracture zone, multiple intersecting fractures with rock fragments up	П	limestone casts or secondary carbonate mineralization up to 1"	-
445_ -402.7				to 1-9/16" in diameter	口	diameter, poorly fossiliferous	_
-402.7			>10	445.1, 445.9' - Fractures (2), 45 deg, rough, undulating, tight	\vdash	439.0-439.7' - yellowish gray, (5Y 7/2), mild HCl reaction, weak to	-
_	DEC 110			- undulating, tight	F	medium strong (R2 to R3), with interbedded carbonate silt lenses,	-
-	R50-HQ 5 ft	7	3	446.4' - Fracture, 45 deg, rough, undulating,	F	voids <1/16" over 20% of surface,	-
-	66%		0	tight	H	poorly fossiliferous, 1/4" organic peat lens at 439.35'	-
_				446.5' - Mechanical break 446.9, 447.0' - Fractures (2), horizontal,	₽	- Silt (ML)	-
_			NR	rough, undulating, tight	Н	439.7-440.2' - medium plasticity,	DEOL 10 minutes
-			INIX	-	П	<50% limestone fragments as sand sized fraction, organic peat lens at	R50: 16 minutes
-	449.0			-	口	440.2'	L Towner begins legging
-			3	449.45' - Fracture, 45 deg, rough, undulating,	╁╴	Limestone 440.2-441.25' - medium light gray to	J. Townes begins logging
450 <u>-</u>				tight —	F	yellowish gray, (N6 to 5Y 7/2), mild	-
-407.7			>10	449.7, 449.95' - Fractures (2), horizontal, rough, undulating, tight	F	HCl reaction, strong (R4), voids <1/16" over 30% of rock surface,	-
-	R51-HQ			450.5' - Fracture, horizontal, rough,	Ë	cavities <1" diameter over 10% of surface, mottled coloration due to	-
-	5 ft	24	>10	undulating, tight 450.9-451.2' - Fracture zone, rock fragments	H	- secondary mineralization of cavities,	-
-	66%		>10	up to 1-9/16" in diameter	Н	organic associated with cavities, with calcite crystals at 440.2-441.25' and	-
-			- 10	451.6-452.3' - Fracture zone, rock fragments up to 1-9/16" in diameter	口	- 441.27-442.2'	-
-			NR	· ·	世	441.25-442.2' - moderate yellowish brown, (10YR 5/4), very weak to	R51: 9 minutes
-			`	-	士	 weak (R1 to R2), faintly laminated 	-
-	454.0			454.0-455.5' - Fracture zone, multiple, high	\vdash	organics No Recovery 442.2-444.0'	-
			>10	angle, intersecting fractures, rock fragments	F	- Limestone	-
455 <u>-</u> -412.7				up to 2-3/8" in diameter	岸	444.0-447.3' - medium light gray, (N6), very fine grained, strong HCl	-
-			>10	- 455.6, 456.0, 456.4, 456.9, 457.0, 457.1' -	世	reaction, strong (R4), voids up to 3/32" over 20% of rock surface,	-
-	R52-HQ			Fractures (6), horizontal, rough, undulating,	₽	cavities up to 9/16" over 1-2% of rock	-
-	5 ft	28	>10	tight 456.6-456.7' - Fracture zone, rock fragments	\sqcap	 surface and some are filled with quartz crystallization 	-
-	82%			up to 3/4" in diameter	口	No Recovery 447.3-449.0'	-
-			>10	457.45-457.65' - Fracture zone, rock	世	<u> </u>	-
-			\vdash	fragments up to 1-3/16" in diameter	\vdash	<u>†</u>	R52: 15 minutes -
-	450.0		NR	-	F	<u>ł</u>	-
-	459.0			459.0-459.3' - Fracture zone, rough,	岸	<u>†</u>	-
400			>10	undulating, rock fragments <2" in diameter	世	<u> </u>	-
460					╁		
					L		

APPENDIX 2BB-343 Rev. 7



338884.FL AD-02

SHEET 14 OF 15

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723982.5 N, 457716.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

WATER LEVELS: 3.0 ft bgs on 9/08/07 START: 9/8/2007 END: 9/12/2007 LOGGER: J. Burkard, R. Bitely, T. Borton, J. Townes DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR. SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -417.7 459.9-460.05' - Fracture zone, rough, Limestone >10 undulating, rock fragments <1" in diameter 449.0-452.3' - light brownish gray to 460.3-460.75' - Fracture zone, rough, light brown, (5YR 6/1 to 5YR 6/4), undulating, rock fragments <3" in diameter, 2 very fine to fine grained, strong HCI R53-HQ reaction, strong (R4), carbonate sandy silt lens from 451.6-451.8' is vertical fractures from 460.4-460.7 46 3 5 ft 460.85, 461.25, 461.95, 462.3' - Bedding plane or mechanical break (4), rough, 80% extremely weak rock, voids up to undulating, tight, open to <1/2 3/16" over 5% of rock surface and 1 are filled with crystallization, trace 461.5' - Mechanical break organic laminations at 451.5' R53: 14 minutes No Recovery 452.3-454.0' NR Limestone 464 0 454.0-458.1' - light brownish gray to light brown, (5YR 6/1 to 5YR 6/4), >10 464.3' - Fractures (3), horizontal and vertical, very fine to fine grained, strong HCI rough, undulating, tight, three intersecting 465 reaction, strong (R4), voids up to 3/16" over 5% of surface, trace -4227 fractures 464.6-465.4' - Fracture zone, rock fragments NA up to 1-3/16" in diameter organic laminations at 456.9 465.6-465.9' - Fracture zone, rock fragments No Recovery 458.1-459.0' R54-HQ up to 3/4" in diameter Limestone 5 ft 0 NA 459.0-463.0' - light gray to yellowish gray, (N7 to 5Y 7/2), very fine to fine grained, weak to strong (R2 to R4), 466.2' - Bedding plane, horizontal, rough, 78% undulating, tight 466.5-467.9' - Fracture zone, rock fragments up to 1-9/16" in diameter NA voids <1/16" over <10% of rock, cavities <3/4" from 462.0-463.0', R54: 10 minutes trace laminated organics, cavity NR infilling, crystalline growth of 469.0 calcite/aragonite, very weak to weak transition from 461.25-461.55' 469.0-469.6' - Fracture zone, multiple high >10 angle, intersecting fractures, rock fragments No Recovery 463.0-464.0' 470 up to 2-3/8" in diameter Limestone 427.7 469.9' - Fracture, horizontal, rough, 464.0-464.9' - light brownish gray to undulating 470.1' - Bedding plane, horizontal, smooth, 3 light brown, (5YR 6/1 to 5YR 6/4), very fine to fine grained, strong HCI stepped, intersecting fractures, rock R55-HQ reaction, medium strong to strong (R3 to R4), trace organic increasing with depth, voids up to 3/32" over fragments up to 2-3/8" in diameter 44 2 470.2' - Fracture, 30 deg, rough, undulating, 98% tight 1-2% of rock surface 2 470.5' - Fracture, 45 deg, rough, undulating, Silt With Limestone Fragments (ML) tiaht 464.9-465.9' - fine grained, strong HCl reaction, extremely weak (R0), 471.75, 472.0, 472.15, 472.75, 473.1' -R55: 12 minutes 1 Fractures (5), horizontal, rough, undulating, with limestone fragments, high except 45 deg at 472.75' 474.0 NR organic content, strong organic odor Complete drilling at 17:00 Limestone 474.3' - Fracture, horizontal, rough, 3 on 09/11/07, water level at undulating, tight 465.9-466.5' - Same as 464.0-464.9' 475 surface 474.7' - Fracture, 30 deg, rough, undulating, Silt With Limestone Fragments (ML) 432.7 466.5-467.9' - Same as 464.9-465.9' 4 No Recovery 467.9-469.0' 474.9' - Fracture, horizontal, rough, undulating Limestone R56-HC 475.3' - Fracture, 30 deg, rough, undulating, 469.0-473.9' - light brownish gray to light brown, (5YR 6/1 to 5YR 6/4), >10 36 5 ft 100% 475.9' - Fracture, horizontal, rough, very fine to fine grained, strong HCI undulating, high relief at 3/4" 475.6, 475.9' - Fractures (2), horizontal, 3 reaction, medium strong to strong (R3 to R4), voids up to 3/16" over rough, undulating, tight 476.4, 475.9' - Fracture zone, horizontal, 20% of rock surface and are fossil R56: 15 minutes molds, moderately fossiliferous, trace >10 rough, undulating, tight, rock fragments to organics near top of run 479 0 No Recovery 473.9-474.0' 1 480



338884.FL AD-02

SHEET 15 OF 15

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723982.5 N, 457716.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

CORING	NILTHOD A	ND LC	ZUIFIV	IENT: BL300T S/N 1517, mud rotary, HQ tools, HW cas	iiig		ORIENTATION : Vertical
WATER	LEVELS: 3.0	ft bgs	on 9	/08/07 START: 9/8/2007 END: 9	12/200	17 LOGGER : J. Burkard, R. Bitely,	T. Borton, J. Townes
>	[DISCONTINUITIES	_ ი	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		SIII	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	OUZE AND DEDTIL OF CASING
ᆱᇬ	R.H.A. A.H.A.	(%)	FRACTURES PER FOOT	DEDTH TYPE OPIENTATION POLICINISCO	1 일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
F A S	RE	Q D (%)	ACT R F(DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	₩ WBC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SCIE	Sar	R	FR	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-437.7				476.75, 477.0, 477.65, 478.0, 478.35' -	Ш	Limestone	
-			4	Fractures (5), horizontal, rough, undulating,	Н	- 474.0-479.0' - yellowish gray, (5Y	1 1
-	R57-HQ			tight 478.6-478.8' - Fracture zone, rock fragments	坩	7/2), very fine to fine grained, mild to strong HCl reaction, medium strong	1 -
-	5 ft	37	>10	up to 1-3/16" in diameter	₽	- to strong (R3 to R4), voids up to	-
l -	96%			479.6, 480.15, 480.45, 480.6, 480.95, 481.25'	Ш	3/16" over 10% of rock surface and	_
			3	 Fractures (6), horizontal, rough, undulating, tight 	Н	are fossil molds, cavities up to 3/8" diameter over 1-2% of rock surface,	
-			3	481.5-481.8' - Fracture zone, rock fragments		moderately fossiliferous, secondary	1
-			40	to 3/4" diameter	1Ш	mineralization from 478.0-479.0'	R57: 12 minutes
-			>10	481.9, 482.1, 482.75, 482.95, 483.2, 483.4' -	╆	- 479.0-483.8' - yellowish gray to light	1 1
-	484.0		NR	Fractures (6), horizontal, rough, undulating, open to 3/4"	╁	gray, (5Y 7/2 to N7), very fine to fine grained, mild to strong HCl reaction,	1 -
-			>10	482.85' - Fracture, vertical, rough, undulating,	世	medium strong to strong (R3 to R4),	-
485				tight	Щ	with and extremely weak carbonate	
-442.7			4	483.55-483.7' - Fracture zone, rock fragments up to 1-3/16" in diameter	Ш	sandy silt lens from 481.5-481.8', voids up to 3/8" over 10% of rock	
-			4	484.0-484.5' - Fracture zone, rock fragments	ЪН	surface and are fossil molds, trace	1
1 -	R58-HQ			up to 2" in diameter	ш	organics, moderately fossiliferous	SC-9 collected at 485.8- 486.85'
-	5 ft	42	2	484.85, 485.0, 485.3, 485.4, 485.8, 486.9, 487.0' - Fractures (7), horizontal, rough,	Ш	No Recovery 483.8-484.0' Limestone	400.03
-	76%			undulating, tight	Ш	484.0-487.8' - light brownish gray,	1 -
-			1	487.2' - Fracture, horizontal, rough,	+	(5YR 6/1), very fine to fine grained,	-
l _				undulating, open to 3/4"	Ш	mild to strong HCl reaction, strong (R4), voids up to 3/16" diameter over]
			NR		Ш	20% of rock surface are fossil molds.	R58: 11 minutes
-	489.0				Ш	quartz crystallization at 487.2',	1
-	100.0			400 Ol. Fracture harizontal rough	Н	1-9/16" diameter and contains	1 1
100			3	489.2' - Fracture, horizontal, rough, undulating, aragonite crystallization	Ш	carbonate crystallization No Recovery 487.8-489.0'	1 1
490 <u>-</u> 447.7				489.45, 489.9' - Fractures (2), horizontal,	₩	- Limestone	I ⊣
-			0	rough, undulating, tight	-	489.0-493.05' - light brownish gray,	1 -
-					\bot	(5YR 6/1), very fine to fine grained, mild to strong HCl reaction, strong	-
l .	R59-HQ 5 ft	64	>10		Ш	(R4), voids up to 3/16" over 10% of]
	81%	04	-10	491.45-491.6' - Fracture zone, rock fragments up to 1-3/16" in diameter	Ш	rock surface and are fossil molds,	
-				ragnients up to 1-5/10 in diameter	Ш	 cavities up to 1-3/8" over 1% of rock surface are filled with carbonate 	1
-			1	492.4' - Fracture, horizontal, rough,	╂┼┤	crystallization and found from	1
-				undulating, tight	Ш	- 489.0-490.0', moderately	R59: 12 minutes
-			NR		Щ	fossiliferous No Recovery 493.05-494.0'	-
I -	494.0				Щ	-	-
I -			5	494.2, 494.3, 494.45, 494.75, 495.1, 495.55,	\square	Limestone - 494.0-498.4' - light brownish gray,	
495			0	495.9' - Fractures (7), horizontal, rough,	Ш	(5YR 6/1), very fine to fine grained,	
-452.7				undulating, trace brown staining, tight -	Щ	mild to strong HCl reaction, medium	7
1 -			4	495.65' - Fracture, vertical, rough, undulating,	Ш	 strong to strong (R3 to R4), carbonate sandy silt, extremely weak 	1
-				tight, intersecting with horizontal fractures at	뮈	rock from 497.3-497.9', voids up to	-
-	R60-HQ		4	495.55 and 495.9'	+	 3/16" over 10% of rock surface and 	-
-	6 ft	19		496.2, 496.45, 496.65' - Fractures (3),	Ш	are fossil molds, cavities up to 9/16" diameter over 1% of rock surface	-
I -	73%	-	>10	horizontal, rough, undulating, tight 497.0' - Fracture, 0-90 deg, rough, undulating	Ш	- and are filled with aragonite]
1			. 10	to stepped, tight	Щ	crystallization, trace organics	
I -			1	497.3-497.6' - Fracture zone, rock fragments	Ш	_	R60: 10 minutes, 6' run to
-				up to 3/4", soft material 498.15' - Fracture, horizontal, rough,	Щ	No Recovery 498.4-500.0'	500' below ground surface -
-			NR	undulating, tight	丗	-	9/12/07 at 10:30, total
-					+	-	depth at 500.0' below
500	500.0				+	Datters of Daries at 500 0 %	ground surface
						Bottom of Boring at 500.0 ft bgs on 9/12/2007	
						5. 1.2.2001	



FRACTURES PER FOOT

>10

>10

>10

>10

>10

>10

9

>10

>10

4

NR

>10

>10

>10

>10

NR

>10

6

0

8

RQD(%)

0 >10

WATER LEVELS: 5.88 ft bgs on 9/13/07

CORE RUN, LENGTH, AND RECOVERY (%)

R1-HQ

5 ft

100%

R2-HQ

100%

R3-HQ

4 ft

43%

R4-HQ

6 ft

67%

209.0

213.0

219.0

200.0

DEPTH BELOW SURFACE AND ELEVATION (ft)

-157.6

205 205.0

-162<u>6</u>

210

167.6

215

172.6

220

PROJECT NUMBER: BORING NUMBER: AD-03

END: 8/24/2007

90

 $\underline{\circ}$

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

START: 8/16/2007

DESCRIPTION

DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND

THICKNESS, SURFACE STAINING, AND TIGHTNESS

200.0-200.6' - Fracture, vertical, rough,

200.6-201.4' - Fracture zone, angular fragments, 1-3" in size

201.7-202.2' - Fracture zone, angular

202.4' - Fracture, horizontal, smooth,

202.9' - Fracture, horizontal, rough,

202.5-202.7' - Fracture (3), 60 deg, rough, undulating, 1/8" relief

203.1-204.7' - Fracture zone, fragments

205.5-206.5' - Fracture zone, fragments

205.8, 206.0, 207.1, 207.3, 207.4, 207.5,

planar to undulating, 1/8" open

plane (3), smooth to rough, planar to

undulating, 1/8-1/4" open 208.3-208.6' - Fracture zone, smooth to

rough, planar to undulating, 1/4-2" open

207.5, 207.6, 207.7, 207.8, 207.9' - Fractures or bedding plane (11), horizontal, rough,

208.1, 208.15, 208.2' - Fractures or bedding

208.6-209.0' - Fracture zone, fragments 2-3"

209.0-209.85' - Fracture zone, multiple high

angle intersecting fractures, rock fragments

210.25' - Bedding plane, horizontal, smooth

210.3' - Fracture, vertical, rough, undulating,

210.6' - Fracture, vertical, rough, undulating,

213.0-213.4' - Fracture zone, multiple high

angle intersecting fractures, rock fragments

214.05' - Fracture, rough, undulating, 3/16"

214.25-216.15' - Fracture zone, multiple high

angle intersecting fractures, rock fragments

216.65-217.0' - Fracture zone, multiple high

angle intersecting fractures, rock fragments

219.0-220.8' - Fracture zone, multiple high

angle intersecting fractures, rock fragments

210.4' - Fracture, horizontal, rough,

213.6' - Fracture, horizontal, rough,

216.3, 216.55, 216.65' - Fracture (3), horizontal, smooth, bedding plane, very low

204.7-205.0' - Fracture zone, fragments 2-3"

205.0-205.5' - Fracture zone, fragments 1/2'

DISCONTINUITIES

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

undulating, open

undulating, open

undulating, open

1/4-3"

to 2" in size

1/4-1" in size

up to 1/8"

<1/16" open

<1/16" open

up to 1-9/16"

up to 1-3/16"

up to 1-3/16"

up to 1/8"

open

undulating, 3/8" open

undulating, 3/8" open

fragments, 1" to 2-1/2"

ORIENTATION: Vertical LOGGER: P. De Sa'rego, J. Townes, R. Bitely, M. Faurote, C. Sump LITHOLOGY COMMENTS ROCK TYPE, COLOR. SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS Limestone Boring AD-3 blind drilled to 200.0-203.6' - light olive gray to approximately 200 feet yellowish gray, (5Y 5/2 to 5Y 7/2), fine grained, moderate HCl reaction, below ground surface before beginning sampling/logging.
"Water level is based on weak to medium strong (R2 to R3), trace voids (<1/16") 201.4-201.5' - horizontal black Ground Water Monitoring at LNP site (FSAR Table organic laminae 2.4.12.08)" Logger: C. Sump (limited 202.8-203.1' - horizontal black organic laminae space in header) Approximately 1.8' of 203.6-205.0' - pale yellowish brown, (10YR 6/2), fine grained, moderate slough (from 0.0-200.0' HCI reaction, weak to medium strong drilling) removed from top (R2 to R3), 30% voids (<1/16"), trace casts/cavities (<1/16") R1: 12 minutes 205.0-207.1' - light olive gray to medium gray, (5Y 5/2 to N5), fine grained, moderate HCI reaction, medium strong (R3), trace medium 15:25: Segment of R2 to coarse subrounded fragments 206.5-207.1' - 5 to 10% voids to clogged, removed for logging and resumed R2 -1/16", trace cavities up to 3/4 x HQ at 206.5' 1-3/16" 207.1-209.0' - pale yellowish brown to yellowish gray, (10Y 5/4 to 5Y 7/2), Driller's Remark: R2 - HQ was a 4.0' run due to blockage in core barrel fine grained, weak HCl reaction, trace voids to 1/16", strong HCI R2: 14 minutes reaction in pulverized material 209.0-209.85' - grayish orange pink, (5YR 7/2), fine grained, moderate HCl reaction, medium strong to strong (R3 to R4), voids (<3/16") over 70% of surface, moderately fossiliferous 209.85-210.7' - moderate orange pink, (5YR 8/4), very fine grained, mild to moderate HCl reaction, weak to medium strong (R2 to R3), voids over 10% of surface, cavities up to R3:15 minutes 3/8" over 1% of surface, laminated, very poorly fossiliferous No Recovery 210.7-213.0' Limestone 213.0-217.0' - grayish orange pink, (5YR 7/2), very fine grained, mild to moderate HCl reaction, medium strong (R3), voids <1/16" over 50% of surface, few cavities up to 3/4", poorly fossiliferous

R4:16 minutes

logging

J. Townes continues

SHEET 1 OF 16

APPENDIX 2BB-346 Rev. 7

No Recovery 217.0-219.0'



338884.FL

AD-03

SHEET 2 OF 16

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

WATER LEVELS: 5.88 ft bgs on 9/13/07 START: 8/16/2007 END: 8/24/2007 LOGGER: P. De Sa'rego, J. Townes, R. Bitely, M. Faurote, C. Sump DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS Limestone >10 219.0-220.8' - yellowish gray to grayish orange pink, (5Y 7/2 to 5YR 7/2), very fine to fine grained, R5-HO moderate HCI reaction, weak to 0 5 ft medium strong (R2 to R3), voids <1/16" over 5% of surface, poorly 36% NR fossiliferous No Recovery 220.8-224.0' R5:13 minutes 224 0 Limestone 224.0-226.9' - yellowish gray, (5Y 7/2), very fine grained, moderate HCl reaction, weak to medium strong (R2 2 225 224.7-224.9' - Fracture, 10 deg, rough, $-182\overline{6}$ undulating, high relief (3/4") due to fossil to R3), voids <1/16" over 60% of >10 molds surface, cavities up to 3/8" over 10% 225.2-226.9' - Fracture zone, multiple high angle intersecting fractures, rock fragments of surface, fossil molds, moderately R6-HC >10 fossiliferous 5 ft 12 up to 1-3/16" 58% No Recovery 226.9-229.0' NR R6:5 minutes 229.0 Limestone 229.0-231.3' - yellowish gray, (5Y >10 229.4' - Fracture, 10 deg, rough, undulating, 230 7/2), fine grained, moderate HCI ~3/32" open, thin black material over 25% of -187<u>.6</u> reaction, weak (R2), voids up to fracture surface >10 1/16" over 20% of surface, cavities 229.55' - Fracture, 10 deg, rough, undulating, up to 3/4" over 1-2% of surface, <1/16" open fossil molds, poorly fossiliferous. >1 R7-HQ 229.7-231.0' - Fracture zone, multiple high trace laminations 5 ft 0 angle intersecting fractures, rock fragments No Recovery 231.3-234.0' 46% up to 1-3/16" 231.0' - Fracture, vertical, rough, undulating, ~3/8" open NR R7:7 minutes 234.0 234.0-234.5' - Fracture zone, multiple high Limestone 234.0-235.5' - yellowish gray, (5Y 7/2), very fine grained, moderate HCl >10 angle intersecting fractures, rock fragments 235 up to 1-3/16" 192.6 234.9-235.5' - Fracture zone, multiple high reaction, weak (R2), voids <1/16" >10 angle intersecting fractures, rock fragments over 5% of surface, cavities up to 1" up to 1-3/16" over 1-2% of surface, fossil molds, trace laminations, poorly fossiliferous R8-HC No Recovery 235.5-239.0 8 5 ft 30% NR R8:7 minutes 239.0 239.0-240.0' - Fracture zone, multiple high >10 angle intersecting fractures, rock fragments up to 1-9/16" 240



PROJECT NUMBER: BORING NUMBER: SHEET 3 OF 16

338884.FL **AD-03**

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

WATER LEVELS: 5.88 ft bgs on 9/13/07 START: 8/16/2007 END: 8/24/2007 LOGGER: P. De Sa'rego, J. Townes, R. Bitely, M. Faurote, C. Sump LITHOLOGY DISCONTINUITIES COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT DESCRIPTION ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD <u>0</u> MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -197.6 Limestone 240.1' - Fracture, 60 deg, rough, undulating 239.0-240.2' - yellowish gray, (5Y 7/2), very fine grained, mild HCI reaction, weak (R2), voids up to R9-HO 3/32" over 30% of surface, fossil 5 ft 0 molds, poorly fossiliferous, trace 24% NR laminations No Recovery 240.2-244.0' R9:7 minutes 244 0 244.0-244.5' - Fracture zone, multiple high Driller's Remark: Smooth Limestone >10 244.0-244.5' - yellowish gray, (5Y 7/2), very fine to fine grained, angle intersecting fractures, rock fragments drilling, no loss of 245 resistance or rod drops; up to 1-3/16" moderate to strong HCl reaction, -202 6 incompetent material being very weak to weak (R1 to R2), voids ground up and washed out <1/16" over 50% of surface, trace laminations, area of oxidized pyrite R10-HQ 3/4", poorly fossiliferous 5 ft 0 NR No Recovery 244.5-249.0' 10% R10:7 minutes 249.0 249.0-249.6' - Fracture zone, multiple high Limestone >10 angle intersecting fractures, rock fragments 249.0-249.6' - yellowish gray, (5Y 250 to 1-3/16" 7/2), very fine to fine grained. -207<u>.6</u> moderate HCI reaction, extremely weak to very weak (R0 to R1), trace laminations, nonfossiliferous No Recovery 249.6-254.0' R11-HQ 0 5 ft NR 12% R11: 7 minutes 254.0 254.0-255.0' - Fracture zone, rough, Limestone 254.0-256.5' - yellowish gray, (5Y 7/2), very fine to fine grained, >10 undulating, multiple high angle intersecting 255 fractures, rock fragments up to 1.5" -212.6 moderate HCI reaction, very weak to 2 255.2' - Fractures (2), 60 deg and horizontal, weak (R1 to R2), trace laminations, rough, undulating, 3/16" open cavities up to 3/8" over 5% of surface, fossil molds, poorly R12-HQ fossiliferous 5 ft 28% 0 No Recovery 256.5-259.0' NR R12: 7 minutes 259.0 >10 260



338884.FL AD-03

SHEET 4 OF 16

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

WATER LEVELS: 5.88 ft bgs on 9/13/07 START: 8/16/2007 END: 8/24/2007 LOGGER: P. De Sa'rego, J. Townes, R. Bitely, M. Faurote, C. Sump DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT DESCRIPTION ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS -217.6 259.0-259.3' - Fracture zone, rough, Limestone undulating, multiple intersecting fractures, 259.0-260.1' - yellowish gray, (5Y 7/2), very fine to fine grained, fragments up to 0.5" with one larger piece moderate to strong HCl reaction, weak (R2), voids <1/16" over 60% of R13-HQ 259.4' - Fracture, <10 deg, rough, undulating, 0 5 ft 259.7' - Fracture, 170 asg, 150 asg, 15 surface, cavities up to 3/4" over 10% 22% NR surface, fossil molds, moderately fossiliferous No Recovery 260.1-264.0' R13: 7 minutes horizontal, rough, undulating, intersecting fractures, ~3/8" open, due to fossil molds 264 0 259.95-260.1' - Fracture zone, fragments up Limestone 264.0-264.5' - yellowish gray, (5Y 7/2), very fine to medium grained, strong HCl reaction, weak to strong (R2 to R4), voids <1/16" over 10% >10 to 1" 264.0-264.35' - Fracture zone, rough, 265 undulating, fragments up to 2' -222 6 >10 264.45, 265.8, 265.95' - Bedding plane or mechanical break (3), <10 deg, smooth to surface, few small dissolution rough, planar to undulating cavities (<1x1/2"), trace shell laminae R14-HQ (<1/2"), poorly to moderately 5 ft 0 22% fossiliferous NR Interbedded Silt And Limestone 264.5-264.7' - yellowish gray, (5Y 7/2), dry to moist, nonplastic to low plasticity, moderate to strong HCI R14: 6 minutes reaction, coarse angular fragments, <50% limestone fragments, all 269.0 10 carbonate 269.0-269.3' - Bedding plane, <10 deg and 80 deg, smooth to rough, undulating to Limestone 264.7-264.95' - Same as planar, intersecting fractures 270 264.0-264.5 -227.6 Interbedded Silt And Limestone 264.95-265.1' - Same as 264.5-264.7 R15-HQ No Recovery 265.1-269.0' 0 5 ft NR Limestone 6% 269.0-269.3' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, medium strong to strong (R3 to R4)
No Recovery 269.3-274.0' R15: 6 minutes 274.0 274.0-274.4' - Fracture zone, rough, Limestone 274.0-275.0' - yellowish gray, (5Y 7/2), very fine to medium grained, >10 undulating, coarse fragments <1.5" 275 274.6' - Bedding plane or mechanical break, -232.6 or fracture, <10 deg, rough to smooth, mild HCl reaction, weak to strong (R2 to R4), voids <1/16" over 10% of undulating surface, moderately fossiliferous with fossil cast lenses R16-HQ No Recovery 275.0-279.0' 5 ft 20% 0 NR R16: 6 minutes 279.0 279.0-280.7' - Fracture, <10 deg, rough, >10 fragments <2", intersecting horizontal and 280 vertical fragments



PROJECT NUMBER: BORING NUMBER: 338884.FL **AD-03** SHEET 5 OF 16

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

ELEVAI	ION . 42.4 IL	(IVAVI	000)	DRILLING CONTRACTOR . Boart Longyear	, muni	SVIIIE, AL, DIIIIEI. A. AIIUEISUII	
CORING	METHOD A	ND E	QUIPM	ENT : BL300T S/N 1517, mud rotary, HQ tools, HW cas	ing		ORIENTATION : Vertical
WATER	LEVELS : 5.8	38 ft b	gs on 9	9/13/07 START: 8/16/2007 END: 8/	24/20	D7 LOGGER : P. De Sa'rego, J. Tow	nes, R. Bitely, M. Faurote, C. Sump
	_			DISCONTINUITIES	(1)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-237.6						Limestone	
- - - -	R17-HQ 5 ft 34%	0	>10 NR			 279.0-280.7' - yellowish gray, (5Y 7/2), very fine grained, moderate HCI reaction, medium strong to strong (R3 to R4) No Recovery 280.7-284.0' 	- - - - R17: 10 minutes
l	284.0				\vdash		
285_ -242.6			>10	284.0-284.55' - Fracture zone, rough, undulating, multiple intersecting fractures 284.8' - Bedding plane, 10 deg, rough, undulating 285.15' - Fracture, <10 deg, rough, undulating, intersecting fractures		Limestone 284.0-284.9' - yellowish gray, (5Y 7/2), very fine to fine grained, medium strong to strong (R3 to R4), <1/16" voids over 10% of surface, fossiliferous	
_	R18-HQ			285.2' - Fracture, 55 deg, rough, undulating,	Ħ	284.9-285.4' - grayish orange pink to yellowish brown, (10YR 6/2 to 10YR	
_	5 ft 62%	12	>10	intersecting fractures 285.25' - Fracture, <10 deg, rough, undulating, intersecting fractures	岸	5/4), fine to medium grained, moderate HCl reaction, extremely	-
-	289.0		NR	285.75' - Fracture or mechanical break, <10 deg, rough, undulating 286.4' - Fracture or mechanical break, <10 deg, rough, undulating 286.6-287.1' - Fracture or mechanical break,		 weak to weak (R0 to R2) 285.4-285.5' - fine to medium grained, moderate HCl reaction 285.5-287.1' - yellowish gray, (5Y 7/2), fine to medium grained, mild 	R18: 6 minutes
290_ -247.6 -	R19-HQ		>10	40 deg, rough, undulating, multiple intersecting fractures 286.61' - Fracture or mechanical break, <10 deg, rough, undulating 289.0-290.5' - Fracture zone, rough, undulating, multiple intersecting fractures, rock fragments <4"x1"		HCl reaction, very weak to weak (R1 to R2), voids <1/16" over 20% of surface, trace fossil casts No Recovery 287.1-289.0' Limestone 289.0-290.5' - yellowish gray, (5Y 7/2), very fine to medium grained, mild HCl reaction, extremely weak to	- - - -
- - -	5 ft 30%	0	NR	290.4' - Fracture, rough, undulating, potential healed fractures, intersecting		medium strong (R0 to R3), voids over 15 to 30% of surface (<1/16"), poorly to moderately fossiliferous No Recovery 290.5-294.0'	- - R19: 5 minutes
-	-				H	_	TCTO. O MINULES
295 -252.6	294.0		>10	294.3' - Fracture, 70 deg, rough, undulating 294.6' - Fracture, 70 deg, rough, undulating 294.6-295.0' - Fractures, multiple intersecting fractures, fragments <2" 295.2' - Bedding plane or mechanical break,		Limestone 294.0-295.9' - yellowish gray, (5Y 8/1), very fine to fine grained, extremely weak to weak (R0 to R2), laminated bedding, <5% voids (1/16") over surface, trace secondary	Driller's Remark: Slow rotation to approx. 400 rpm - to achieve better recovery in softer material M. Faurote continues - logging
- - - -	R20-HQ 5 ft 38%	10	10 NR	<10 deg, smooth to rough, undulating 295.3' - Fracture or mechanical break, 60 deg, rough, undulating 295.8-295.9' - Fracture zone, rough, undulating, >3 fractures intersect		infill on clast inclusion No Recovery 295.9-299.0' -	R20: 5 minutes
-					丗	L	-
-	299.0					_	-
300	-		3	299.35' - Mechanical break or bedding plane, <10 deg, smooth to rough	臣		-



PROJECT NUMBER:

338884.FL

BORING NUMBER:

AD-03 SHEET 6 OF 16

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

				TENT . BESOUT S/N 1517, Hud Totally, HQ tools, HW Cast			ORIENTATION: Vertical
WATER	LEVELS : 5.8	8 ft b	gs on		24/20		nes, R. Bitely, M. Faurote, C. Sump
≥∩≘	_ (6			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	CIZE AND DEDTH OF CACING
ᆱ끯은	RUN H. A	(%) Q	N N	DEDTIL TYPE OPIENTATION POLICINESS	1 ≒	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
F A S	Sort) O	ACT R FC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	/BC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SCE		S Q	FR/ PEF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-257.6				299.45' - Mechanical break or bedding plane,	Н	Limestone	
-			>10	<10 deg, smooth to rough, slickensided		- 299.0-299.3' - grayish orange, (10YR	-
l -				299.7' - Mechanical break or bedding plane,	Н	7/4), very fine grained, mild HCl	
1	R21-HQ		- 10	<10 deg, smooth to rough, slickensided 300.4-300.65' - Fracture zone, rough,	Ш	reaction, extremely weak (R0), trace	
-	5 ft 82%	51	>10	undulating, gravel sized fragments <2"	Н	299.3-299.35' - olive gray, (5Y 4/1),	1
-	0270			301.0-301.1' - Fracture zone, rough,	Н	very fine grained, no HCl reaction,	SC-1 collected at 302.0-
-			1	undulating, sand sized fragments	ш	extremely weak (R0)	302.8'
-				301.5' - Fracture or mechanical break, <10	Н	299.35-301.0' - yellowish gray to light	l
l _			0	deg, smooth to rough, undulating 301.9-302.1' - Fracture, <10 deg, smooth to		olive gray, (5Y 8/1 to 5Y 6/1), very fine to medium grained, moderate	R21: 7 minutes
1	304.0		NR	rough, undulating, gravel sized fragments <1"	Ш	HCl reaction, extremely weak to very	1
1 -				302.85' - Fracture or mechanical break, <10	Ш	weak (R0 to R1), laminated bedding] 1
-			>10	deg, rough, undulating		= 301.0-303.1' - yellowish gray, (5Y	
305_				304.0-305.9' - Fracture zone, rough, undulating, gravel sized fragments <2"	H	7/2), very fine to fine grained, mild to moderate HCl reaction, laminated	Ⅰ
-262.6			>10	andalating, graver sized tragificities >2	Ш	bedding, voids <1/16" over 10% of]
					\mathbb{H}	surface]]
I -	R22-HQ				ш	No Recovery 303.1-304.0'] 1
-	5 ft	0			ш	Limestone 304.0-305.9' - yellowish gray, (5Y	1
-	38%			-	Н	8/1), mottled colorations with trace	-
l -			NR	_		organics, very fine grained, moderate	
1					Н	HCl reaction, medium strong to	
-					ш	strong (R3 to R4), trace voids <1/16",	R22: 7 minutes
-					Н	_ poorly fossiliferous No Recovery 305.9-309.0'	-
-	309.0				Н	Limestone	-
-			>10	undulating, gravel sized fragments <2"	П	- 309.0-312.8' - yellowish gray, (5Y	
310					Н	7/2), very fine to fine grained,	
-267.6				210.25.210.25! Fracture zone rough	Ħ	moderate HCl reaction, extremely	1
-			>10	310.25-310.35' - Fracture zone, rough, undulating, gravel sized fragments <1"	ш	 weak to weak (R0 to R2) 309.0-310.8' - very fine grained, 	1 1
-	R23-HQ			310.8, 311.15, 311.55, 311.95, 312.1' -	Ш	mottled laminations	1 -
-	5 ft	33	3	Bedding plane (5), <10 deg, rough,	Н	- 310.8-312.8' - very fine to fine	-
l _	76%			undulating	Н	grained, laminated bedding, with	
			>10	242.2.242.01 Freehurs	ш	voids (<1/16") over 30% of surface] 1
I -			- 10	312.3-312.8' - Fracture zone, rough, undulating, gravel sized fragments <1"	\mathbb{H}	F] 1
-				and and any graver of the magnitude of		- No Recovery 312.8-314.0'	R23: 5 minutes
-			NR		ш	_	-3. 5
-	314.0				Н	<u></u>	
			\10	314.0-315.6' - Fracture zone, rough,	П	Limestone	
315			>10	undulating, gravel sized fragments <3"	Ш	- 314.0-315.6' - yellowish gray, (5Y 8/1), very fine to medium grained,	1
-272.6			>10	_	口	moderate HCl reaction, extremely	⊣
-			-10		\vdash	 weak to weak (R0 to R2), voids]
-						<1/16" over 10% of surface	
	R24-HQ 5 ft	0			Щ	No Recovery 315.6-319.0']
1	32%	U			Н		1
-			NR		П	-] 1
-			INIT		Н	-]
-				319 0 320 01 Fronture ==== -=:-=h	Ш	-	D24: 5 minutes
I _				318.0-320.0' - Fracture zone, rough, undulating, gravel sized fragments <2"	H	_	R24: 5 minutes
	319.0			andalating, graver sized fragments 12	Н		
1 -					Ш] 1
-			>10		Н	 	1
320					H		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

AD-03 SHEET 7 OF 16

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

WATER LEVELS : 5.88 ft bqs on 9/13/07

START : 8/16/2007

END : 8/24/2007

LOGGER : P. De Sa'rego, J. Townes, R. Bitely, M. Faurote, C. Sum

WATER	LEVELS : 5.8	8 ft bg	gs on 9	9/13/07 START: 8/16/2007 END: 8/	24/200	DT LOGGER : P. De Sa'rego, J. Tow	nes, R. Bitely, M. Faurote, C. Sump			
≥ ∩≎	(%)			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS			
ELOV N (ft	N, AND 3Y (%		ZES T	DESCRIPTION		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,			
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.			
-277.6			4	320.1' - Fracture, 30 deg, rough, undulating,	囯	Limestone - 319.0-320.5' - yellowish gray, (5Y				
				4 intersecting fractures 320.3' - Fracture, 70 deg, rough, undulating,	Щ	8/1), very fine to medium grained,				
_	R25-HQ 5 ft	0		4 intersecting fractures	Д	mild to moderate HCl reaction, very weak to weak (R1 to R2)	_			
_	30%				Ш	No Recovery 320.5-324.0'	-			
-			NR		口	-	-			
-				-	団	-	R25: 6 minutes			
-	324.0			-	団	-	-			
-				324.0-326.1' - soil interval	\prod	Silty Sand (SM)	Begin drilling at 8:00 on – 8/22/07; water level at 3'			
325			NA	_		- 324.0-326.1' - yellowish gray, (5Y 7/2), moist, dense, fine to coarse	below ground surface Driller's Remark: No —			
-282.6	R26-HC 5 ft		NA		$\ \cdot\ _1$	grained, mild HCl reaction, 40 to 60% carbonate sands, 40 to 60% low	slough in boring, clean to 324' below ground surface			
_			INA		11111	plasticity carbonate silts	Driller's Remark: Moderate -			
-		0			$\ \ \ $	No Recovery 326.1-329.0'	to slow advancement rate; very consistent			
-	42%			-	$\{\{\}\}$	_	advancement _ Driller's Remark: Slow			
-			NR	-	$\ \cdot\ $	-	rotation rate to approx. 300			
-				-		-	rpm to achieve better _ recovery in softer material			
-	329.0			-		-	R26: 7 minutes			
			NA		Ш	Sandy Silt (ML) 329.0-331.3' - yellowish gray, (5Y]			
330_			14/ (_		7/2), dry to moist, very dense, fine to	_			
-287.6		40	NA		$\ \ $	coarse grained, >50% low plasticity carbonate silts, carbonate sands	_			
-	R27-HQ					NA		$\{ \}$	-	-
-	5 ft 88%			331.5' - Mechanical break, boxing core 331.7' - Bedding plane or mechanical break, <10 deg, rough, undulating	H	Limestone 331.3-333.4' - yellowish gray, (5Y 7/2), very fine to fine grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), trace	-			
-	00%				田		-			
-			2	331.85' - Bedding plane or mechanical break,	囯					
			0	<10 deg, rough, undulating 332.5' - Fracture or mechanical break, 60	丗	organic laminations	R27: 6 minutes			
	334.0		NR	deg, rough, undulating 332.9' - Bedding plane or mechanical break,	囯	No Recovery 333.4-334.0'	 			
-				<10 deg, rough, undulating	川	No Recovery 334.0339.0'	Driller's Remark: Possible void space; low torque on -			
335 -292.6				<u> </u>	H	_	drill indicating very soft material or no material; no			
					団	-	fluid return; fluid return at			
-	R28-HQ			-	団	-	higher flow rate of approx. 25 gpm and not drilling			
-	5 ft 0%	0	NR	-	団	-	(approx. 25% circulation) –			
-				·	団	-				
					団	-	1			
					囯	_	R28: 7 minutes			
-				<u>.</u>	H	- No Books 200 C 242 St	_			
-					H	No Recovery 339.0-342.0'	_			
340					\vdash					
							-			



338884.FL AD-03

SHEET 8 OF 16

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

	LEVELS : 5.8			9/13/07 START : 8/16/2007 END : 8/2		D7 LOGGER : P. De Sa'rego, J. Tow	nes, R. Bitely, M. Faurote, C. Sump
				DISCONTINUITIES	(J	LITHOLOGY	COMMENTS
AND	AND ≪ (%D		ES	DESCRIPTION	SLOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE	E RUI	(%) Q	TUR FOO	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI(MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RO	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-297.6							Driller's Remark: Clogging
-			NR	-	Ш	-	in core barrel; tag total – depth at 341' below ground
-	R29-HQ			-	Ш	_	surface with cutting bit
	5 ft 34%	0			Ш		pulled; core barrel is open, but rock fragments may be
_			NA	342.0-343.7' - Fracture zone, rough, undulating, trace staining, silt material,		Sandy Silt (ML) - 342.0-343.4' - yellowish gray, (5Y	rolling under the bit causing no recovery or
_				fractures in rock fragments	Ш	7/2), moist to wet, soft to stiff, fine to	possible void; felt rock
-			NA	-		coarse grained, moderate HCl reaction	fragment break loose or move out of the way; 2' of
-	344.0		NR	-		343.4-343.7' - bluish gray, yellowish gray, (5B 7/1, 5Y 7/2), moderate HCl	recovery from 342 to 344' R29: 6 minutes
			7	344.3-344.4' - Fracture zone, vertical and	Ш	reaction, weak (R2)	1
345_ -302.6				horizontal, multiple fractures on and through the zone, broken fragments	H	No Recovery 343.7-344.0' Silt (ML)	-
-			>10	345.5-345.75' - Fracture zone, fragments 1/4"	Ш	- \344.0-344.3' - brown to orange gray, carbonate grains	1
-	R30-HQ			to 3/4", in transition between lithologic units - 346.1' - Mechanical break	Ш	Limestone	1
	5 ft 74%	32	3	346.4' - Mechanical break	ш	 344.3-345.7' - very fine to coarse grained, strong HCl reaction, very]
			2	346.95' - Mechanical break or bedding plane 347.3' - Bedding plane, horizontal, smooth, -		weak (R1), bedded at 345.7']
_				planar, organic, trace iron oxide 347.4' - Bedding plane, horizontal, smooth,		\fine grained, strong HCl reaction,	
-			NR	planar, organic, trace iron oxide		medium strong (R3), pyrite mottling Silt (ML)	R30: 7 minutes
-	349.0			-	Ш	347.4-347.7' - compact, carbonate No Recovery 347.7-349.0'	-
			>10	349.5' - Fracture, 65 deg, planar to	H	Limestone	-
350_ -307.6				undulating — 349.6-350.4' - Fracture zone, heavily	H	349.0-350.5' - light gray to white, (N8 to N9), very fine grained, strong HCl	-
-			>10	fractured, fragmented		reaction, medium strong (R3) 350.5-352.0' - yellowish gray, (5Y	1
	R31-HQ	56	2	350.7-351.1' - Bedding plane, horizontal, planar, silt to sand horizon between weak	H	8/1), very fine grained, strong HCl]
	5 ft 98%	90	3	rock	H	reaction, very weak (R1), laminated bedding, trace organics, trace pyrite]
_			2	undulating to planar	H	352.0-354.0' - white, light gray, yellowish gray, (N9, N8, 5Y 8/1), very	
-				352.0' - Mechanical break, 0-10 deg, rough, undulating to planar	H	fine grained, strong HCl reaction, weak (R2), trace iron, pyrite	R31: 6 minutes
-			2	352.6' - Mechanical break, 0-10 deg, rough, undulating to planar	H	weak (RZ), trace iron, pyrite	K31. 6 Milliules
-	354.0			353.05' - Mechanical break, 0-10 deg, rough, undulating to planar	H	Sandy Silt (ML)	
355			0	353.55' - Mechanical break, 0-10 deg, rough,		S54.0-354.4' - pinkish gray, (5YR]
-312.6			NIA.	undulating to planar — 354.4' - Bedding plane, horizontal, smooth,	11111	Limestone	
			NA	undulating, light to moderate organic 354.6' - Bedding plane, horizontal, smooth,		354.4-354.8' - pale orange, (10YR]
	R32-HQ 5 ft	24	>10	undulating, light to moderate organic staining	Н	\<10% voids <1/16"]
_	100%	27	- 10	354.8-356.4' - Fracture zone, 0-80 deg, organic staining, fragments 1/4" x 1/2"	\square	Silt (ML) \354.8-356.0'	
-			>10	357.0-357.5' - Fracture zone, 0-75 deg, multiple fragments 1/2" x 1/2"	H	Limestone 356.0-358.2' - pale orange, (10YR	
-				357.5-358.3' - Fracture zone or bedding plane, 0-60 deg, random fractures, multiple	Щ	 8/2), very fine grained, strong HCl 	R32: 8 minutes
-	050.0		>10	sizes	囯	reaction, weak to medium strong (R2 to R3), 15-18% voids <1/8"	-
-	359.0			358.4' - Fractures, 75 deg and 60 deg, smooth, intersecting	H	<u> </u>	-
360			2	359.4' - Bedding plane, rough, undulating	Ш	-	
- 555					П		_



PROJECT NUMBER:

33884.FL

BORING NUMBER:

AD-03 SHEET 9 OF 16

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

				IENT : BL300T S/N 1517, mud rotary, HQ tools, HW casi			ORIENTATION : Vertical
WATER	LEVELS : 5.8	8 ft b	gs on		24/20		nes, R. Bitely, M. Faurote, C. Sump
≥ 5€				DISCONTINUITIES	8	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-317.6 -			>10	359.95' - Bedding plane, rough, undulating 360.2-360.4' - interbedded, generally horizontal		Limestone - 358.2-361.1' - pale orange, (10YR 8/2), very fine grained, weak to	-
-	R33-HQ 5 ft 82%	50	3	360.95' - Mechanical break 361.5' - Fracture or bedding plane, horizontal and vertical, rough, undulating	H	medium strong (R2 to R3), 20% voids (<1/16"), fossiliferous 361.1-361.3' - very fine grained,	SC-2 collected at 361.75-
-			>10	361.6' - Fracture or bedding plane, horizontal and vertical, rough, undulating 361.7' - Fracture or bedding plane, horizontal	Ħ	transition zone, irregular, convoluted surface, laminar, horizontal bedding, organic interbedding, rip-up clasts	362.65'
-	364.0		NR	and vertical, rough, undulating 362.7-363.1' - Fracture zone, smooth to rough, undulating, multiple fragments, no	Ė	361.3-363.1' - yellowish gray, (5Y 8/1), trace mottling, very fine to medium grained, moderate to strong HCl reaction, weak (R2), fossil casts	R33: 6 minutes
365_ -322.6			7	visible orientations 364.25-364.45' - Bedding plane, smooth, undulating —	Ė	- (1/16 to 3/8") over 10 to 15% of the surface, faint bedding No Recovery 363.1-364.0'	-
-	R34-HQ		0	364.7' - Fracture, 85 deg and vertical, rough, undulating 364.9' - Bedding plane, horizontal, smooth,		Limestone 364.0-364.25' - pale orange, (10YR 8/2), trace mottling, very fine grained,	-
- -	5 ft 100%	52	2	contact, with 45 deg fracture 366.2' - Bedding plane, rough, contact very irregular 366.9-368.0' - Fracture zone, smooth,	E	 moderate to strong HCl reaction, weak (R2), fossil casts (1/16 to 3/8") over 10 to 15% of the surface, faint]
_			>10	undulating, irregular contact with uneven surfaces		bedding 364.25-364.9' - pale orange, (10YR 8/2), very fine grained, strong HCI	R34: 6 minutes
- -	369.0		1	368.7' - Bedding plane, horizontal	Ħ	reaction, medium strong (R3), granular, voids (<1/16") over 15% of surface, cavities (up to 1/2 to 1/4") over 10% of surface (fossil molds)	
370 -327.6			>10	369.35-369.8' - Fracture zone or bedding plane, 0-90 deg, smooth to rough, planar to undulating, iron oxides and trace organics	Ē	364.9-366.15' - grayish orange, — (10YR 7/4), very fine grained, strong to very strong HCl reaction, medium	_
_	R35-HQ 5 ft	44	>10	370.1' - Fractures, horizontal and 8 deg, rough, undulating 370.6-370.7' - Fracture zone		strong (R3), trace organics as laminae at top of interval 366.15-368.2' - white, pale orange,	-
_ 	74%	44	1	371.5' - Mechanical break 371.9' - Mechanical break	H	(N9, 10YR 8/2), very fine grained, - medium strong to strong (R3 to R4), 20% burrows, molds, and 5% voids	
-			NR	372.6' - Mechanical break	H	(<1/16"), trace organics368.2-368.6' - pale orange, (10YR 8/2), very fine grained, very weak to weak (R1 to R2), granular, 1/8"	R35: 5 minutes
	374.0		>10	374.0-374.3' - Fracture zone, fragments 1/4" to 3/4"		organic layer at 368.3', few voids, few cavities Limestone	- -
375 <u> </u>			>10	374.3' - Bedding plane, horizontal and 5 deg, smooth, undulating 374.4' - Bedding plane, horizontal and 5 deg, smooth, undulating	E	— 369.4-370.5' - white to pale orange, (N9 to 10YR 8/2), very fine grained, strong HCl reaction, medium strong	-
- -	R36-HQ 5 ft 66%	12	>10	374.6' - Bedding plane, horizontal and 5 deg, smooth, undulating 374.85' - Fracture, 20 deg, rough, undulating	Ħ	(R3), trace organics, burrows and molds create cavities to 1/2", 10% voids (<1/16") 370.5.372.7', yellowish gray (5)	
- - -	379.0		NR	374.9-375.3' - Fracture zone, multiple orientations, fragments are 1/2"x1" to 2"x1" - 375.55' - Mechanical break 375.7-375.95' - Fracture zone 376.55' - Fracture zone, horizontal and 25 deg, rough, undulating		 370.5-372.7' - yellowish gray, (5Y 7/2), very fine grained, strong HCl reaction, medium strong to strong (R3 to R4), 20 to 25 % voids (<1/16") and fossil molds and casts No Recovery 372.7-374.0' 	R36: 7 minutes
380			2	378.6-376.8' - Fracture zone, trace iron oxide staining		-	
					_		1

APPENDIX 2BB-354 Rev. 7



338884.FL **AD-03**

SHEET 10 OF 16

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing WATER LEVELS: 5.88 ft bgs on 9/13/07 START: 8/16/2007 END: 8/24/2007 LOGGER: P. De Sa'rego, J. Townes, R. Bitely, M. Faurote, C. Sump DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR. SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -337.6 Limestone 380.1, 380.2, 380.45' - Bedding plane (3), 374.0-374.45' - grayish orange, 5 horizontal (10YR 7/4), fine to medium grained, 380.8, 380.9' - Mechanical break (2) moderate HCI reaction, very weak R37-HQ 381.05' - stepped fracture over 3/4", angular (R1), laminated bedding, organic 18 4 5 ft 381.4' - Bedding plane, smooth, undulating, interbedding 374.45-377.3' - yellowish gray, (5Y 82% stepped 381.7, 381.9, 382.15, 382.6' - Bedding plane 8/2), very fine grained, moderate HCI reaction, weak to medium strong (R2 to R3), 25 to 35 % burrows, cavities (molds), 5 to 10% voids (<1/16"), leastly because the strength of the strength 4 (4), smooth, undulating 382.7, 382.9' - Bedding plane (2), rough, R37: 6 minutes undulating NR locally heavily fractured 384 0 No Recovery 377.3-379.0' 384.2, 384.4, 384.5, 384.7' - Bedding plane Limestone 8 or mechanical break (4) 379.0-381.75' - grayish orange, 385 (10YR 7/4), very fine to fine grained, strong HCl reaction, very weak to 384.9' - mid point of vertical fracture along -342 6 center of core 6 385.05, 385.2, 385.7, 385.9' - rough, multiple weak (R1 to R2), nonreactive granular material, localized laminated fragments, angular to spike random angles R38-HQ 386.0' - Fracture, 20 deg bedding with trace organics 5 ft 39 >10 386.6-387.5' - Fracture zone, multiple 381.0-381.3' - extremely weak (R0), 96% friable, dissembles in water fragments up to 2", crosses lithology change 381.75-383.1' - yellowish gray, (5Y >10 8/1), very fine grained, strong HCI 387.8' - Bedding plane, 10 deg, smooth, SC-3 collected at 387.8reaction, medium strong (R3), 10% undulating 388.8' voids (<1/8") 382.7-383.1' - very weak to weak (R1 0 R38: 7 minutes 389.0 NR to R2) 389.05' - Mechanical break No Recovery 383.1-384.0' 4 389.4-389.5' - Bedding plane, horizontal and Limestone 390 5 deg, smooth, undulating, silt/clay infill 384.0-384.5' - yellowish gray, (5Y -347<u>.6</u> 7/2), very fine grained, very strong 2 HCI reaction, extremely weak (R0) 390.5-391.5' - Fracture zone, fragments to 2", subangular to angular, 40-60% infill <1" 384.5-387.0' - grayish orange, (10YR R39-HQ 7/4), very fine grained, strong HCI reaction, medium strong (R3), 20% 27 2 5 ft 391.5-391.8' - Bedding plane, horizontal, 94% smooth, undulating, rock partings on both <1/16" voids, trace organics, cavities to 3/4" ends 1 387.0-388.8' - light gray, light blue gray, (N7, 5B 7/1), very fine to fine 391.8-392.6' - Fracture zone, fragments to 1-1/2", subangular to angular R39: 8 minutes grained, strong HCl reaction, weak to 392.9' - Bedding plane, smooth, undulating, >10 contact rock with silt/sand medium strong (R2 to R3), 25% NR 394.0 393.4-393.7' - Fracture zone, fine infill, fossil casts (1/16 to 9/16" max.) of angular fragments to 1" forams, pelecypods, and >10 394.0-394.55' - Fracture zone, fractures from echinoderms 395 horizontal to vertical, immediately below 3/8" No Recovery 388.8-389.0' -352.6 gravel sized fragments, clay/silt rock Limestone >10 389.0-393.7' - grayish orange, very pale orange (392.0'), (10YR 7/4, 10YR 8/2), strong HCl reaction, fragments to end of run R40-HQ 0 5 ft extremely weak to very weak (R0 to 36% R1), fracture zone, bréccia begins at 390.5', 15-18% voids (<1/16") in rock NR fragments No Recovery 393.7-394.0' R40: 6 minutes Limestone 394.0-395.8' - Same as 389.0-393.7' 399 0 395.6' - becomes tacky, heavy silt 1 No Recovery 395.8-399.0' 399.65' - Bedding plane, smooth, horizontal 400



338884.FL AD-03

ROCK CORE LOG

SHEET 11 OF 16

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 5.8	8 ft bg	s on 9	9/13/07 START: 8/16/2007 END: 8/	24/20	07 LOGGER : P. De Sa'rego, J. Tow	nes, R. Bitely, M. Faurote, C. Sump
200				DISCONTINUITIES	ß	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ACE ATIC	L H	Q D (%)	F. 0	DEPTH, TYPE, ORIENTATION, ROUGHNESS,		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
LEV	ORE	σp	RAC FIRE	PLANARITY, INFILLING MATERIAL AND	YMB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	0,77	₩	<u> </u>	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	· ·
-357.6 -			2	400.0' - Fracture, horizontal, rough, undulating		Limestone - 399.0-399.25' - very pale orange,	_
				400.1' - Fracture, vertical, rough, undulating	\Box	(10YR 8/2), moderate HCl reaction,	
	R41-HQ 5 ft	67	1	401.0' - Mechanical break	」	very weak (R1), 30% voids (<1/8") (fossil molds), sand-sized grains,	
	88%	01				fossil fragments	SC-4 collected at 401.5- 402.65' -
			,			399.25-403.4' - yellowish gray, (5Y - 8/1), mild to strong HCl reaction,	402.03
			1	402.7' - Fracture, 45 deg, planar		weak (R2), trace iron oxides on shell	
		[1		╁	casts, 15% <1/16" voids with	R41: 6 minutes
	404.0		NR	•	\vdash	 sporadic fossil casts to 1/4" No Recovery 403.4-404.0' 	_
1	× · · · ·			404.1' - Bedding plane, 5 deg, undulating	口	Limestone]
405			2		\blacksquare	 404.0-408.95' - grayish orange pink, (5YR 7/2), fine to medium grained, 	
-362.6		Ì		404.85' - Fracture, 15 deg, smooth, planar — 405.05' - Bedding plane or mechanical break,	\sqcap	moderate HCl reaction, very weak	_
-			1	core contacts spun against each other		 (R1), HCl reaction delayed, brecciated at 410.2-410.35' 	-
-	R42-HQ	ŀ				_ brecolated at 410.2 410.00	-
-	5 ft 99%	86	1	. 406.65' - Bedding plane, horizontal and 5	╨	-	-
-	9970	ŀ	-	deg, smooth, undulating	口	-	-
-			2	407.05' - Bedding plane, 10 deg, smooth,		-	-
-		ŀ		planar 407.75' - Mechanical break	╂┬	-	R42: 6 minutes
-			1	-		-	-
-	409.0	\dashv	NR	408.85' - Mechanical break, probably when	世	No Recovery 408.95-409.0'	-
-			>10	breaking core run off bottom	₽	_ Limestone	-
410_ -367.6		ŀ	-	409.7-410.0' - Mechanical break, undulating,	┲	409.0-411.3' - Same as 404.0-408.95'	_
-			>10	heavily fractured near vertical planes, probably mechanically induced		-	_
-	R43-HQ		_	410.3' - Fracture, 40 deg and 45 deg, zone infilled with 1/8" or less rock fragments in silt	╂┯	_	_
_	5 ft	14	>10	matrix		- Limestone	_
-	60%			410.6-412.0' - Fracture zone, horizontal and	片	411.3-412.0' - mild HCl reaction, very weak (R1), dark organic laminae,	_
-				vertical, multiple fragments of varying size ranging to 3"x1-1/2"x1", organic (coatings) on	╀	- trace iron oxides on bedding plane	_
_			NR	planar surfaces and lining casts from	\blacksquare	surfaces	
				411.3-412'	口	No Recovery 412.0-414.0'	R43: 7 minutes
	414.0					<u></u>	_
			5	414.15' - Bedding plane, horizontal, smooth,		Limestone 414.0-414.6' - very pale orange,	_
415		ļ		planar 414.4' - Fracture, vertical and 60 deg —	٥٠٥	(10YR 5/2), very fine grained, very]
-372.6			3	414.6' - Bedding plane, rough, undulating	\Box	strong HCl reaction, weak (R2), 5% (<1/16") voids on surface, trace	
			Ĭ	414.95, 415.2, 415.5, 415.8' - Mechanical break (4)	片	_ \organics	
	R44-HQ 5 ft	57	2	. ,	\vdash	Conglomerate 414.6-414.8' - strong HCl reaction,	
]	89%	51		416.4' - Mechanical break, horizontal 416.8' - Fracture, 65 deg, planar to	尸	variegated, silica gravel up to 3/8",	
]		Ī	$\overline{}$	undulating, 1/16" separation	口	limestone grains]
1 1			2	417.15, 417.25' - Fracture (2), horizontal and 80 deg, 1/16" to 1/16" separation	Ш	Limestone 414.8-418.45' - very pale orange,]
1		İ	1		\Box	(10YR 8/2), very fine grained, strong	R44: 8 minutes
	419.0	Ī	NR	418.4' - Bedding plane, smooth, undulating	片	HCl reaction, weak to medium strong (R2 to R3), 5 to 20% (<1/16") voids,	1
				419.2' - Bedding plane, probable organic	 	fossil molds, some including cavities	1
420			1	stain and/or infill	Ħ	up to 1/2", trace organic material]
720			-		1		
					_		1

APPENDIX 2BB-356 Rev. 7



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AD-03

SHEET 12 OF 16

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

WATER	LEVELS: 5.8	88 ft b	gs on 9	9/13/07 START: 8/16/2007 END: 8/	24/200	D7 LOGGER: P. De Sa'rego, J. Tow	ownes, R. Bitely, M. Faurote, C. Sump	
\$ D ⊋	(%			DISCONTINUITIES	ي	LITHOLOGY	COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,	
TH B	E R.L. STH, OVEI	(%) □	T. S. S.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD	
SURF SURF	COR	RO	ER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	N.S	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.	
-377.6	014	ш.		419.75' - Mechanical break	+ "	Peat		
-			1	410.70 Weditalion break	+	- \419.0-419.2' - brownish black, (5YR	-	
_	R45-HQ		Н		╂	2/1), malleable	-	
_	5 ft	65	2	421.3' - Fracture, vertical, smooth, undulating	Н	Limestone 419.2-421.8' - very pale orange,	-	
_	96%		Ш	421.7-422.5' - Bedding plane or fracture	Ш	_ (10YR 8/2), very fine grained, strong	-	
_			>10	zone, rough, undulating, irregular contact with uneven surfaces	\perp	HCl reaction, medium strong (R3), fossil mold rich, 25% (<1/16") voids,	-	
_					+	trace organics		
_			>10	423.1' - Mechanical break	耳	421.8-423.8' - very pale orange to pale yellowish brown, (10YR 8/2 to	R45: 9 minutes	
_	424.0		NR	423.4-423.8' - Fracture zone, horizontal and vertical, rough, undulating, may be	Ш	_ 10YR 6/2), very fine grained,	_	
			1	extensively broken from/by breaking core for	Ш	moderate to strong HCl reaction,		
425				retrieval	Ш	 medium strong to weak (R3 to R2), voids (<1/16") over 10-15% of 	1	
-382.6				424.9' - Mechanical break	Н	surface, 3-8% cavities (1" x 1/4"),	_	
_			2	425.4' - Fracture, rough, undulating, angular 425.65' - Bedding plane, 5 deg and 15 deg,	П	 weak (R2) rock (last 1' of interval), trace organics, laminar interbeds with 	-	
_	R46-HQ			undulating, organic infilling	⇈	fossil coatings	-	
-	5 ft 100%	86	4	426.45' - Bedding plane or mechanical break	₩	No Recovery 423.8-424.0' Limestone	-	
-	100 /0			426.5' - Mechanical break, 10 deg and vertical, undulating, short	口	424.0-428.3' - Same as 421.8-423.8'	-	
_			2	426.7' - Bedding plane, trace organic	Ш	-	-	
-			\vdash	staining, open to 1" 427.3' - Bedding plane, rough, undulating,	+	-	R46: 8 minutes	
-			3	open channel interface	丗	- 428.3-433.3' - very pale orange,	Driller's Remark: Lost	
-	429.0			427.6' - Fracture, rough, undulating, 1/16"	Ш	(10YR 8/2), very fine grained, moderate to strong HCl reaction,	circulation at 428.2-429.3'	
_			3	opening 428.05, 428.2, 428.7' - Bedding plane (3),	Н	very weak (R1), voids (1/16"-1/8")	-	
430 <u> </u>			Н	organic infill, stains	Щ	over <10% of surface , 1/16"-3/16" fossil casts, at 428.3-429.0' vertical	_	
-307.0			3	429.2, 429.45, 429.8, 430.1' - Bedding plane (4), smooth, planar to undulating	$-\Box$	- channel-like voids (1/2"-1-1/2" wide)	SC-5 collected at 430.5-	
_	D 110		Ш	430.2' - Fracture, organic or iron oxide	+	_	431.55' -	
_	R47-HQ 5 ft	50	1	healed, 1/16" 430.35, 430.5, 431.55, 434.55, 434.7' -	Н	-	-	
_	98%			Bedding plane (5), smooth, planar to	Ш	-	_	
_			1	undulating 432.3' - Mechanical break	Ш	_	_	
_			Ŀ	402.0 - Medianical break	口	_	_	
			2			- Peat	R47: 9 minutes	
	434.0					433.3-433.9' - black to dark brown		
			NR/		EB	black, (N1 to 5YR 2/1), laminated to	SC-7S collected at 434.0-	
435			2	434.55, 434.7' - Bedding plane, between rock	1	thin bedding, organic and silt No Recovery 433.9-434.0'	434.25' -	
-392.6				and clay or organic detritus –	Ħ	─ Peat	_	
-			1	435.65' - Bedding plane, rough, undulating		434.0-434.65' - Same as 433.3-433.9 Limestone	_	
_	R48-HQ				₩	434.65-435.7' - limestone fragments,	-	
_	5 ft 88%	22	3	436.2' - Bedding plane, horizontal and 7 deg, rough, undulating, fossil cast openings	0:0	variegated, random size and type in variable matrix, trace to some	-	
-	00 /0		$\vdash \vdash$	436.4' - Bedding plane, smooth, undulating,	口	organics	1 -	
-			>10	rock with silica rich gravel 436.75' - Fracture, 35 deg and vertical,	╫	435.7-436.5' - yellowish gray, (5Y	-	
-			1	smooth, filled with carbonate fragments and	卄	7/2), very fine grained, moderate to strong HCl reaction, very strong (R5),	R48: 12 minutes	
-			NR	silty clay 436.9-437.7' - Fracture zone, multiple	丗	voids (<1/16") over 5-10% of surface,	-	
-	439.0		INIX	fragments up to 1-1/2" some organic infill and	₽	angular cavities (1/2 to 3/4") and open	-	
_			1	stain 438.0' - Mechanical break	Щ	- -	-	
440			\square	+50.0 - IVIECHAHIICAI DIEAK	H			



338884.FL AD-03

SHEET 13 OF 16

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 5.88 ft bgs on 9/13/07 START: 8/16/2007 END: 8/24/2007 LOGGER: P. De Sa'rego, J. Townes, R. Bitely, M. Faurote, C. Sump DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR. SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -397.6 439.9, 440.5, 441.0' - Mechanical break (3) Peat 3 436.5-436.6' - brownish black, (5YR 2/1), platy, malleable, parting tendencies, HCl reaction on parting R49-H0 441.25, 441.4' - Bedding plane (2), rough, surfaces 42 4 5 ft planar, 1/16" open 94% Conglomerate 441.6' - Bedding plane, 60 deg, rough, 436.6-436.95' - strong HCl reaction, planar, 1/16" open, planar fracture with extremely weak (R0), variegated, limestone fragments (1/2"x3/8") and >10 organic material as sporadic blebs 442.2-444.0' - Fracture zone, very strongly silica grains (up to 5/16"), trace R49: 10 minutes >10 broken rock fragments in silty sand or sandy organics, angular silica NR 444 0 Limestone 436.95-437.5' - grayish orange, 2 (10YR 7/4), very fine grained, 444.6, 444.95' - Bedding plane (2), rough, 445 moderate HCI reaction, medium stepped to undulating, fragmented -402.6 strong (R3), thin bedding, 5 to 10% separations 2 discontinuous organic stringers and 445.3' - Fracture, 75 deg, rough, irregular, blebs trace organics 437.5-437.7' - very pale orange, (10YR 8/2), very fine grained, strong HCl reaction, extremely weak (R0), R50-HQ 446.1-446.3' - Fracture, vertical, multiple 5 ft 8 >10 small fractures throughout 92% laminated bedding, organic partings, undulant to scour like bedding 437.7-438.4' - moderate orange pink >10 (5YR 8/4), very fine grained, mild HCI R50: 8 minutes >10 reaction, weak (R2), voids (1/16") NR over <5% of surface, trace organics, 449.0 fossil molds infilled, recrystallized 449.0-450.1' - Fracture zone, random >10 carbonate minerals orientations, fragments to 2-1/2" x 2" No Recovery 438.4-439.0' 450 -407.6 Limestone 439.0-441.25' - vellowish grav. (5Y >10 7/2), very fine grained, very strong 450.6' - Fracture, 70 deg, rough, planar 450.7-454.0' - Bedding plane or fracture HCl reaction, very strong (R5), R51-HQ >10 zone, smooth, undulating 5-10% blebs and stringers of organic 8 5 ft material, voids (<1/8") over 5% of surface, 1-1/2 x 1/2" cavities, lined or 52% partially lined with calcite NR Peat 441.25-441.5' - black. (N1). above R51: 13 minutes carbonate derived silt 454.0 Limestone 454.0-454.6' - Fracture zone 441.5-443.7' - pale brown to pale >10 vellowish brown, (5Y 5/2 to 10YR 455 6/2), moderate HCl reaction, 454.8, 454.95' - Fracture (2), 15 deg and 30 -412<u>.6</u> extremely weak to very weak (R0 to deg, rough, undulating, recrystallized R1), limestone fragments, trace 2 455.15, 455.6' - Bedding plane (2), smooth, organics planar No Recovery 443.7-444.0' R52-HC . 455.7' - Fracture, 75 deg, undulating to >10 5 ft 20 Peat planar 58% 444.0-444.1' - black, (N1), amorphous 457.2-459.0' - Bedding plane or fracture Limestone zone, horizontal, smooth, undulating NR 444.1-448.6' - light brown, (5YR 5/6), R52: 12 minutes very fine to fine grained, mild to moderate HCI reaction, very weak to 459 0 strong (R1 to R4), voids (<1/8") over 459.0-460.0' - Fracture zone, fragments to 15% of surface >10 3"x2"x1' No Recovery 448.6-449.0' 460



338884.FL AD-03

SHEET 14 OF 16

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

WATER LEVELS: 5.88 ft bgs on 9/13/07 START: 8/16/2007 END: 8/24/2007 LOGGER: P. De Sa'rego, J. Townes, R. Bitely, M.							
≥0 ≈	(9)			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	032	œ	5	THICKNESS, SURFACE STAINING, AND TIGHTNESS 460.3, 460.4, 460.6, 460.65, 460.95' -	S S	CHARACTERISTICS Limestone	-
-405 -422.6	R53-HQ 5 ft 84%	0	>10	Mechanical break or bedding plane (5), 60 deg, trace organic staining 461.3' - Fracture, 60 deg, rough, undulating, intersecting 461.7-462.0' - Fracture zone, 60 deg, rough, undulating, angular 462.1' - Bedding plane, smooth 462.4, 462.6' - Fracture (2), 45 deg,		7/2), very fine grained, mild to very strong HCl reaction, strong to very strong (R4 to R5), voids (<1/8") over 10% of surface	
			>10		No Recovery 451.5-454.0' Peat 454.0-454.1' - brown black, (5YR 2/1) Limestone	- R53: 14 minutes	
	464.0		NR	undulating, one healed is parallel to these, tight 462.8' - Fracture, 85 deg, rough, undulating	dulating, one healed is parallel to these, it 454.1-456.9' - light brown to pale yellowish brown, (5YR 6/4 to 10YR 6/2) very fine grained, mild to very	-	
	R54-HQ 5 ft 86%	17	2	463.2' - Fracture, 30 deg and vertical, smooth, undulating — 463.3' - Fracture, vertical, smooth, undulating — 464.1' - Fracture, 45 deg, rough, undulating _	Ė	strong HCl reaction, very strong (R5), voids (<1/16") over 5-8% of surface, trace cavities (1/2" x 1/4"), trace	
			>10	464.6' - Mechanical break, 10 deg, core pieces spun against each other 465.1' - Fracture zone, 70 deg, rough, planar,	Ė	organics No Recovery 456.9-459.0' Silt (ML)	
			>10	may extend to 496' with multiple fragments between 466.0-467.0' - Fracture zone, fragments to 2",	Ë	459.0-459.2' - with subrounded gravel to 1/2" Limestone	-
- -			>10 >10 NR	sporadic organic staining 467.8' - Fracture, 15 deg, rough, undulating, angular		459.2-461.8' - moderate yellow brown, (10YR 5/4), very fine to fine grained, mild to strong HCI reaction, very weak to weak (R1 to R2), thin	R54: 13 minutes
-	469.0		INIT	468.0' - Fracture, 20 deg, rough, undulating, angular -	I	bedding, voids (<1/16") over 10-15%	
470 -427.6			2	469.3' - Bedding plane, rough, stepped to planar, organic staining locally 469.6' - Bedding plane, rough, stepped to		of surface Fine Sand (SP) 461.8-462.0' - dusky yellow, (5Y 6/4),	
-	R55-HQ 5 ft 90%	31	5	planar, organic staining 470.05' - Bedding plane, smooth, undulating, contact	H	Limestone 462.0-462.75' - moderate yellow	
- -			>10	470.4' - Fracture, 45 deg, smooth, planar, intersecting, fractures at a bedding plane parting with veneer to laminar bedded black		brown, (10YR 5/4), very fine to fine grained, mild to strong HCI reaction, very weak to weak (R1 to R2), thin bodding, voids (/1/8"), over 10, 15%	
-432.6 -432.6 			2	(organic) material 471.05' - Fracture, rough, irregular, trace organics		bedding, voids (<1/8") over 10-15% of surface Silty Sand (SM) 462.75-463.0' - very fine grained,	
	474.0		NR	471.1-471.5' - Fracture zone, stepped, irregular, fracture along suture type material 471.9' - Bedding plane, stepped to undulating	H	carbonate	
	R56-HQ 5 ft 94%	24	4	472.55' - Fracture, horizontal, rough, undulating 472.8' - Fracture, 60 deg, smooth, undulating, —		Limestone 463.0-463.2' - yellowish gray, (5Y 7/2), very fine grained, moderate HCl reaction, very weak (R1), small blebs	_
			>10	trace organics 473.3' - Fracture, 15 deg, rough, undulating 474.6' - Fracture, vertical, rough, planar	Ħ	of black organics throughout No Recovery 463.2-464.0' Limestone	
			3	474.95' - Fracture, vertical, rough, undulating, angular 475.2-476.1' - Fracture zone 476.5' - Fracture, 15 deg, rough, undulating, angular 476.7' - Fracture, 75 deg, rough, undulating		464.0-464.65' - pale reddish brown, (10R 5/4), very fine grained, moderate HCl reaction, strong (R4), voids (<1/16") over 5% of surface 464.65-466.1' - grayish orange, (10YR 7/4), very fine grained, delayed mild HCl reaction, medium R56: 9 minutes	
			3				R56: 9 minutes
	479.0		2 NR	477.2' - Fracture, 60 deg, rough, undulating, infilled, limestone fragments and fines 477.6' - Fracture, 5 deg and 30 deg, bottom of previous fracture area			
480			>10	477.9' - Fracture, 85 deg, rough, undulating			-



PROJECT NUMBER: BORING NUMBER: 338884.FL

AD-03

SHEET 15 OF 16

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

WATER LEVELS: 5.88 ft bgs on 9/13/07 START: 8/16/2007 END: 8/24/2007 LOGGER: P. De Sa'rego, J. Townes, R. Bitely, M. Faurote, C. Sump DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR. SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -437.6 478.15' - Fracture, 60 deg, smooth, planar 478.35' - Mechanical break Limestone >10 466.1-468.3' - dusky yellow, (5Y 6/4), 479.0-481.0' - Fracture zone, 60 deg, random very fine to medium grained, mild to fragments 1/2 to 2", 480.7-481.6' is single moderate HCI reaction, extremely Driller's Remark: Lost R57-HQ weak to strong (R0 to R4), granular, voids (<1/16") over 18-20% of >10 fragment with fracture 26 circulation on this run 5 ft 481.0-481.3' - Fracture zone, random angles, sizes from 1/4" to 2", average about 3/8" 74% water column dropped to surface 50' below top of casing 482.2' - Bedding plane, 0-5 deg, smooth, No Recovery 468.3-469.0' 0 undulating Limestone 469.0-470.15' - Same as R57: 6 minutes 1 466.1-468.3 470.15-471.5' - light brown, (5YR 484 0 NR 6/4), very fine grained, moderate to strong HCl reaction, weak (R2), 484.3' - Mechanical break, 15 deg, smooth, 3 undulating 484.55' - Mechanical break, 15 deg, smooth, laminated to very thin bedding, black 485 beds, lenticels and lenses, at 470.45' $-442\overline{6}$ undulating and 471.0' beds to 1/4" 1 471.5-482.25' - light brown, (5YR 484.75' - Bedding plane, 30 deg, smooth, 5/6), very fine to fine grained, weak undulating R58-HQ weak to medium strong (R1 to R3)
No Recovery 473.7-474.0' 485.8' - Mechanical break 486.2' - Fracture, edges do not match, could Driller's Remark: Lost 5 ft 43 3 circulation in large cavity 95% where the two opposing be up to 0.3' separation fragments do not match Limestone >10 486.7' - Mechanical break or bedding plane, indicating the cavity exceeds the apparent 475.2-475.8' - limestone fragments in smooth, undulating 487.6-488.3' - Fracture zone, fragments from carbonate silt, fracture or cavity infill, >10 volume fragments subangular to R58: 10 minutes 488.4' - Fracture, 65 deg, rough, planar, flat subrounded, 15% voids (<1/8") and 489.0 NR fossil molds (up to 3/8") 489.05, 489.35, 489.5, 489.6' - Bedding plane Breccia 9 (4), smooth, flat 477.0-477.6' - sand and silt matrix **No Recovery 478.7-479.0'** 490 489.75, 489.85' - Bedding plane (2), 65 deg, 447.6 rough, planar 6 489.9, 490.0, 490.15, 490.3, 490.6, 490.85, 491.05, 491.3, 491.5, 491.68, 491.9' -Limestone 482.85-487.7' - grayish orange, dark gray, (10YR 8/2, N3), very fine grained, moderate HCl reaction, R59-HQ Bedding plane (11), smooth, flat 19 5 5 ft weak to medium strong (R2 to R3), voids (<1/8") over 5-15% of surface, fossil molds filled or partially infilled 82% 492.15' - Fracture, 20 deg, rough/smooth, SC-6 collected at 492.2-1 undulating 493.15' with aragonite/calcite, cavities range to greater than width of core and over R59: 10 minutes 2" high, trace organics (shells or NR shell fragments) 494.0 No Recovery 482.7-484.0' Limestone 2 494.6' - Fracture, 15 deg, smooth, undulating 494.9, 495.0, 495.15, 495.3, 495.9' - Fracture 487.7-491.7' - dusky yellow to light 495 brown with 1 to 2" grayish orange, (5YR 6/4 to 10YR 7/4), very fine to 452.6 (5), horizontal and 10 deg, smooth, 4 fine grained, mild to strong HCI undulating reaction, very weak to medium strong (R1 to R3), voids (<1/16") 496.1' - Bedding plane, horizontal, smooth, 2 planar, lithology change 496.5' - Mechanical break over 15-30% of surface, solution cavities (1/2" to 2-1/2"x2") R60-HQ 6 ft 62 No Recovery 488.75-489.0' 92% 2 497.5' - Fracture, rough, planar, angular, Limestone 490.1-492.0' - numerous thin stepped 497.95' - Fracture, 55 deg, rough, planar, dissolution cavities subparallel to 2 gently arcuate 498.4' - Fracture, horizontal and 20 deg, 491.5-497.0' - extremely weak to very 1 rough, irregular weak (R0 to R1), 1/4" black organic 498.75' - Fracture, 45 deg, rough, planar bed at/near contact NR 500 500.0



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	AD-03	SHEET	16	OF	16	

ROCK CORE LOG

ORIENTATION : Vertical

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723083.8 N, 458040.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: A. Anderson

CORING METHOD AND EQUIPMENT : BL300T S/N 1517, mud rotary, HQ tools, HW casing

WATER	LEVELS : 5.8	38 ft bo	gs on 9	9/13/07 START : 8/16/2007	END: 8/2	4/20	D7 LOGGER: P. De Sa'rego, J. Tow	nes, R. Bitely, M. Faurote, C. Sump
>00				DISCONTINUITIES		G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S.I.	DESCRIPTION		SYMBOLIC LOG	ROCK TYPE, COLOR,	OUTE AND DEDTIL OF GARING
품병은	Z H. A.H.	(%) Q	J-N-N-N-N-N-N-N-N-N-N-N-N-N-N-N-N-N-N-N	DEPTH, TYPE, ORIENTATION, ROUG	CHNESS)LIC	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
FYF EVEN	88 80 80	αD	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIA	L AND	MB(WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
무용되	S淵胐	R O	유립	THICKNESS, SURFACE STAINING, AND	TIGHTNESS	SΥ	CHARACTERISTICS	DROFS, TEST RESULTS, ETC.
	_			\ 499.0' - Mechanical break			Limestone	
1 1				\499.2-499.5' - Fracture zone			- 491.7-500.0' - very pale orange to grayish orange, (10YR 8/2 to 10YR	1
1 1					-		7/4), very fine to fine grained, mild	-
-					-		HCl reaction, very weak to medium	-
-					-		strong (R1 to R3), voids (<1/16") over 10% of surface, voids (<3/8")	-
-					-		 over 5% of surface, trace larger 	-
-					-		Cavities No Recovery 493.1-494.0'	-
-					_		- Limestone	_
1 4					_		495.35' - very weak to medium strong (R1 to R3), wavy to undulant	_
					_		 silt sized laminae with organic 	_
							interbeds, <1/2" total thickness	
							496.2' - very weak to medium strong (R1 to R3), wavy to undulant silt	
]							sized laminae with organic interbeds,]
7							<pre><1/2" total thickness 498.45' - very weak to medium</pre>]
1					_		strong (R1 to R3), wavy to undulant	1
					_		silt sized laminae with organic interbeds, <1/2" total thickness	1
1 1					-		No Recovery 499.5-500.0'	-
-					-		Bottom of Boring at 500.0 ft bgs on	-
-					-		_ 8/24/2007	-
-					-		-	-
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338884.FL AD-04

SHEET 1 OF 16

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723034.6 N, 458030.5 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT: Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS : 5.8	8 ft bo	s on 9	9/13/07 START: 9/6/2007 END: 9/	27/200	D7 LOGGER : R. Bitely, J. Townes,	S. Roberti, K. Waikins
200	- (s)			DISCONTINUITIES	ß	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A A CE	J.H.	(%) О	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	J J	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
LEV.	ORE ECO	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	024	ď	<u> </u>	THICKNESS, SURFACE STAINING, AND HIGHTNESS	Ś		
-157.4					H	No Recovery 200.0-212.0'	Boring AD-4 blind drilled to approximately 200 feet -
					Н	_	below ground surface
					П	-	before beginning sampling/logging
					Ш	-	"Water level is based on
					Ш	-	Ground Water Monitoring at LNP site (FSAR Table -
					\square	_	2.4.12.08)" `
					П	_	8/26-8/29/07: Sonic casing at 200.0' below ground
					Ш	_	surface, attempt
					Н	_	advancement of HQWL with only 2.5' of
205				_	尸	_	advancement, no recovery
-162.4					Д	-	of material and two rock coring bits (#636)
					Ш	_	destroyed 9/5/07: Sonic rig setup on
					Н	_	AD-4, advances sonic
					H	<u>-</u>	4"core barrel from 202.5- 207.5' below ground
_					Ħ	<u>-</u>	surface, no recovery of
_					H	<u>-</u>	material due to broken HQWL bit plugging Sonic
4					Ш	_	core barrel; no voids noted;
-					Н	=	HQWL bit removed, advance 207.5-213' below
-					Ш	=	ground surface _
210 -167.4				_	ш		Advance Sonic 4" casing to
-107.4					団	_	213' below ground surface; -
-					Н	-	retrieve 5.0' of crushed limestone fragments and
_					Н	-	limestone core segments, -
+	212.0			212.0-213.0' - Fracture zone, rough, angular	H	Limestone	4" long each; no void space; set Sonic 6" casing
-	R1-HQ		>10	to undulating, limestone fragments, <2"	Ħ	 212.0-213.0' - yellowish gray, (5Y 	to 210.0' below ground -
-	2 ft	0	\dashv	diameter fracture zone	H	7/2), very fine to fine grained, strong HCl reaction, weak to strong (R2 to	surface; R1: 13 minutes
-	50%		NR		世	 R4), voids <1/16" over 30% of 	-
1 +	214.0		\dashv		ᡛᡰ	surface, poorly fossiliferous with few fossils <1/4" diameter, no organics,	9/6/07: Begin rock coring
245	R2-HQ		2		田	no cavitiesNo Recovery 213.0-214.0'	after advancing HWT -
215 -172.4	2 ft 100%	33	\dashv	214.8, 215.0' - Bedding plane (2), <10 deg, —rough, undulating	囯	213.0-214.0'	casing to 2.38 below ground surface, 1.0
	216.0		>10	215.25-215.85' - Fracture zone, rough,	団	 Limestone 214.0-216.0' - yellowish gray, (5Y 	material inside casing to – 212.0', core blockage at
1 +	2 10.0	\dashv	\dashv	undulating, limestone fragments <2" diameter	\boxplus	7/2), very fine to fine grained, strong	214.0' bgs due to fragment
			>10		\mathbb{H}	 HCl reaction, weak to medium strong (R2 to R3), voids <1/16" over 	locking in sample barrel; – no further advancement for
			\dashv	216.8-216.95' - Fracture zone, <10 deg and <20 deg, rough, undulating, limestone	Ħ	10-40% of surface decreasing with	R1, limestone inside casing
			1	fragments <3" diameter, bedding plane	Ħ	 depth, few cavities, poorly to moderately fossiliferous with fossil 	to 212.0', – SC-1 collected at 214.0-
	R3-HQ		\exists	fractures with high angle intersecting fractures	H	casts <1/4" diameter, trace laminated	214.8'
	5 ft 90%	56	3	217.25, 218.15, 218.25, 219.15, 219.4' -	⊞	_ bedding	R2: 5 minutes –
	00,0		\dashv	Bedding plane or mechanical break (5), <10 deg, rough, undulating	囯	-	1
220			>10		囯	-	1
			\neg	_	П		
					Ш		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

AD-04

SHEET 2 OF 16

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723034.6 N, 458030.5 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT: Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

CORING	METHOD A	ND EC	JUIPIV	IENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud r	otary,	HQ tools, HW casing	ORIENTATION : Vertical
WATER	LEVELS : 5.8	8 ft bo	gs on 9		27/200		
≥0≎	_ @			DISCONTINUITIES	ပ္ထ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-177.4 -	221.0		>10 NR	219.4-219.85' - Fracture zone, rough, undulating, limestone fragments <2" diameter 219.85, 220.3' - Bedding plane (2), 30 deg		Limestone 216.0-221.0' - yellowish gray, (5Y 7/2), very fine to medium grained,	Consistent slow to moderate drilling rate with approx. 50% circulation
_			3	and 70-90 deg, rough, undulating 220.3' - Fracture zone, rough, undulating, limestone fragments <2" diameter		strong HCl reaction, medium strong to strong (R3 to R4), voids <1/16" over 10-30% of surface, variable,	return; circulated mud is losing to formation through – 4" HWT's, 6" sonic casing
-	DALIO		3	221.75-221.9' - Fracture or mechanical break (2), <30 deg, rough, undulating, 3 fractures 222.15' - Fracture or mechanical break, <10 deg, rough, undulating, 3 fractures		moderately fossiliferous with several fossil casts/molds <1/2" diameter, few cavities <1", trace organic laminations	gap SC-2 collected at 218.3- 219.15' R3: 9 minutes
-	R4-HQ 5 ft 52%	25	>10	222.25' - Fracture or mechanical break, 40 deg, rough, undulating 222.5' - Bedding plane or mechanical break,		No Recovery 220.5-221.0' Limestone 221.0-223.6' - yellowish gray to light	-
- 22 <u>5</u> -182.4			NR	rough, undulating 223.2-223.35' - Fracture zone, rough, undulating, silt lens, limestone fragments <1" diameter with silt lens		 gray, (5Y 7/2 to N7), very fine to medium grained, strong HCI reaction, very weak to strong (R1 to R4), strength decreasing with depth, 	R4: 5 minutes
-	226.0		>10	- 226.3-226.9' - Fracture zone, multiple		voids <1/16" over <10-25% of surface, few cavities up to 2"x1", poorly to moderately fossiliferous	-
-			>10	intersecting fractures with rock fragments up to 1-9/16" diameter 226.95, 227.0, 227.1' - Fractures (3), 60 deg,		with few fossil molds and casts <1/2" diameter, secondary infill present over <30% of surface; 223.2-223.35' silt lens with limestone fragments <1"	-
-	R5-HQ 5 ft	24	4	rough, undulating, three intersecting fractures Y shaped, moderate relief (~3/8") 227.25' - Fracture, 30 deg, rough, undulating, -3/8" relief, fossil molds		diameter, rough, calcareous silt No Recovery 223.6-226.0' Limestone	-
230	78%		4	227.7-227.9' - Fracture zone, multiple intersecting fractures with rock fragments up to 1-3/16" diameter		226.0-229.9' - yellowish gray, (5Y 7/2), very fine to fine grained, weak HCl reaction, very weak to weak (R1	-
-187.4 -	231.0		NR	228.3' - Fracture, 30 deg, rough, undulating, relief ~3/8" . 228.5' - Fracture, 80 deg, rough, undulating,		to R2), voids <1/16" over 20% of rock surface mostly along bedding surfaces; cavities up to 3" diameter cover 5% of rock surface and are	R5: 10 minutes
-			>10	low relief 228.65, 229.0, 229.35' - Bedding plane (3), 80 deg, rough, undulating, stepped, low relief 229.8-229.9' - Fracture zone or mechanical		dissolution fossil molds; trace laminations, fossiliferous No Recovery 229.9-231.0'	- Drillada Damadu Danid
-	R6-HQ		>10	break 231.0-231.9' - Fracture zone, multiple intersecting fractures with rock fragments up		Limestone 231.0-233.0' - yellowish gray, (5Y 7/2), very fine to fine grained, weak	Driller's Remark: Rapid advancement at 232.0- 233.0' and 234.0-235' due to possible void space or
-	5 ft 40%	0	NR	to 1-3/16" diameter 232.15' - Fracture, 50 deg, rough, undulating, 3/8" relief 232.3-232.4' - Fracture zone		to moderate HCl reaction, weak to medium strong (R2 to R3), voids up to 3/16" cover 10% of rock surface, poorly fossilierous	unconsolidated material -
23 <u>5</u> -192.4				232.55' - Fracture, 60 deg, rough, undulating, 3/8" relief		No Recovery 233.0-236.0'	R6: 3 minutes
-	236.0		>10	236.0-237.2' - Fracture zone, multiple intersecting fractures with rock fragments up to 1-9/16" diameter		Limestone - 236.0-239.2' - yellowish gray, (5Y 7/2), very fine to fine grained,	-
			>5	237.2' - Fracture, 30 deg, smooth, stepped, low relief		moderate HCl reaction, weak to medium strong (R2 to R3), voids up to 3/8" 20% of rock surface, poorly	SC-3 collected at 237.2- 238.0'
-	R7-HQ 5 ft 64%	32	>10	238.0' - Mechanical break, 30 deg, rough, undulating, tight, hardness test 238.85-239.2' - Fracture zone		fossiliferous, trace organics	-
240				-	固	No Recovery 239.2-241.0'	-
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APPENDIX 2BB-363 Rev. 7



338884.FL AD-04

SHEET 3 OF 16

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723034.6 N, 458030.5 E (NAD83)

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

				IENT . DIEURIT D-120 3/N 620, BL3001 3/N 1317, Illud I	- tu j ,	3	ORIENTATION : Vertical
WATER	LEVELS: 5.8	8 ft b	gs on 9	9/13/07 START : 9/6/2007 END : 9/	27/200	D7 LOGGER: R. Bitely, J. Townes,	S. Roberti, K. Waikins
>				DISCONTINUITIES	(n)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표유현	Z, A	(%	FRACTURES PER FOOT		일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
±ĕĕ.	RE F GTF SOV	(%) O	P.S.	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	l BO	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	SEN SEN	a a	F.R.A	THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-197.4	014	ш.	NR	, , , , , , , , , , , , , , , , , , ,	0,		R7: 3 minutes
-137.4			' '' \		Ш	_	R7. 3 minutes
	241.0				ш		
-				241.0-242.2' - Fracture zone, multiple	Н	Limestone	1
-			>10	intersecting fractures with rock fragments up		- 241.0-242.2' - yellowish gray, (5Y	1
-			>10	to 1-3/16" diameter	Н	7/2), very fine to fine grained, moderate HCl reaction, weak to	Driller's Remark: Rapid,
l -			10		Ш	- medium strong (R2 to R3), voids up	consistent drilling; potential -
l _					Н	to 3/32" cover 5% of rock surface,	cavity or silt infill washed
	R8-HQ				Н	trace organics	out during drilling
-	5 ft 24%	0			Ш	- No Recovery 242.2-246.0'	1
-	2170		NR		╁┼	-	1
-					П	_	-
245				_	₽		I
-202.4					Ш	_	R8: 2 minutes
	246.0				Н		
-				246.0-247.0' - Fracture zone, multiple	Ш	Limestone	Driller's Remark: Potential
-			>10	intersecting fractures with rock fragments up	ш	- 246.0-247.0' - yellowish gray, (5Y	cavity at 246.0-250.0' or silt
-				to 2" diameter	Н	7/2), very fine to fine grained, weak to moderate HCl reaction, weak to	zone washed out consistent 50% circulation
-					\Box	- medium strong (R2 to R3), voids up	- Consistent 30 % circulation
l _					Н	to 3/32" cover 1-2% of surface,	
	R9-HQ	•			Ш	poorly fossiliferous No Recovery 247.0-251.0'	
-	5 ft 20%	0			Н	- No Recovery 247.0-251.0	1
-	2070		NR		\Box	_	1
-					Н	-	1 -
250 <u>-</u> 207.4				_	ш		0/6/07: Complete drilling of
-207.4					Н	_	9/6/07: Complete drilling at 17:00, water level at
	251.0						surface
				251.2' - Mechanical break or fracture, rough,	Н	Limestone	9/7/07: Re-spool 650.0'
-			>10	undulating, angular rock fragment potentially	ш	- 251.0-251.2' - yellowish gray, (5Y	wireline, transmission – down time for repair, start
-				fallen from above onto top of run, no	Н	7/2), very fine to medium grained, strong (R4), no voids, cavities or	drilling at 12:15
-			>10	discernible rock contact/fracture angle	ш	fossil, light organic stain on <30% of	ag a.c .zs
-				251.85-252.05' - Fracture zone, rough, undulating, multiple intersecting fractures	Ш	surface	
	R10-HQ	18	>10	252.5' - Fracture or mechanical break, 60-70	Н	251.2-252.6' - yellowish gray, (5Y – 7/2), strong HCl reaction, very weak	Driller's Remark: at 253.0-
I -	5 ft 50%	10		deg, rough, undulating, variable	口	to weak (R1 to R2), voids <1/16"	254.0' light chatter; core - blockage at 254.25'
-	/			252.6-253.5' - Fracture zone, rough, undulating, interbedding with silt seams	⇈	over 20-30% of surface, poorly	
l			NR	undulating, interbedding with sit seams	ш	- fossiliferous, trace laminated bedding	1 1
255_ -212.4			INEX	_	++	252.6-253.5' - yellowish gray, (5Y 7/2), extremely weak (R0), silt lenses	R10: 5 minutes
-212.4						interbedded	R 10. 5 minutes
	256.0				Н	No Recovery 253.5-256.0'	
				256.0-257.5' - Fracture zone, rough,	Ш	Limestone	1
-			>10	undulating, intersecting fractures and gravel sized fragments 3" diameter	\mathbb{H}	 256.0-259.75' - yellowish gray, (5Y 7/2), very fine to medium grained, 	1
-				Sized fraginients of diafficter	Ш	strong HCl reaction, extremely weak	Driller's Remark: at 257.0-
-			>10		П	to weak (R0 to R2), voids <1/16"	259.0' light to moderate
-	_				Н	over <10% of surface, poorly	chatter, consistent drilling
_	R11-HQ	15	>10	258.3-258.5' - Fracture zone, rough,	口	fossiliferous, trace organic staining/laminar from 256.0 to 257.0';	rate
1	5 ft 75%	10	10	undulating, gravel sized fragments <2"	Н	laminated bedding predominant from]
-			_10	diameter	Ш	258.8 to 259.75'	1
-			>10	258.5' - Mechanical break or fracture, 50 deg,	H	_	
260				rough, undulating	H		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

AD-04

SHEET 4 OF 16

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723034.6 N, 458030.5 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT: Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

CORING	NIL ITIOD AI	ND EC	אורוט	1ENT: Dietrich D-120 S/N 820; BL3001 S/N 1517, mud r	olary,	rig tools, rive casing	ORIENTATION : Vertical
WATER	LEVELS : 5.8	88 ft bg	gs on s	9/13/07 START: 9/6/2007 END: 9/	27/200	17 LOGGER: R. Bitely, J. Townes,	S. Roberti, K. Waikins
> 0 0				DISCONTINUITIES	υ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		SII	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
岩병은	₹, %	(%	URE		1 일 [MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
F X X	954 200	D (%)	CT R FC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	₩	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SEE	COOF RECENSE	a a	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-217.4				258.8-259.75' - Fracture zone, rough to	Н	No Recovery 259.75-261.0'	R11: 4 minutes
-			NR	smooth, undulating to planar, intersecting		-	-
-	261.0			fractures and gravel sized fragments up to	╀┼┤		_
l _]			<2" diameter, rough to smooth transitioning with depth, bedding plane fractures with	Ш	No Recovery 261.0-266.0'	
				intersecting vertical fractures prevalent from	Н	_	
1 -	1			259.0-259.75'		-	Driller's Remark: Rapid
-	1				₩	-	advancement 262.0-265.0' -
-	R12-HQ				団	_	below ground surface, possible voids or silt lens;
-	5 ft	0	NR		\vdash	_	continuous circulation –
l .	0%				Ш	_	(approximately 50% return)
					Ш		through run; minimum of pump pressure increasing -
265	1				Ш	-	intermittently through run
-222.4				_	П		indicating core/fluid
-	-				╀┤┨	-	blockage due to formation –
-	266.0				Ш	No Booken, 266 0 274 0	back pressure on equipment, likely silt/soil
-					\vdash	No Recovery 266.0-271.0'	zone washed out to
l .					П	_	formation
					Н		R12: 5 minutes Driller's Remark: Rapid –
-	1				Ш	-	advancement 266.0-271.0'
-	R13-HQ				╁	-	below ground surface, as
-	5 ft	0	NR		П	-	above, no recovery due to unconsolidated silt/soil
-	0%				₽	-	concentration; pressure on
-					П	_	flow increasing during
270				_	Н		drilling indicating back
-227.4					П		pressure from formation; — HQ core barrel set on
1 -	271.0				幵	-	formation at 271.0' below
-	27 1.0		>10	271.0' - Fracture, rock limestone fragments	Ш	- Limestone	ground surface with no free
-			igcup	up to 12" in size 271.0-271.1'	Н	271.1-271.25' - yellowish gray, (5Y	rod drop: material is _ present but not retrievable
-						8/1), very fine to fine grained,	due to unconsolidated
l .	R14-HQ 3 ft	0			Н	moderate HCl reaction, very weak	nature
	8%	U	NR		Ш	(R1), 5% small voids up to 1/16" No Recovery 271.25-274.0'	R13: 4 minutes
-	1				Н	140 Recovery 27 1.25-27-4.0	K. Watkins and Robert – logging
-	1274.0				ᡛ᠊ᡰ	-	Coring Equipment: BL
-	274.0				Ш	No Recovery 274.0-279.0'	300T -
-					丗	-	R14: No Time Recorded
275				_	뭐		_
-232.4]				Щ	_	
1 7					Ш		
1 -	R15-HQ				Ш	-	Driller's Remark: Slow
-	5 ft 0%	0	NR		口	-	drilling; used 300 gallons of
-	U 70				ᡛ╣	-	muck with no recovery, decision to trip out rod and
-					П	-	barrel to check bit, bit -
-						_	inspected and appears
1 -]				口	_	intact, hole tagged at 279.0', tripped back in to -
1 -	279.0				Н		try another run
-					口	-	R15: 20 minutes
	R16-HQ		4		╂┯╂	-	-
280	110110			_	幵		_
1							
							1



338884.FL AD-04

SHEET 5 OF 16

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723034.6 N, 458030.5 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT: Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS: 5.8	8 ft bo	s on S	9/13/07 START: 9/6/2007 END: 9/	27/200	D7 LOGGER : R. Bitely, J. Townes,	S. Roberti, K. Waikins
≥∩⊙	(9)			DISCONTINUITIES	ق	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A A CE	TH.	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Ğ	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
	ORE	ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ΧMΒ	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
_оош -237.4	0 ∃ m 2 ft	<u>≃</u> 21	╙╙		S		Drillarda Darrandu Marra
-237.4	95%	۱ '	>10	279.4, 279.6, 279.85, 279.9, 280.3, 280.4, 280.5, 280.65, 280.75' - Fractures, horizontal,	Ш	Limestone - 279.0-279.85' - yellowish gray, (5Y	Driller's Remark: More pieces of bit recovered -
]	281.0		NR)	smooth, planar to undulating, horizontal,	Ш	7/2), medium grained, moderate HCl	R16: 6 minutes
_			8	clayey white infilling, open (1/5" pore) 280.0-280.15' - clay infilling	Щ	reaction, very weak (R1), <1% voids on surface, <1/32"	
	R17-HQ 2 ft	0	١	281.4, 281.5, 281.6' - Fractures (3),	Н	279.85-280.0' - Same as	
7	80%	١	>2	horizontal, rough, planar to undulating, 9/16" relief	\mathbb{H}	279.0-279.85' except yellowish gray, (5Y 8/1), with clayey striation	R17: 6 minutes Driller's Remark: Slow
7	283.0		NR	281.6-281.75' - soft infill, clayey	Ш	280.0-280.3' - clay - white, soft,	drilling
7				281.9, 281.95, 282.0, 282.1, 282.3, 282.5,	\vdash	moderate HCl reaction]
7			2	282.6' - Fractures (7), horizontal, rough, stepped	Ш	 280.3-280.9' - yellowish gray, (5Y 8/1), very fine grained, moderate HCl 	1
				283.0-238.5' - Fracture zone, broken/crushed	ш	reaction, medium hard, 25% surface	1 7
285			1	283.9' - Fracture, 85 deg, rough, stepped, 9/16" relief	Н	 area voids 3/16" No Recovery 280.9-281.0' 	1
-242.4			-	284.4, 285.0' - Fractures (2), horizontal,	Ħ	Limestone	-
-	I R18-HQ		2	rough, 11-4/5" relief, infill, limestone 285.1-285.4' - Fracture zone	甘	 281.0-282.6' - light gray, (N7), fine to medium grained, mild to moderate 	1
+	6 ft 100%	50	-	285.5-287.3' - Fracture zone, infill of loose	Ш	HCl reaction, weak to medium strong	-
+	100 /6		1	medium-grained limestone	Ш	 (R2 to R3), abundantly fossiliferous, voids to 3/16" (molds) 	-
-			-		団	No Recovery 282.6-283.0'	-
+			0		+	Limestone 283.0-283.5' - light gray to pale	SC-4 Collected at 287.3-
-			-		+	yellow brown, (N7 to 10YR 6/2), mild	288.5' _ R18: 16 minutes
-			1	288.5' - Mechanical break, horizontal, rough,	口	HCl reaction 283.5-285.0' - light gray, (N7), fine to	-
-	289.0		-	stepped, 9/16" relief, across large 1" void	Ш	medium grained, abundant fossils,	-
-			3	289.25, 289.5, 289.85' - Fractures (3),	Н	voids to 9/16" over 100% (molds) 285.0-287.3' - loose fragments as in	-
290 <u> </u>				horizontal, rough, stepped, medium limestone, 9/16" relief	Д	— 283.0 to 283.5'	_
2-171			3		Ш	287.3-288.4' - light gray to very light gray, (N7 to N8), medium grained,	-
4	D10 LIO		-	290.9, 291.4, 291.85, 292.25, 292.8, 293.0,	H	- mild to moderate HCl reaction, very	-
	R19-HQ 5 ft	57	2	294.5, 294.7' - Fractures (8), horizontal,		weak to weak (R1 to R2), irregularly spaced voids to 9/16"; highly	-
	94%			rough, stepped, infill, loose, broken	岸	- fossiliferous	-
			3		₽₩	289.0-293.7' - very light gray to very	-
]					尸	light bluish gray, (N8 to 5B 8/1), very fine grained, mild to moderate HCl	
]			2		Ш	reaction, very weak to weak (R1 to	R19: 13 minutes –
]	294.0		NR		Н	R2), some portions clayey, <5% voids (molds)]
]			>10	294.0-295.2' - Bedding plane, smooth, undulating, slight (mt) metal oxide staining,	\Box	No Recovery 293.7-294.0'	
295				parting on bedding planes	H	Limestone — 294.0-295.5' - yellowish gray, (5Y	
-252.4			3		H	8/1), fine grained, weak (R2), poorly	
			5	295.8, 298.7' - Fractures (2), horizontal,	Щ	to moderately fossiliferous, <5% voids (molds) to 1/16" near 294.0'	
	R20-HQ 5 ft	55	>10	rough, 9/16-1" relief	川	295.5-298.9' - very light gray to very	
	98%	55	- 10		Ш	light bluish gray, (N8 to 5B 8/1), mild to moderate HCl reaction, very weak	
			1		H	to weak (R1 to R2), poorly to]
]					H	abundantly fossiliferous, voids to 3/4" (molds)]
]			2		┢		R20: 11 minutes
]	299.0	_			Ш	N D 000]
7			NR/	299.0-304.0, 304.0-309.0' - Mechanical break	Ш	No Recovery 298.9-299.0']
300			>10	(2)	Ή		1
1 '							



338884.FL AD-04

ROCK CORE LOG

SHEET 6 OF 16

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723034.6 N, 458030.5 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 5.8	8 ft b	gs on 9	9/13/07 START: 9/6/2007 END: 9	/27/20	07 LOGGER: R. Bitely, J. Townes,	S. Roberti, K. Waikins
≥∩≎	(%)			DISCONTINUITIES	ဖွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	TH.	(%) O	F.00	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Ğ Ğ	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
LEV.	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	×ΜΕ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-257.4	075	α.	шш	THORACOO, COTA ACC CITAMANC, THE HOTHING	S	Limestone	
-257.4			>10		+	 299.0-301.0' - very light gray to very 	1 -
	DO4 LIO		-		世	light bluish gray, (N8 to 5B 8/1), fine grained, mild to moderate HCl	1 -
	R21-HQ 5 ft	0	>10		₽	 reaction, very weak to weak (R1 to 	-
-	62%				\perp	R2), fossil molds, voids to 3/4" (less than 5%)	1 -
-					上	Clavev Limestone	1
-			NR		\pm	301.0-302.1' - light yellowish gray to light bluish gray, (5Y 7/2 to 5B 8/1),	R21: 16 minutes
-					+	 very fine grained, moderate HCl 	R21. To minutes
-	304.0		-		丰	reaction, with layers of very weak (R1) dark olive silty clay	1 -
-			>10		井	No Recovery 302.1-304.0'	1 -
305_ -262.4			\blacksquare	-	₽	Clayey Limestone 304.0-308.5' - light yellowish gray	-
-202.4			>10		\blacksquare	with bluish gray mottling, (5Y 7/2 with	-
-	Dag LIO		-		丰	5B 8/1), very fine grained, moderate HCl reaction, extremely weak (R0),	1 -
-	R22-HQ 5 ft	28	>10		上	very poorly unconsolidated,	1 -
-	90%		-		+	bioturbation filled with bluish gray infill; <5% voids	1 -
-			>10		\mathbf{H}	-	1 -
-			- 10		丰	-	R22: 15 minutes
-			>10		H	No Recovery 308.5-309.0'	1022. 13 minutes
-	309.0		NR	309.0-310.8, 311.5-311.8, 312.6-312.8' -	世	Limestone	1 -
-			>10	Mechanical break (3)	₩	- 309.0-310.0' - very light bluish gray	1 -
310 <u> </u>			-	-	┰	with medium bluish gray mottling, (5B 8/1 with 5B 5/1), very fine	II
-			>10		士	grained very weak (R1)	1 -
-	R23-HQ		-	311.0, 312.2' - Fractures (2), <5 deg, smooth,	\pm	310.0-313.5' - yellowish gray with bluish gray streaking, (5Y 7/2 with 5B	1 -
-	5 ft	43	>10	planar to undulating, tight	+	 8/1), very fine grained, strong HCl 	1 -
-	90%		-		F	reaction, very weak to weak (R1 to R2), scarce voids (bioturbation)	1 -
-			>10	312.6-312.8' - Mechanical break	丰	-	1
-			>10	312.0-312.0 - IVICUIAIIICAI DICAN	世	-	R23: 15 minutes
-	214.0		NR		世	No Recovery 313.5-314.0'	-
-	314.0		1417		厂	314.0-318.6' - Same as 310.0-314.0'	
215			>10		厂	-	
315 -272.4			\dashv	-	世	F	-
			>10		\pm	-	
	R24-HQ		\vdash		一	-	
-	5 ft 92%	17	>10		广	-	1
-	32/0		\dashv		岸	-	1
-			>10		世	-	
-			>10		╨	f	R24: 15 minutes
-	319.0		NR		F	No Recovery 318.6-319.0'	1
-	5 15.0			319.0-319.9, 320.8-322.9, 323.4-323.8' -	世		1
320			>10	Mechanical break (3)	世	†	1
020			\Box		\top		



338884.FL AD-04

SHEET 7 OF 16

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723034.6 N, 458030.5 E (NAD83)

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

WATER	LEVELS: 5.8	8 ft bg	gs on 9	9/13/07 START: 9/6/2007 END: 9/	27/20	DOT LOGGER : R. Bitely, J. Townes, S	S. Roberti, K. Waikins
≥∩≘	_ (%			DISCONTINUITIES	Ğ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-277.4 - - -	R25-HQ 5 ft 96%	30	>10	320.05, 320.3' - Mechanical break (2), <5 deg, smooth, undulating, tight to 1/4" open		Limestone 319.0-323.4' - yellowish gray, (5Y 7/2), medium grained, moderate HCl reaction, extremely weak to very weak (R0 to R1), friable, <5% voids (molds) at 322.0-323.0', otherwise <1%	- - -
- - -	324.0		>10 >10 NR	320.5-320.8, 322.9-323.4' - Mechanical break or fracture zone (2), smooth, undulating		- No Recovery 323.4-324.0' Limestone	R25: 15 minutes -
325 -282.4 -	R26-HQ 5 ft 95%	32	>10	324.4-324.7' - Mechanical break, multiple breaks		- 324.0-324.5' - light gray with bluish gray mottling, (N7 to 5B 8/1), moderate HCl reaction, weak (R2), brown organic peat staining 324.5-328.8' - yellowish gray, (5Y 7/2), medium grained, strong HCl reaction, very weak (R1), to unconsolidated	- - - - -
- - -	329.0		>10 >10 NR			- unconsolidated - - - No Recovery 328.8-329.0'	R26: 15 minutes -
330 -287.4 - - -	R27-HQ 5 ft 74%	15	>10	329.0-330.0' - Fracture zone, loose 330.0-330.4' - Mechanical break, fracture/breakage zone across friable rocks 330.4-331.5' - Mechanical break 331.95' - Bedding plane, horizontal, smooth, undulating, tight to 1/4" open		Limestone 329.0-330.0' - light yellowish gray, (5Y 7/2), medium grained, strong HCI reaction, extremely weak (R0), loose 330.0-330.2' - medium dark gray, (N4), medium strong (R3), very hard with calcite filled bioturbation voids Clayey Limestone 330.2-332.0' - yellowish gray, (5Y 8/1), medium grained, strong HCI	Driller's Remark: 15:26 - pulling core
-	334.0		NR			reaction, extremely weak (R0), loose 332.0-332.7' - Same as 330.0-332.0' except very weak (R1) No Recovery 332.7-334.0' Limestone	R27: No Time Recorded -
335 -292.4 - - - - - - -	R28-HQ 5 ft 100%	62	3 2 1 3 >10	334.6' - Mechanical break, 40 deg, rough, undulating, 3/8" relief (mechanical) 334.75' - Fracture, horizontal, rough, planar, 1/16" relief 335.1' - Fracture, horizontal, rough, 9/16" relief 335.8, 336.7, 337.2' - Fractures (3), 30 deg, rough, undulating, 15 deg, and horizontal, 9/16" relief 337.6' - Fracture, horizontal, rough, planar, loose infill 337.8-339.2' - abundant breaks in very loose limestone		- 334.0-337.6' - yellowish gray, (5Y 7/2), medium grained, moderate HCI reaction, very weak to weak (R1 to R2), abundantly fossiliferous, <5% voids (molds) at 334.0-336.8', voids to 3/8"	SC-5 Collected at 335.9- 336.6' 5.6' of recovery in R28 on 5' run; upper break point of core matches lower break point of R27 R28: 13 minutes
340							



338884.FL AD-04

SHEET 8 OF 16

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723034.6 N, 458030.5 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT: Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS : 5.8	8 ft b	gs on 9	9/13/07 START: 9/6/2007 END: 9/	27/20	D7 LOGGER: R. Bitely, J. Townes,	S. Roberti, K. Waikins
≥∩≎	(%)			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE	E RU	(%) Q	TT.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30Lic	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EPT URF LEV	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-297.4	075	<u>~</u>	шФ	THIORNALOO, COIN MOL CIVILINIO, VIIID HOMMLEGO	S	Limestone	
-297.4			>10	-	岸	 339.0-343.8' - yellowish gray, (5Y 	1 -
-	D20 110			-		7/2), medium grained, mild to moderate HCl reaction, extremely	1
-	R29-HQ 5 ft	0	>10	-	₽	- weak to very weak (R0 to R1), voids	
_	96%			-	H	1/32-1/16" throughout; friable	1
-			>10	342.4' - Fracture, smooth, undulating, brown	世	-	1 -
_				organic staining, tight, ~1/8" thick	\vdash	_	D20: 15 minutes
_			>10	-	F	-	R29: 15 minutes
-	344.0		NR.	-	Ħ	- No Recovery 343.8-344.0'	1
-			1	-	片	Limestone 344.0-348.8' - light bluish gray with	-
345_				344.7' - Mechanical break or bedding plane,		— medium bluish gray mottling, (5B 7/1	
-302.4			>10	10 deg, smooth, undulating, 1/16" relief 345.0-345.7' - Fracture zone, large angular,	П	with 5B 5/1), very fine grained, strong HCl reaction, very weak (R1), clayey,	-
-	Dag 110			brittle limestone	口	voids (bioturbation); otherwise <1%	1
-	R30-HQ 5 ft	75	1	-	団	voids	1
-	96%			346.6' - Mechanical break, rough, planar, along bedding plane	┢	-	00000-1141-4-047-0
-			1	347.0' - Fracture, horizontal, rough,	F	-	SC-6 Collected at 347.0- 347.9' -
-				undulating, 3/16" relief	H	-	D20: 40
-			1	348.0, 348.8' - Fractures or bedding plane (2), horizontal, rough	世	-	R30: 10 minutes
_	349.0		NR.	-	⊬	- No Recovery 348.8-349.0	1
-			1	349.1, 350.0, 351.5, 351.7, 352.0, 352.2, 352.3, 352.8' - Bedding plane (8), horizontal,	\vdash	Limestone 349.0-353.5' - bluish white with light	
350_ -307.4				smooth, undulating, tight to 1/4" open,	口	— bluish gray mottling, (5B 9/1 with 5 B	-
-507.4			1	bedding planes 349.8, 349.9' - Fractures (2), 60 deg, smooth,	団	7/1), very fine grained, strong HCI reaction, very weak to weak (R1 to	1 -
-	 R31-HQ			undulating, tight	┢	R2), friable, <1% visible voids	1 -
-	5 ft	42	>10	350.35' - Mechanical break, <5 deg, rough, stepped, tight	\vdash	_	1 -
-	96%			351.0-351.5' - Fracture zone	F	_	1 -
-			5	352.2' - Fracture, vertical, smooth, undulating, 1.1' long fracture, tight	世	_	1 -
-				anddating, 1.1 long natture, tight	世	_	R31: 8 minutes
-			1	353.5' - Mechanical break, <5 deg, rough,	仠	No Recovery 353.5-354.0	- TO 7. O Hilliotes
-	354.0		NR	undulating, tight	厂	-	-
-			1	353.6' - Fracture, vertical, smooth, undulating, 4" long fracture, tight	世	-	-
355 <u> </u>				354.8' - Fractures (2), 40 deg, smooth, —		_	-
-			3	undulating, two intersecting fractures, tight 354.9' - Fractures (2), vertical, smooth,	\vdash	-	-
-	R32-HQ			undulating, two 2-7/16" fractures, tight	F	Limestone 355.7-356.5' - yellowish gray, (5Y	-
-	5 ft	48	>10	355.05, 355.55, 355.8, 355.91, 356.05, 356.2, 357.85' - Bedding plane (7), horizontal,	片	8/1), medium grained, moderate to	-
-	100%			smooth, planar to undulating, tight to 1/4"	世	strong HCl reaction, weak (R2), abundantly fossiliferous, primarily	-
-			2	open 356.2-357.2' - Fracture zone, fragments, 3"	\vdash	 foraminiferous <1/32" molded voids 	-
-				diameter -	厂	(forams) throughout; brown organic silt partings	R32: 10 minutes
-	050.0		1	358.2' - Fractures (2), 10 deg and 40 deg, rough, undulating, broken up there, force not	口	- 356.5-359.0' - Same as 349.0-355.7'	-
-	359.0			tight, broken at 1" fossil cast	\Box	except bluish white to yellowish gray, (5B 9/1 to 5Y 8/1), scarce	-
			2	359.2' - Fracture, 60 deg, smooth, undulating, jitight to 1/4" open, 4-3/16" long	\vdash	- bioturbation	
360				<u> </u>	F		



338884.FL AD-04

SHEET 9 OF 16

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723034.6 N, 458030.5 E (NAD83)

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

				IENT . DIELICIT D-120 3/N 620, BL3001 3/N 1317, Illuu I	- te j ,	3	ORIENTATION : Vertical
WATER	LEVELS: 5.8	88 ft b	gs on s	9/13/07 START: 9/6/2007 END: 9/	27/20	D7 LOGGER : R. Bitely, J. Townes,	S. Roberti, K. Waikins
300	<u></u>			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표원한	N + R	<u>@</u>	FRACTURES PER FOOT		음	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
F A A		(%) Q	FS F	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
989	R N N N	Ø	RA(PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	075	œ	ΗД		S		
-317.4				359.9, 360.2, 360.45, 360.6, 362.15, 362.35,	Н	Limestone	
-			>10	362.55, 362.65, 363.45' - Bedding plane (9), horizontal, smooth, undulating, tight to 1/4"	T	 359.0-365.5' - yellowish gray, (5Y 7/2), medium grained, mild to 	1 1
-	R33-HQ			open		moderate HCl reaction, very weak to	1 1
l -	5 ft	50	>10	360.6-360.95, 361.25-362.15, 362.55-362.65'	₽	- weak (R1 to R2), moderately to	1 4
1	100%			- Fracture zone (3), fragments 3" diameter	Н	abundantly fossiliferous, forams,	
-	1					pelecypods, bryozoa; <1/32" voids	1
-			>10		╁	- and foraminiferous molds ~ 50%	1 1
-					╀	bioturbated and finer grained, 359.0 to 360.2' and 363.0 to 365.5'	1 40
l _			2			L 500.2 and 505.0 to 505.5	R33: 12 minutes
	364.0		_	262 751 Franking working amounts	\vdash		
-	001.0			363.75' - Fracture, vertical, smooth, undulating, 6" long, tight	T	-	1 1
-			2			_	1 -
365				364.6, 365.6, 364.9, 366.0' - Bedding plane	┵		
-322.4				(4), horizontal, smooth, undulating, tight to 1/4" open			
1 -	1		2	365.0' - Fracture or mechanical break. 20		Limestone	1 1
-	l R34-HQ			deg, rough, undulating, open, fragment	₩	- 365.5-366.8' - yellowish gray, (5Y	1 1
-	5 ft	60	1	missing		8/1), fine grained, mild to moderate	1 4
	100%			365.4' - Fracture or mechanical break, 30		HCl reaction, weak (R2), friable, silty, voids over <5%	SC-7 Collected at 366.8-
				deg, rough, undulating to stepped, missing	\vdash	366.8-367.7' - pale yellow gray to	367.7'
-			1	fragments, tight to 1" open 366.5-366.8' - Fracture zone, fragments to		very light gray, (5Y 7/2 to N8), weak	1
-				1-2"	╂	to medium strong (R2 to R3), >50%	R34: 12 minutes
l _			2	368.05-368.6' - Fracture zone, fragments to	╨	bioturbated with voids over 60% of	R34. 12 Illinutes
	369.0		_	2-3" rock weakened by fossiliferous zone		sample, abundantly fossiliferous	
1 -				OCO OL Daddian alama harimantal	Н	 367.7-369.0' - yellowish gray, (5Y 7/2), very fine to fine grained, mild to 	1 1
l			4	369.2' - Bedding plane, horizontal, moderately smooth, planar, 1/16-3/16" open	╀	moderate HCl reaction, abundantly	1 1
370_				(typ)	厂	fossiliferous (pelecypods, forams)	-
-327.4			3	369.4, 369.6, 369.8, 370.1, 370.3' - Bedding	┝	voids, molds up to 1/16" >50%	
			٦	plane (5), horizontal, moderately smooth,	\vdash	bioturbated	1
-	R35-HQ			planar, 1/16-3/16" open (typ)	ш	369.0-370.3' - yellowish gray, (5Y 7/2), fine to medium fine grained,	1 1
-	5 ft	35	3	370.3-370.7' - Fracture zoné, lithology change	\mathbf{H}	mild HCl reaction, very weak to weak	1 -
l -	88%			371.1' - Fracture, rough, undulating, 9/16"		(R1 to R2), <1/32" voids (primarily	
				relief, break across void	\square	foraminifera molds), friable, silty	
1			1	371.5, 371.8, 371.9, 373.0' - Bedding plane	1—	370.3-373.7' - very light gray, (N8),	1 1
1 -				(4), 0-10 deg, rough, undulating, 3/16-3/4"		 with <5% light bluish gray mottling, moderate to strong HCl reaction, 	1 1
-			N.D.	open	$oldsymbol{\sqcup}$	abundantly fossiliferous (primarily	-
Ι -	374.0		NR			foraminifera), molds <1/32-3/16",	l J
			2	274.2.274.6.275.41.		>50% bioturbated	R35: 12 minutes
275				374.3, 374.6, 375.1' - Fractures (3), horizontal, rough, undulating, 3/16-9/16" open	1—	No Recovery 373.7-374.0'	1 1
375_ -332.4			>10	nonzoniai, rough, anddiaing, or ro-or to open		Limestone 374.0-374.9' - yellowish gray, (5Y	Driller's Remark: Hard
-			>10	075 5 070 01		- 8/1), strong HCl reaction, very weak	rocks lodged in inner core,
	R36-HQ 4 ft	10		375.5-376.8' - fragments, silty limestone	\vdash	to weak (R1 to R2), voids to 3/16";	only advanced 4'
	70%	10	>10			friable and very weak rock (R1)rock]
1 -				•	1—	- at 374.0-374.3'	1 1
1 -					╀	374.9-376.8' - yellowish gray, (5Y 8/1), strong HCl reaction, weak (R2),	R36: 15 minutes
I -			NR		口	riable, as at 374-374.3' above, but	1.00. 10 minutes
1	378.0				\vdash	with occasional olive gray organic]
1 -					1	streaks	1
1 -			1	279.6. 270.2! Ernaturas (2) barinantal	仜	- No Recovery 376.8-378.0'	-
-				378.6, 379.3' - Fractures (2), horizontal, rough, undulating, poorly fit 3/16-9/16" open	+	-	-
_			2	. cag.i, and alating, poorly in or to or to open		_]
380			-		\coprod		
					1		
1							



338884.FL AD-04

SHEET 10 OF 16

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723034.6 N, 458030.5 E (NAD83)

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

				IENT : DIE(IICH D-120 3/N 620, BL3001 3/N 1317, IIIdd 1			ORIENTATION: Vertical
WATER	LEVELS : 5.8	88 ft b	gs on s		<u>27/20</u>		
≥∩₽	, @			DISCONTINUITIES	Ö	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	OLZE AND DEDTH OF GAOING
出병은	RU, H	(%) _Q	N I	DEDTIL TYPE OBJECTATION BOLIGINESS	1 ∺	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
F A S	See		ACT 7 FC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	₩ W	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
		S O	FR/	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-337.4				379.6, 380.0, 380.1, 380.2, 380.7' - Bedding		Limestone	
-	R37-HQ		3	plane (5), horizontal, tightly fill 1/16-3/16"	F	 378.0-379.5' - very light gray, (N8), 	-
-	6 ft	39		relief	╀	very fine grained, moderate HCl	-
Ι.	78%		>10	380.9-382.7' - Fracture zone	\Box	reaction, weak (R2), >50% voids - <1/32" wide and bioturbated	_
l			10		\vdash	379.5-382.6' - vellowish grav. (5Y	
-	1		1.0			7/2), fine grained, moderate HCl	1
-			>10		╨	 reaction, very weak to weak (R1 to R2), friable, silty, voids <1/32", well 	-
-				-	世	distributed but <5%	R37: 16 minutes
_			NR		╀	 382.6-382.9' - pale yellowish gray, 	- To minutes
l -	384.0			_		(5Y 8/1), strong HCl reaction, weak	_
			>10	384.0-384.3' - Fracture zone, fragments to 4"x2"	\vdash	to medium strong (R2 to R3), bioturbated, voids 1/8" wide	
385			/10	384.3, 384.5, 384.8, 385.3, 387.85' - Bedding		No Recovery 382.9-384.0'	1
-342.4				plane (5), 0-5 deg, smooth, undulating, tight	1—	Limestone	_
-			3	to 1/2" open		 384.0-385.7' - Same as 379.5-382.6' except 3/8" single very extensive void 	-
-	R38-HQ			385.5' - Fracture, rough, undulating, 4-3/16" void	\vdash	across sample 385.2-385.7'	-
l -	5 ft	55	1	385.65' - Mechanical break, <5 deg, rough,	╁┰	_ 385.7-388.5' - Same as 384.0-385.7'	-
l _	100%			undulating, tight	H	_	_
			ا م				
-			2	387.5' - Mechanical break, 20 deg, rough,	Ш	_	1
-				undulating, tight	T	<u>-</u>	R38: 10 minutes
-			>10	388.4-388.8' - Fracture zone, fragments to	—		-
-	389.0			2"x2"	╀┷	 medium grained, moderate HCl 	-
l -			2	389.4' - Fracture, 80 deg, rough, undulating,	\vdash	reaction, weak to medium strong (R2	-
390				open, missing face		to R3), hard, abundant voids <1/32-1/8" throughout, primarily	
-347.4			0	389.6' - Mechanical break, <5 deg, rough,	144	foraminiferous	
I -			>10	undulating, tight 389.8' - Bedding plane, horizontal, smooth,	Ľ	Clay (CL)	1
-	R39-HQ			planar to undulating	╨	-\390.0-390.3' - soft, calcareous with	-
-	5 ft	0	>10	389.9-394.0' - Fracture zone, some brown	仜	_ ∖dark brown orange silt Limestone	-
-	100%			organic staining on fractures, various	╂┯	390.3-394.0' - yellowish gray, (5Y	-
-			>10	fragments of all orientation within limestone; mechanical	世	_ 7/2), moderate HCl reaction, very	-
l _					oxdot	weak to weak (R1 to R2), friable,	_
			. 10			organic staining within many fractures <1/32-3/16" voids	R39: 10 minutes
	394.0		>10		—]
-				204.2. 204.2. 204.5. 204.0! Machanian!	世	394.0-399.0' - yellowish gray, (5Y	1
			3	394.2, 394.3, 394.5, 394.9' - Mechanical break or bedding plane (4), horizontal and 10	╨	- 8/1), very fine to fine grained, strong	-
395_ -352.4			\vdash	deg, rough, undulating, organic staining at —	仜	HCl reaction, very weak to weak (R1 to R2), voids <1/32-3/16" (molds and	-
-			>10	394.5', 3/16 to 3/8" relief	1	- casts) 394.0-395.0' bioturbated	-
-				395.3-395.8' - Fracture zone, 3/4 to 1-1/2" blocky fragments		-	
	R40-HQ 5 ft	53	2	• •	\vdash	_	
	90%	JJ		396.4, 396.9' - Mechanical break (2), horizontal, rough, undulating, 1-3/16" relief]
I -				nonzoniai, roagn, andalating, 1-0/10 Tollel	1—	_]
I -			0			-	-
-			0		╀┸	-	R40: 9 minutes
-			_		仜	No Recovery 398.5-399.0'	-
-	399.0		NR		╀	- 140 Necovery 000.0-033.0	-
-			3	399.3, 399.7, 400.1' - Bedding plane (3),		<u> </u>	
400				horizontal, smooth	片		
I					1		l l



338884.FL AD-04

ROCK CORE LOG

SHEET 11 OF 16

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723034.6 N, 458030.5 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT: Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 5.88 ft bgs on 9/13/07 START: 9/6/2007 END: 9/27/2007 LOGGER: R. Bitely, J. Townes, S. Roberti, K. Waikins DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD SYMBOLIC MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -357.4 Limestone 400.1-400.3' - Fracture zone 2 399.0-404.0' - yellowish gray, (5Y 8/1), very fine to fine grained, strong HCl reaction, very weak to weak (R1 R41-H0 401.1' - Fracture, 30 deg, rough, 3/16-9/16" to R2), mold and casts over 20% of 2 53 5 ft relief, mechanical 96% rock, foraminifera, gastropods, 401.7, 402.1, 402.4, 402.6, 403.2' - Fractures pelycypods, bioturbated 400.0-401.0' (5), 0-20 deg, planar, tight 2 R41: 9 minutes 3 Finished at 15:15 on 404 0 NR No Recovery 403.8-404.0' 9/20/07 404.1, 404.3, 404.5, 404.6, 404.8, 405.3, Limestone 5 405.7' - Mechanical break (7), horizontal and 404.0-409.0' - Same as 399.0-404.0' Started at 07:30 on 9/21/07 405 30 deg, rough, planar to undulating, poorly fit, except molds and casts 1/16-3/16" -362.4 >9/16" open between 405.0-407.0' 3 406.0, 406.5, 406.8' - Mechanical break (3), R42-HQ 0-20 deg, rough, undulating, tightly fit to 3/8" 2 5 ft 40 99% 1 407.5, 408.2' - Mechanical break (2), 30 deg, very rough, planar, tightly fit R42: 11 minutes 3 408.5-408.8' - Mechanical break, vertical 409.0 NR 408.9' - Mechanical break, horizontal, planar No Recovery 408.95-409.0' to undulating 409.1, 409.2' - Mechanical break (2), 409.0-411.3' - light yellowish gray, 2 (5Y 9/1), fine grained, moderate HCI 410 horizontal, smooth, undulating, poorly fit 367.4 reaction, very weak (R1), voids to 410.3' - Mechanical break, horizontal, very 1/4", fine black needle form mineral 2 rough, stepped, tightly fit, 3/4" relief 410.7' - Fracture, 30 deg, smooth, planar, throughout 5% (possibly phosphate or organic) R43-HQ 1/16" open Clay (CL) 27 0 5 ft 411.1, 411.3' - Mechanical break (2), 411.3-411.7' - light gray calcareous 80% horizontal, very poorly fill, 1-3/16" open silty clay 3 411.6-411.9' - Fracture zone, through Limestone consolidated limestone 411.7-413.0' - Same as 409.0-411.3' 412.2' - Mechanical break, 30 deg, break except medium strong (R3) R43: 14 minutes through unconsolidated limestone NR No Recovery 413.0-414.0' 412.7, 412.8' - Mechanical break (2), 414.0 Limestone 414.25, 414.4' - Mechanical break (2), planar 5 414.0-416.5' - yellowish gray, (5Y to undulating, poorly fit 8/1), moderate HCl reaction, medium 415 414.6' - Fracture, horizontal, undulating, -372.4 strong (R3), finely crystalline; poorly fit with (Mt) oxide staining evident 415.0-416.5' medium strong (R3); 1 415.0' - Fracture, 40 deg, discontinuity 414.0-415.0' very weak; 414.7-414.9' between hard fossiliferous limestone and very weak (R1), dark brown organics R44-HQ dark organic silt clay 1 50 5 ft 415.7, 416.5, 417.2, 417.7, 418.0, 418.3' -416.5-418.7' - yellowish gray, (5Y 96% 8/1), fine grained, very weak to weak Mechanical break (6), horizontal, planar (R1 to R2), >5% fossiliferous casts 3 and molds (foraminifera, echinoderma, pelycypods, R44: 13 minutes 2 gastropods), occasional black mineral growth in voids, very soft, NR 419.0 418.7' - Fracture, horizontal, rough, planar, voids <1/32-3/16" 0 contact: hard fossiliferous limestone over Clayey Silt (ML) dark brown silty clay. mt oxide staining on 2 418.7-418.8' - greenish black 420 limestone surface

APPENDIX 2BB-372 Rev. 7



338884.FL

AD-04

SHEET 12 OF 16

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723034.6 N, 458030.5 E (NAD83)

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

WATER	LEVELS : 5.8	8 ft b	gs on s	9/13/07 START: 9/6/2007 END: 9/	27/20	007	LOGGER : R. Bitely, J. Townes,	, S	. Roberti, K. Waikins
≥ D ≥	(%)			DISCONTINUITIES	၅		LITHOLOGY		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG		ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS		SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-377.4 -			0	419.3' - Bedding plane, 10 deg, contact: black orange clayey silt over limestone, unbroken		∖c	lo Recovery 418.8-419.0' Clayey Silt (ML) 19.0-419.2' - greenish black,	1	-
-	R45-HQ 5 ft 100%	61	3	419.9' - Mechanical break, horizontal, rough, planar, 3/8" relief, 1/16" open, tight 421.5' - Bedding plane, horizontal,	Ħ	- [L	rganic imestone 19.2-421.5' - yellowish gray, (5Y		-
-			4	undulating, horizontal undulating break along bedding, <1/16" infill (organic) 421.8-422.3' - Mechanical break, vertical	Ħ	- 8. - m	/1), weak (R2), >5% casts and nolds (foraminiferons, tortella, elycypods), voids of various size		
-	424.0		1	422.8' - Bedding plane, smooth, undulating, break along bedding, tight fit, organic staining		4:	nroughout 21.5-423.0' - pale yellowish brown, 10YR 6/2), very fine grained, strong		R45: No Time Recorded
_	.		1		 		ICI reaction, weak (R2) 23.0-424.5' - pale yellowish brown,	Д	Bit drops at 424.5'
425 -382.4 -			NA >10			T in	10YR 6/2), very dense, mild to noderate HCI reaction, very strong R5), crystalline, <1/32" voids		
-	R46-HQ 5 ft 58%	12	>10	-		\C	rroughout Clay (CL) 24.5-425.2' - brownish gray, soft,		
- - -	. 56%		NR	- - -		4: - 6: - to	arbonate imestone 25.2-427.0' - light olive gray, (5Y /1), strong HCl reaction, very weak b weak (R1 to R2), limestone		Various bit drops between 427-429' (void depths unknown) R46: 15 minutes
-	429.0			-	\perp		agments lo Recovery 427.0-429.0'	١	-
430			4	429.2, 429.5, 429.8, 429.9, 430.0' - Fractures (5), 10-30 deg, planar, tight, 1/16-1/16" relief,	H	4: - 4: - (5	imestone 29.0-433.0' - light yellowish gray, 5Y 9/1), dense, strong HCl reaction,		-
-387.4 - -			1	thin organic silty infill <1/32" 430.0-432.5' - Mechanical break, horizontal, smooth, planar, tight to 1/8" open	Ē	l m	nedium strong (R3), nicrocrystalline, no visible voids, nedium strong (can be carved with a		
-	R47-HQ 5 ft 78%	27	1				nife) organic, silty bedding planes, ast 4" very soft and clayey		
-			3	-	世	}-		١	
-	424.0		NR	432.7' - Fracture, rough, undulating break, disconformity, limestone over friable organic silt	H	N	lo Recovery 433.0-434.0'		R47: 15 minutes
- - 435	434.0		NA			- 4	Clayey Silt/ Silt (ML) 34.0-435.4' - greenish black, (5GY /1), organic soft		SC-8S Collected at 434.0- 435.4' (soft soil sample)
-392 <u>.4</u> - -	R48-HQ 4 ft	0	NA 0	435.4-438.0' - Fracture zone, hard limestone with angular fragments		P 4	Peat/organics 35.4-435.9' - greenish black, (5GY	$\frac{1}{2}$	- -
-	100%		>10		Ħ	† ∖e: R	/1), moderate HCl reaction, xtremely weak to very weak (R0 to 11), >50% organic material		R48: 16 minutes
-	438.0		>10	-	Ë	- 4 - 7	imestone 35.9-438.0' - grayish orange, (10YR /4), fine grained, strong HCl eaction, very weak to weak (R1 to		- 10 11 11 11 11 11 11 11 11 11 11 11 11
-			1	438.5' - Mechanical break, horizontal, rough, undulating, 3/16" open	Ħ		eaction, very weak to weak (R1 to 12)		SC-9 Collected at 438.5- 439.4'
440			>10	-		-		-	



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AD-04

SHEET 13 OF 16

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723034.6 N, 458030.5 E (NAD83)

CORING METHOD AND EQUIPMENT: Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

ORIENTATION: Vertical WATER LEVELS: 5.88 ft bgs on 9/13/07 START: 9/6/2007 END: 9/27/2007 LOGGER: R. Bitely, J. Townes, S. Roberti, K. Waikins DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD <u>0</u> MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -397.4 439.4-440.6' - Fracture zone, through soft 438.0-439.4' - yellowish gray, (5Y >10 7/2), very fine grained, moderate HCI R49-HQ reaction, medium strong (R3), 6 ft 14 abundant voids to 1/8" with some 43% voids filled with organic silt, <5% fossils, primarily molds 439.4-440.6' - dusky yellow, (5Y 6/4), NR strong HCI reaction, very weak (R1), friable silt No Recovery 440.6-444.0' R49: 18 minutes 444 0 Limestone 444.0-446.0' - moderate yellowish 2 444.5' - Fracture, 15 deg, very rough brown, (10YR 5/4), fine to very fine 445 -402.4 445.0' - Fracture, possible void grained, mild HCI reaction, very weak 1 to weak (R1 to R2), dolomite, 445.6' - Mechanical break, notched medium crystalline friables, >5% voids up to fit 1/16" open Driller's Remark: Bit drop R50-HQ 446.0' - Fracture, bit dropped, assumed void 446.0-447.8' - missing 5 ft 20 2.0 ft into run, interpreted location 56% as void NR 447.6' - Fracture, 60 deg, break across void 447.8-448.6' - dusky yellowish brown to pale yellow brown, (10YR 2/2 to 1 R50: 9 minutes 10YR 4/2), fine grained, strong HCl reaction, crystalline, calcite, large NR 449.0 449.0' - Fracture, void Driller's Remark: Void at voids to 1-1/4" with calcite rhombic top of run, 1.0' of drilling in crystals and clean hexagonal quartz 450 middle of void near bottom. crystals other voids filled with silty NR -407<u>.4</u> (based on bit drop) friable dolomite No Recovery 448.6-449.0' No Recovery 449.0-451.0' R51-HQ 451.0-452.0' - Fracture zone, limestone Limestone 0 >10 (dolomite) 451.0-452.0' - pale yellowish brown, 5 ft 32% (10YR 6/2), medium strong to strong 452.0' - Fracture, void (R3 to R4), crystalline >5%, of voids (molds) voids up to 1/8", dolomite No Recovery 452.0-454.0' NR R51: No Time Recorded 454.0 454.0-456.0' - Mechanical break, large Limestone >10 angular fractures at all angles 454.0-455.9' - pale yellowish brown, 455 (10YR 6/2), fine grained, <5% voids -412.4 to 3/16", poorly fossiliferous >10 455.9-457.0' - light olive gray to pale olive, (5Y 5/2 to 10Y 6/2), fine R52-HQ 456.2, 456.3, 456.6, 456.7' - Fractures (4), 4 5 ft 76% 7 horizontal, smooth, planar to undulating, tight grained, mild HCI reaction, very weak to weak (R1 to R2), friable, silty 457.0-457.8' - Same as 454.0-455.9' 5 457.3-457.7' - shattered dolomite, large except first 3" are amber brown, angular fragment R52: No Time Recorded No Recovery 457.8-459.0' NR Finished drilling on 9/21/07 459 0 at 459.0' 459.0-459.5' - Fracture zone. 1"-3" rock >10 fragments of hard dolomite Start drilling on 9/22/07 460



338884.FL AD-04

SHEET 14 OF 16

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723034.6 N, 458030.5 E (NAD83)

CORING METHOD AND EQUIPMENT : Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

WATER	LEVELS : 5.8			9/13/07 START: 9/6/2007 END: 9/		<u> </u>	S. Roberti, K. Waikins
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SLOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ACE ATIO	: RUI	(%) O	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EV EV	SORE	ROD	RAC ER I	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	3 V ME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-417.4	014	ш.		460.0, 462.7' - Fracture (2), 75 deg, planar,	0)	Limestone	
-			3	fracture through hard dolomite, 3/16" relief -460.4' - Fracture or mechanical break, 30	╁	 459.0-460.2' - moderate brown to grayish brown, (5YR 3/4 to 5YR 3/2), 	1
-	R53-HQ			deg, rough, planar	F	dense, fine to medium grained, mild	1
-	5 ft 100%	25	>10	460.6, 460.8, 461.2, 461.3' - Bedding plane - or mechanical break (4), horizontal, planar,	Ħ	 HCl reaction, medium strong to strong (R3 to R4), crystalline, 	1
-			_	3/16" relief	Ħ	dolomite; <1/32" voids over 70% of surface	1
			5	461.7-462.3' - Fracture zone, horizontal, undulating, dolomite, poorly fit	片	460.2-462.2' - fine to medium]
_			>10	463.4-463.8' - Fracture zone	Ħ	grained, mild HCl reaction, very weak (R1), friable breaks on bedding	R53: 13 minutes
_	464.0		. 10	_	H	planes 462.2-464.0' - Same as 459.0-460.2'	
-			>10	464.0-466.3' - Fracture zone, large fragments of blocky to angular dolomite -	H	 except moderate brown to grayish 	-
465 -422.4						brown, (5YR 3/4 to 5YR 3/2), dolomite	-
-			>10	-	Н	_ Limestone	-
-	R54-HQ			-	H	464.0-466.5' - Same as 462.2-464.0'	-
-	5 ft 60%	0	>10	466.5' - Fracture or mechanical break, 45	H	466.5-467.0' - yellowish brown,	-
-	0070			deg, across hard dolomite over friable dolomite below, tightly fit	囯	 (10YR 5/4), moderate HCl reaction, friable, silty, streaks of organic 	1
-				466.7' - Fracture, horizontal, planar, 3/16-3/8"	口	staining on bedding	1
_			NR	relief, contact between hard dolomite and friable dolomite below	Ш	- No Recovery 467.0-469.0'	R54: 12 minutes
	469.0				\parallel	_]
_			>10	469.0-470.2, 471.0-471.4' - Fracture zone (2), hard, dolomite -	H	Limestone - 469.0-472.0' - moderate yellowish	
470 -427.4					団	brown, (10YR 5/4), mild HCl reaction, very weak to weak (R1 to R2), finely	_
-427.4			1		団	 crystalline, dolomite, voids 	-
-	R55-HQ			470.6' - Fracture, horizontal, rough, planar, break tensely fit, 9/16" relief	団	throughout variable 1/16-3/4"	-
-	5 ft 60%	13	>10	-	╁	-	-
-	0070			471.8-472.0' - Fracture zone -	┢	No Recovery 472.0-474.0'	1
-				-	\vdash	-	1
-			NR	-	H	-	R55: 12 minutes
	474.0				H	_]
_			>10	474.0-475.1' - Fracture zone	Ħ	Limestone - 474.0-478.0' - moderate yellowish]
475_ -432.4				_	H	brown, (10YR 5/4), mild HCl reaction, very weak to weak (R1 to R2),	_
-432.4			1	475.5' - Fracture or mechanical break, 50	H	 extensive voids throughout 1/16-3/4", 	-
-	R56-HQ			deg, very rough, undulating, tight	Ħ	finely crystalline dolomite, few of the voids with clean hexagonal guartz	-
-	5 ft 80%	27	3	476.5' - Mechanical break, 45 deg, tightly fit	Ħ	- crystals (1/8")	-
-	00%			476.7' - Mechanical break, 10 deg, planar, - tight	H	-	-
-			>10	477.3' - Mechanical break, horizontal,	H	_	1
-				undulating, tight -	H	No Recovery 478.0-479.0'	R56: 14 minutes
	479.0		NR		Ш	_]
			2	479.0-479.3' - Fracture zone, hard dolomite 479.3' - Fracture, 45 deg, rough, irregular	oxdot	_]
480				break across voids	Н		

APPENDIX 2BB-375 Rev. 7



PROJECT NUMBER: BORING NUMBER: 338884.FL

AD-04

SHEET 15 OF 16

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723034.6 N, 458030.5 E (NAD83)

CORING METHOD AND EQUIPMENT: Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

WATER LEVELS: 5.88 ft bgs on 9/13/07 START: 9/6/2007 END: 9/27/2007 LOGGER: R. Bitely, J. Townes, S. Roberti, K. Waikins DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD <u>0</u> MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS -437.4 480.0-480.3' - Fracture zone, through Limestone 2 479.0-481.7' - yellowish orange, (10YR 7/4), very weak to weak (R1 to 480.8' - Fracture, horizontal, rough, R2), finely crystalline, dolomite, voids R57-HQ undulating, horizontal break through voids 481.0-481.4' - Fracture zone, through friable 6 throughout to 3/4" 48 5 ft 88% 481.7-483.4' - grayish orange, (10YR SC-10 Collected at 481.7dolomite 7/4), dolomite with calcareous infill 483.3' 481.4-481.7' - Fracture, 60 deg, through hard voids; 482.6': portion of gray infilled limestone 3" thick 0 dolomite 481.7' - Fracture, horizontal, very rough, 0 R57: 14 minutes undulating, Mt oxide staining No Recovery 483.4-484.0' NR 484 0 Limestone 484.0-487.0' - yellowish gray, (5Y 7/2), moderate HCl reaction, weak to medium strong (R2 to R3), finely 484.2-484.5' - Mechanical break, 45 deg and 4 horizontal, undulating, poorly fit 485 -442 4 crystalline dolomite, voids to 1 485.7' - Mechanical break, horizontal, <1/16-3/16"; many filled with amber calcite R58-HQ undulating, across void, tightly fit 2 5 ft 38 486.4' - Fracture zone, irregular 90% 487.0-488.5' - dusky yellow, (5Y 6/4), very weak (R1), very friable, finely 487.0, 487.3' - Mechanical break (2), >10 horizontal, planar, very poorly fit across friable dolomite crystalline dolomite 487.3-488.5' - Fracture zone, friable to R58: 12 minutes >10 unconsolidated dolomite No Recovery 488.5-489.0' NR 489.0 489.0-489.8' - Fracture zone, large angular Limestone 489.0-489.3' - yellowish gray, (5Y >10 block, limestone fragments 8/1), very fine grained, very strong HCl reaction, weak to medium strong 490 447.4 490.0-490.1' - Fracture, horizontal, smooth, (R2 to R3), <1/32" void over 10%, 1 thick layer of soft calcareous clay 6 undulating, discontinuity with 1" white clay infill 489.3-493.6' - pale grayish orange to dusky yellow, (10YR 7/4 to 5Y 6/4), 490.1, 490.3' - Mechanical break (2), R59-HQ 50 2 horizontal, planar, poorly fit 5 ft fine grained, moderate HCI reaction, 92% 490.6' - Mechanical break, 15 deg, rough, planar, tightly fit weak to medium strong (R2 to R3), 2 . 490.8-491.0' - Mechanical break, 85 deg, >8% voids throughout <1/32-1/16", fracture between 2 horizontal bedding plane many voids with amber calcite fill, finely crystalline breaks R59: 14 minutes 0 491.7' - Mechanical break, undulating, 1/16-3/16" open 492.4-492.5' - Mechanical break (2), planar, No Recovery 493.6-494.0' NR 494.0 Limestone 3/16-5/16" open 494.0-499.7' - grayish orange, (10YR 4 494.4, 494.7, 494.9, 495.0' - Mechanical break (4), 0-15 deg, rough, poorly fit 7/4), moderate HCl reaction, medium 495 452.4 strong (R3), dolomite, weak to 3 medium strong (R1-R2) through areas of bedding plane 495.8' - Fractures (2), horizontal, light brown discontinuities; voids <1/32-1/8", SC-11 Collected at 496.0clay infill (1"), poorly fit uniformly distributed, some voids >10 496 9 495.9' - Fracture (2), horizontal, light brown R60-HQ filled with amber calcite, numerous clay infill (1"), poorly fit 6 ft 47 open voids to 1.5" with amber, calcite 95% crystal growth, finely crystalline 2 496.0-496.9' - moderate yellowish 497.7-498.3' - Mechanical break or bedding brown to grayish brown, (10YR 5/4 to plane (4), horizontal, planar, through friable 10YR 7/4), mild HCl reaction, finely 4 dolomite crystalline dolomite, well-distributed 498.8, 498.9, 499.0, 499.3, 499.5, 499.6' -1/32-1/16" voids, some filled with R60: 14 minutes 3 Bedding plane (6), horizontal, poorly fit, crystals, black organics, white friable dolomite calcareous clay NR 500 500.0



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	AD-04	SHEET	16	OF	16	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723034.6 N, 458030.5 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Boart Longyear, Huntsville, AL; Driller: K. Heinrich, A. Anderson

CORING METHOD AND EQUIPMENT: Dietrich D-120 S/N 820; BL300T S/N 1517, mud rotary, HQ tools, HW casing ORIENTATION: Vertical

WATER	LEVELS : 5.8	38 ft bo	gs on 9	9/13/07 START : 9/6/2007	END : 9/2	7/200	D7 LOGGER: R. Bitely, J. Townes, S	S. Roberti, K. Waikins
>∩≎	- (%			DISCONTINUITIES		စ္ခ	LITHOLOGY	COMMENTS
ELO)	Ä, AND ≪ (%		ZES T	DESCRIPTION		CLC	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROL	JGHNESS,	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SURF	COR	١۵۶	-RAC	PLANARITY, INFILLING MATERI THICKNESS, SURFACE STAINING, ANI	AL AND D TIGHTNESS	SYME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
В 07 Ш	014	ш.		· · ·		0)	No Recovery 499.7-500.0'	
-					-		Bottom of Boring at 500.0 ft bgs on	-
-					-		_ 9/27/2007	-
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PROJECT NUMBER:	BORING NUMBER:	
338884.FL	B-01	SHEET 1 OF 9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723999.6 N, 457491.6 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

						ry, auto nammer, nvvo rous,			ONIENTATION : Vertical
WATER	LEVELS	: 1.0 ft b	gs on 5/2	3/07	START : 5/23/2007	END: 5/30/2007	LOGGE	R : R.	
				STANDARD		SOIL DESCRIPTION		U	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				SYMBOLIC LOG	
표시한		RECOVE	ERY (ft)	TEOT NEODETO		IE, USCS GROUP SYMBOL		일	DEPTH OF CASING, DRILLING RATE,
L H H			<u> </u>	011 011 011		E CONTENT, RELATIVE DE ICY, SOIL STRUCTURE, MI		₽ B	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			#TYPE	6"-6"-6" (N)	OONOIGTEN	IOT, SOIL STITIOOTOTIL, WIII	NEHALOGI	S⊀	INSTRUMENTATION
40.8	0.0			(1.1)	Topsoil			V1 15	Additional equipment note: 3-7/8" tricone bit,
-	0.0			1-3-5		nish black, (5YR 2/1), moi	st, 15% roots /-		split spoon Start drilling 5/23/07 at 08:15;
l _		0.9	SS-1	(8)	$_{\neg}$ \85% organic fir				water level = 1' ft below ground surface
	1.5			, ,	Poorly Graded	d Sand (SP)			
					0.3-0.85' - very	pale orange to grayish or 4), moist, loose, very fine	ange, (10YR	1	
-					grained, trace	roots, trace nonplastic fine	es. silica sand	1	-
-					9	, , , , , , , , , , , , , , , , , , ,		┨	-
-							-	1	=
I _							-	1	_
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	- ^						-	1	-
5 35.8	5.0	 	 	 	Poorly Graded	d Sand With Silt (SP-SM)		11.30	-
-				1-4-6	5.0-6.1' - pale y	yellowish brown to modera	ate yellowish -	li li	_
I _		1.1	SS-2	(10)	brown, (10YR 6	6/2 to 10YR 5/4), moist to	wet, loose,	I ¦i∤i	_
	6.5			, ,	very fine to fine	e grained, no HĆI reaction	, 12%	Г''	
					(nonplastic lines	s, trace roots, silica sand		1	
-							-	1	-
-							-	┨	-
-							-	1	_
I _							_	1	_
							-	1	_
							-	1	=
10 30.8	10.0				Poorly Graded	1 Sand (SD)			_
- 00.0				4-9-10	10.0-11.1' - pal	le vellowish brown to mod	erate -		=
I _		1.1	SS-3	(19)	yellowish browi	n, (10YR 6/2 to 10YR 5/4)	, moist to		_
	11.5			, ,		lense to dense, fine to me			
					\no HCI reaction	n, trace black minerals, sil	ica sand	1	_
-							-	1	-
-							-	1	-
-								1	_
							_		
]									
-							-	1	1
							-	1	-
15 <u> </u>	15.0			-	Poorly Graded	d Sand With Silt (SP-SM)		17 P. 17	-
23.6				6-9-9	15.0-15.8' - nal	le yellowish brown to mod	erate -	陆	
		0.8	SS-4	(18)		n, (10YR 6/2 to 10YR 5/4)	, wet,	11.14	
]	16.5				\ medium dense	e, no HCI reaction, 5% non	plastic fines, \int_{-1}^{1}		
-					\silica sand			1	7
-							-	1	-
-							-	1	-
-							-		_
							_		
							-	1]
							-	1	-
20							_	\vdash	



PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	B-01	SHEET	2	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723999.6 N, 457491.6 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

WATER	LEVELS	: 1.0 ft bo	s on 5/23	3/07 S	START : 5/23/2007 END : 5/30/2007 LOGGE	R : R.	Bitely
<u> </u>				STANDARD	SOIL DESCRIPTION	g	COMMENTS
AND N (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COIL NAME LICCS CROLID SYMBOL COLOR	O LO	DEDTH OF CASING DOWNING DATE
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
SURF			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYM	INSTRUMENTATION
20.8	20.0				Silty Sand (SM)		
		1.5	SS-5	2-2-2 (4)	20.0-21.5' - palé yellowish brown, (10YR 6/2), wet, very loose, no HCl reaction, 35% nonplastic fines,		
	21.5			(' '	silica sand		
-						1	_
-						-	-
-						-	-
-						1	-
-						1	-
25	25.0						
25_ 15.8					Silty Sand (SM) 25.0-26.5' - Same as above except 35-40% nonplastic		
_		1.5	SS-6	1-1-1 (2)	fines		_
-	26.5						_
-						1	-
-						┨	-
-						1	-
-							
]
30	30.0						
10.8			00 -	0-1-1	Silty Sand (SM) 30.0-31.5' - Same as above except 35-40% non to low		_
-		1.5	SS-7	(2)	plastic fines	-	-
-	31.5						-
-						1	-
-						1	1
]	
_						1	
-						-	-
35 5.8	35.0				Silt (ML)	+	-
-		0.5	SS-8	1-2-4	35.0-35.5' - pale yellowish brown, (10YR 6/2), moist to wet, low plasticity, rapid dilatancy, mild to moderate	╫	-
-	36.5		· -	(6)	HCI reaction, very thinly bedded, 5-10% fine to	1	-
-					medium grained silica sand, lens of coarse sand-sized material from 35.4-35.5', all carbonate	1]
] -					materials, trace organics throughout, one 1/4" thick organic lense		
-						4	_
-						-	-
-						1	-
40						1	-
+0						T	
						1	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-01	SHEET	3	OF	q	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723999.6 N, 457491.6 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

						ry, auto nammer, nvvo rous,			ONIENTATION : Vertical
WATER	LEVELS	: 1.0 ft b	gs on 5/23	3/07 S	START : 5/23/2007	END : 5/30/2007	LOGGE	<u>₹ : R.</u>	
30=				STANDARD PENETRATION		SOIL DESCRIPTION		ğ.	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	SOIL NIVANI	E, USCS GROUP SYMBOL,	COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H H H H		RECOVE	RY (ft)			E CONTENT, RELATIVE DEN		O O	DRILLING FLUID LOSS, TESTS, AND
EV.			#TYPE	6"-6"-6"	CONSISTEN	CY, SOIL STRUCTURE, MIN	NERALOGY	₩	INSTRUMENTATION
프장교				(N)				Ś	
0.8	40.0			0.00		Vith Organics (SC) ve gray, (5Y 4/1), moist to v	wet verv		_
		1.5	SS-9	2-2-2 (4)	loose, very fine	to fine grained, no HCl re	action.		
	41.5			(- /		, 16% medium plastic fines	s, fines		
					appear to be or	rganic, silica sand			_
-								1	-
_								1	=
-							-	1	-
-							-	ł	-
-							-	1	-
_								-	=
45	45.0			50/5		•••			
-4.2	45.4	0.4	SS-10	50/5 (50/5")	Organic Soil (0	OL) eenish black, (5GY 2/1), m	oist to wet	772	HW casing down to 45.0'
_				(55/5)	hard, very fine t	to fine grained, medium pl	asticity, slow	1	
						ICI reaction, 5-10% silica's	and		
					Clayey Sand (S	ht olive gray, (5Y 6/1), mois	st to wet		
					35% medium to	o plastic fines, silica sand	or to work,	1	
-							•		_
-							-	1	-
-								1	-
-									=
								┨	-
50 -9.2	50.0				Silty Sand (SM	/ \			_
		0.9	SS-11	27-50/5 (77/11")	50.0-50.85' - m	noderate yellowish brown to	pale -	1111	-
_	50.9			(77711)	yellowish brown	n, (10YR 5/4 to 10YR 6/2), e, very fine to medium grai	moist to	111	_
_					HCl reaction. 4	e, very line to medium grai I5-50% nonplastic fines, all	I carbonate		_
_					material				_
									_
-									_
-									1
	EE O							1	=
55 <u> </u>	55.0 55.3	0.3	SS-12	50/4	Sandy Silt (ML	_)		╫	-
-				(50/4")	\ 55.0-55.3' - ligh	ht olive gray, (5Y 5/2), wet,			-
-					to low plasticity	y, rapid dilatancy, moderate 80% very fine to medium sa	e to strong	-	=
-					coarse sand, al	III carbonate materials		1	-
-								1	_
-								1	_
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60							•	1]
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-01	SHEET	4	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723999.6 N, 457491.6 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

						ary, auto nammer, invvo rous			ONIENTATION : Vertical
WATER	LEVELS	: 1.0 ft bo	gs on 5/20	3/07 S	START : 5/23/2007		LOGGE	<u>₹ : R.</u>	
300				STANDARD PENETRATION		SOIL DESCRIPTION		ă	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	COIL NAM	AE LICCE CROUR CYMROL	COLOR	SYMBOLIC LOG	DEDTIL OF CACING DRILLING DATE
불병		RECOVE	ERY (ft)		MOISTURE	ME, USCS GROUP SYMBOL E CONTENT, RELATIVE DE	., COLOR, ENSITY OR	5	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTF/			#TYPE	6"-6"-6"		NCY, SOIL STRUCTURE, MI		₩	INSTRUMENTATION
밀징핍				(N)				်	
-19.2	60.0			00.45.40	Sandy Silt (MI	I L) ght olive gray, (5Y 5/2), we	t nonnlastic		There is no distinct boundary between the subunits; boundary is gradational
		1.5	SS-13	32-15-10 (25)	rapid dilatancy	y, mild to moderate HCl re	action,	1	Suburitio, bouridary is gradational
	61.5			(20)	\30-40% fine to	o coarse sand, all carbona	te	1111	1
_	01.0				Silty Sand (SI	M)	t	1	1
-					dense, mild to	ght olive gray, (5Y 5/2), we o moderate HCl reaction, 4	0% nonplastic	1	-
-					fines, limeston	ne lenses up to 1/4"-1/2" th	nick, all	1	-
-					carbonate			-	-
-								-	-
_							-	4	_
_								4	_
65	65:P								_
-24.2		0.0	SS-14	50/0.25 (50/0.25")	Limestone Fra	r <mark>agments</mark> ght olive gray, (5Y 5/2), mil	d to moderate	Ι'	Driller's Remark: Hit rock at 65.0'
]				(50/0.25)	HCl reaction. f	fine gravel-size fragments	u to moderate /]
-								1	1
-								1	1
-							-	1	
-							-	1	-
-							-	1	-
-							-	-	-
-								-	-
_								1	_
70	70.0	0.0	SS-15	50/1	No Recovery	70 0-70 1'	7	⊨	10:00 Began rock coring; water level at 2.3'
-29.2	70.1		(33-13)	(50/1")		oring at 70.0 ft bgs		1	\below ground surface
					See the next s	sheet for the rock core log	_		
							•	1	
-							·	1	1
-							-	1	1
-								1	-
-								1	-
-								┨	-
-								┨	-
75 <u> </u>							_	-	-
-34.2							-	4	_
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-01	SHEET	5	OF	9	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723999.6 N, 457491.6 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT: CME 55 S/N 299205, mud rotary, NQ tools, HW casing

節うド ボゼッ き DEPTH, TYPE, ORIENTATION, ROUGHNESS, LEVEN BY AND POCK MASS FLUID LOSS, CORING RATE AT MEATHERING, HARDNESS, SMOOTHNESS, CAVING ROLL HARDNESS, CAVING ROLL	CONTROL METHOD 71	ND EC	אורוע	IENT : CME 55 S/N 299205, mud rotary, NQ tools, HW o	asing		ORIENTATION : Vertical
Section Description Description Section Description Section Description	WATER LEVELS: 1.0	ft bg	s on 5	/23/07 START : 5/23/2007 END : 5/	30/200	7 LOGGER : R. Bitely	
29.2 70.0 10 70.3' - Fracture, 66 deg, rough, undulating, tight, open <18" 70.3' - Fracture, 200 every fine to 70.5' - 70.5'	30-			DISCONTINUITIES	(J)	LITHOLOGY	COMMENTS
29.2 70.0 10 70.3' - Fracture, 66 deg, rough, undulating, tight, open <18" 70.3' - Fracture, 200 every fine to 70.5' - 70.5'	DEPTH BELOW SURFACE AND ELEVATION (#) CORE RUN, LENGTH, AND RECOVERY (%)	Ø	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LO	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
To To To To To To To To	-29.2 70.0 - - - - R1-NQ - 5 ft		>10	tight, open <1/8" 70.35-70.6' - Fracture zone, very fine to coarse gravel sized fragments 70.65-70.85' - Bedding plane, <10 deg, smooth, undulating, tight to 1/4" open 71.1' - Fracture or mechanical break, rough,		 70.0-71.95' - moderate olive brown, (5Y 4/4), fine grained, moderate to strong HCI reaction, weak (R2), voids (1/16") over 25% of surface, trace fossil molds, largest 1/4"x1/2", trace secondary recrystallization in voids 	71.95' Driller's Remark: Soft from 72.0-74.0'
34.2 2	-				坩	-	171. 3 minutes
R3-NO R3-R3-NO R3-R3-NO R3-R3-NO R3-R3-NO R3-R3-NO R3-R3-NO R3-R3-NO R3-R3-R3-R3-R3-R3-R3-R3-R3-R3-R3-R3-R3-R	-34.2 - - - - - - - - - - - - - - - - - - -		6	75.5-75.9' - Fracture zone 76.4, 76.55, 76.7, 76.9, 76.95' - Bedding plane (3), <10 deg, rough, undulating to stepped, open <1/2" 76.8-76.9' - Fracture zone 77.25, 77.1, 77.6, 77.9' - Bedding plane or mechanical break (4), <10 deg, rough,		75.0-75.9' - moderate olive brown to light olive gray, (5Y 4/4 to 5Y 2/2), fine grained, moderate HCl reaction, weak (R2), voids (<1/16") over 15-20% of surface, secondary recrystallization in voids trace casts 75.9-78.2' - moderate olive brown to light olive gray, (5Y 4/4 to 5Y 2/2), fine to coarse grained, strong HCl reaction, weak (R2), voids (<1/16")	
80.0-84.2' - moderate olive brown, (5Y 4/4), fine to medium grained, strong HCI reaction, very weak (R1), except from 82.5-82.8' where secondary calcite crystals in voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium strong (R3), voids (<1/16") exists, medium st			NR			recrystallization, trace fossil casts up to 1/2" diameter	R2: 5 minutes
No Recovery 84.2-85.0' Standard Standar	-39.2 - - - - R3-NQ - 5 ft		2	- Bedding plane or mechanical break (7), <10 deg, smooth, undulating, open <1/2" 81.05' - Bedding plane or mechanical break, 30 deg, smooth, undulating, open <1/8" 82.35-82.4' - Mechanical break 82.4' - Bedding plane or mechanical break, 10 deg, rough, undulating, tight 82.4-82.7' - Mechanical break		- 80.0-84.2' - moderate olive brown, (5Y 4/4), fine to medium grained, strong HCl reaction, very weak (R1), except from 82.5-82.8' where secondary calcite crystals in voids (<1/16") exists, medium strong (R3), voids (<1/16") over 50% of surface, many cavities, highly fossiliferous	circulation at 80' SC-2 collected at 81.35-
-44.2 -4	95 950		\sim	62.7-64.2 - Fracture Zone		No Recovery 84.2-85.0'	R3: 6 minutes
90 J30.0	-44.2 - - - R4-NQ - 5 ft - 44%		>10	10 deg, rough, fine gravel with clayey silt infill, open (large) 85.35, 86.0, 86.85, 86.95' - Bedding plane or mechanical break (4), <10 deg, rough, undulating, no infill, open <1/2" 85.9' - Bedding plane or mechanical break, 50 deg, smooth, undulating, tight 86.0-86.4' - Fracture zone, clayey silt infill 87.1' - Bedding plane or mechanical break,		85.0-87.2' - moderate olive brown, (5Y 4/4), except two zones: 85.0-85.1' and 86.1-86.3' of clayey silt, pale greenish yellow, (10Y 8/2), moist, strong HCl reaction, extremely weak (R0)	silty clay Driller's Remark: Still no circulation
	90 90.0				╀≒		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-01	SHEET	6	OF	9	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723999.6 N, 457491.6 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

WATER							
WAILIN	LEVELS: 1.0	ft bgs	s on 5	/23/07 START : 5/23/2007 END : 5/	30/20	07 LOGGER : R. Bitely	
> 0 00	(9)			DISCONTINUITIES	ق	LITHOLOGY	COMMENTS
ANE I	λ N O O O		SI.	DESCRIPTION	51.06	ROCK TYPE, COLOR,	CIZE AND DEDTIL OF CACINO
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-49.2 -			>10	90.2' - Bedding plane or mechanical break, <10 deg, smooth, undulating, open <1/2" 90.4-90.8, 91.3-91.45' - Fracture zone (2),		Limestone - 90.0-90.4' - yellowish gray, (5Y 8/1), moderate HCl reaction, weak (R2),	-
-			1	fine to coarse gravel sized fragments	H	voids (<1/16") over 5% of surface, trace fossil molds/cavities Limestone	-
	R5-NQ 5 ft 46%	29	0		Ē	90.4-92.3' - moderate olive brown, - (5Y 4/4), strong HCl reaction, weak (R2), voids (1/16") over 40% of	Driller's Remark: 92.0-93.0' silty clay
			NR			surface, fossil molds No Recovery 92.3-95.0'	- -
	95.0			_		- - -	Driller's Remark: 94-94.5' possible voids
-54.2			>10	95.0-95.1, 95.4-95.7' - Fracture zone (2), fine to coarse gravel sized fragments 95.7-96.0' - Fracture, vertical, smooth,		Limestone 95.0-96.5' - yellowish gray, (5Y 7/2), strong HCl reaction, extremely weak	
			5	undulating, fragmented rock on one side of fracture 96.0, 96.1, 96.4, 96.55' - Bedding plane or		(R0), voids (1/16") over 40% of surface from 95.0-96.1' and 25% of surface from 96.1-96.5', few cavities,	Driller's Remark: 96.0-99.0' very soft clay
-	R6-NQ 5 ft 38%	0	NR	mechanical break (4), <10 deg, smooth, planar to undulating, open <1/2"	- - - -	\few small (<1/4") fossils Silt (ML) 96.5-96.9' - carbonate material No Recovery 96.9-100.0'	-
	100.0					-	R6: 3 minutes
-59.2 - -			2	100.6, 100.7, 100.8' - Mechanical break (3), <10- 50 deg, smooth, undulating, tight	H	Limestone - 100.0-104.35' - grayish yellow to yellowish gray, (5Y 8/4 to 5Y 7/2),	-
_			5	101-30 deg, smooth, undulating, light 101.3, 101.4,101.5, 101.55, 101.6' - Mechanical break (5), <10 deg, smooth, planar to undulating, tight to open <1/8"		fine to medium grained, strong HCl reaction, very weak (R1), trace coarse grained material, voids (<	-
	R7-NQ 5 ft 87%	32	6	102.2-102.3' - Fracture zone, very fine to fine gravel sized fragments 102.5, 102.75, 103.0, 103.1, 103.35, 103.55,	Ħ	1/16") over 40% of surface, abundant cavities/fossil molds, few fossils, trace black organics material	-
			5	103.6, 103.85' - Mechanical break (8), <10 deg, smooth, planar to undulating, tight to open <1/8"		- -	R7: 5 minutes
105_ -64.2	105.0		NR	104.1-104.35' - Fracture zone, coarse gravel —	Ė	No Recovery 104.35-105.0'	- -
			3	105.15-106.8' - Bedding plane or mechanical break, <10 deg, rough, undulating, open <1/2"		Limestone - 105.0-106.5' - light olive gray, (5Y 6/1), fine to medium grained, strong HCl reaction, very weak (R1), trace	- Driller's Remark: 106.0-
_	R8-NQ		>10	106.6' - Fracture zone, fine to coarse gravel		coarse-sized material, voids (< 1/16") over 40% of surface, abundant cavities/fossil molds, few fossils,	107.5' soft, probably sand
-	5 ft 51%	20	0		#	trace black organics material 106.5-107.55' - Same as 105.0-106.5' except grayish yellow,	- -
-			NR			- (5Y 8/4) No Recovery 107.55-110.0'	R8: 4 minutes
110	110.0						



PROJECT NUMBER:

33884.FL

B-01 SHEET 7 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723999.6 N, 457491.6 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

00111110	WETTOD /	VD L	ZOII IV	IENT: CME 55 S/N 299205, mud rotary, NQ tools, HW c	asiriy		ORIENTATION : Vertical
WATER	LEVELS: 1.0	ft bg	s on 5	/23/07 START : 5/23/2007 END : 5/	30/20	07 LOGGER : R. Bitely	
	<u> </u>			DISCONTINUITIES	(J	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	- FOG	ROCK TYPE, COLOR,	
표원한	ER'A	(%	FRACTURES PER FOOT		SYMBOLIC	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
H Ä Ä	R TO	(%) Q	FE	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
925	S S S S	g	RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	074	ľ	шп		S		
-69.2			>10		╨	Limestone - 110.0-114.2' - yellowish gray, (5Y	_
			10	110.5' - Mechanical break, 60 deg, smooth,		8/1), fine to medium grained, strong	
-				undulating, tight 110.7, 110.9-111.1, 111.3, 111.35, 111.55' -	╁	HCl reaction, very weak (R1), voids	-
-			7	Bedding plane or mechanical break (5), <10		 (<1/16") over 40% of surface, few 	-
-				deg, smooth, planar to undulating, open <1/8"	\Box	cavities, fossil molds	-
1 _	R9-NQ 5 ft	20	5	111.1-111.35' - Fracture (2), 80 deg, smooth,	┢		_
	84%	20		undulating, tight			
-				112.4, 112.45' - Mechanical break (2), <15 deg, undulating, smooth to rough, open <1/2"	╨	-	-
-			6	112.75-112.85' - Fracture zone	╂┰	-	-
-			1	113.3, 113.45, 113.7, 113.8' - Bedding plane	-	-	-
_			$\overline{}$	or mechanical break (4), <15 deg, undulating,	╨	No Recovery 114.2-115.0'	R9: 4 minutes
115	115.0		NR	smooth to rough, open <1/2", gray/black staining on rock core and fracture surface —	\Box	-	
-74.2				from 112.8-113.6',	1—	Limestone	_
-			2	113.8-114.2' - Fracture zone		- 115.0-117.8' - yellowish gray, (5Y	-
-				115.2-115.4' - Fracture zone, sand- to	╨	8/1), fine to medium grained, strong HCl reaction, very weak (R1),	-
-			3	gravel-size fragments 115.75, 116.3, 117.0' - Bedding plane or	╁┼	gray/black staining from 117.5-117.9'	_
				mechanical break (3), <10 deg, rough,		g. 2, . 2. 2	
-	R10-NQ		>10	undulating to stepped, tight to open <1/2"	╨		<u> </u>
-	5 ft 56%	13	/10	116.0-116.1, 117.2-117.8' - Fracture zone	仜	-	-
-	30%			(2), fine to coarse gravel-sized fragments	╂┯	- No Recovery 117.8-120.0'	-
-						_	_
1 _			NR		oxdot		
					\vdash		R10: 3 minutes
120	120.0						
-79.2	120.0				╀┴	Limestone	_
-			3	120.15' - Fracture, 30- 50 deg, rough, undulating, open <1/4"	仜	 120.0-124.85' - yellowish gray, (5Y 	-
-				120.55' - Fractures, 10 - 50 deg, undulating,	╂┯	8/1), fine to medium grained, strong	_
l _			>10	smooth to rough, open <1/2"		HCI reaction, extremely weak (R0), trace secondary recrystallization	_
			10	121.0, 121.1, 121.25, 121.4, 121.6, 121.65,	\vdash	voids	
-	R11-NQ			121.8, 122.05, 122.1, 122.2, 122.75, 122.8, 122.95' - Bedding plane (13), <10 deg,	\Box	_	1
-	5 ft	16	>10	smooth, undulating, open <1/4"	—	-	-
-	97%				╀┼	-	_
_			6	123.2, 123.4, 123.45, 123.75, 124.2, 124.35' -		_	
1			Ľ l	Fractures (6), 10 - 50 deg, undulating,	┢		
1			3	smooth to rough, <1/2" open			R11: 3 minutes
125	125.0		•	404.71 Dodding plane 440.4	╨	<u> </u>	_
125 -84.2	125.0		NR.	124.7' - Bedding plane, <10 deg, smooth, undulating, open <1/4"		— No Recovery 124.85-125.0'	_
-			3	125.2, 125.4, 125.9' - Bedding plane (3), <10	\Box	Limestone	-
1 -				deg, smooth, undulating, open <1/2"	╨	125.0-129.45' - yellowish gray, (5Y - 8/1), fine to medium grained, strong	
1			,	125.9' - Fractures, 30 deg, smooth,		HCI reaction, extremely weak (R0)	16:00 Stopped drilling and
1 -			3	undulating, tight to open <1/4" 126.1, 126.2, 126.3,' - Bedding plane (3), <10	1—	[left core barrel in overnight – due to possibility of hole
1 -	R12-NQ			deg, smooth, undulating, open <1/2"		-	caving
-	5 ft	38	5	127.1' - Fractures, 30 deg, smooth,	╀	-	-
1 -	89%			undulating, tight to open <1/4"	仜	-	
1 -			3	127.8, 127.9, 128.2, 128.5, 128.7, 128.85' - Bedding plane (6), <10 deg, smooth,		_	
1				undulating, open <1/2"	\vdash		
1 -			2	3, 1	П		R12: 5 minutes
	1000		NR	129.25' - Fractures, 30 deg, smooth, undulating, tight to open <1/4"	╁	h Na Baarray 400 45 400 01	
130	130.0			and alating, tight to open > 1/4	F	No Recovery 129.45-130.0'	
1					1		
							I .

APPENDIX 2BB-384 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-01

SHEET 8 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723999.6 N, 457491.6 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 1.0 ft bgs on 5/23/07 START: 5/23/2007 END: 5/30/2007 LOGGER: R. Bitely DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -89.2 Limestone 130.2, 130.4, 130.7, 131.0, 131.1, 131.2, >10 130.0-134.9' - yellowish gray, (5Y 131.25' - Bedding plane or mechanical break 8/1), fine to medium grained, strong (7), <10 deg, undulating, smooth to rough, HCl reaction, extremely weak (R0), open <1/2" 5 very fine grained from 130.7-131.3 131.3' - Fractures, 15 -20 deg, smooth, undulating, open <1/2" 132.0, 132.25, 132.5, 132.6, 132.75, 132.95, R13-NQ 73 7 5 ft 133.9' - Bedding plane or mechanical break 98% (7), <10 deg, undulating, smooth to rough, SC-3 collected at 133.1open <1/2" 0 134 1 133.95' - Fractures, 15- 20 deg, smooth, R13: 5 minutes 3 undulating, open <1/2" 134.65, 134.75, 134.8' - Bedding plane or 135_ 135.0 NR mechanical break (3), <10 deg, undulating. No Recovery 134.9-135.0' -94 2 Limestone 5 smooth to rough 135.0-138.9' - yellowish gray, (5Y 135.1, 135.25, 135.3, 135.4, 135.6, 135.75, 136.1, 136.2, 136.3' - Bedding plane or mechanical break (9), <10 deg, smooth, 8/1), fine to medium grained, strong HCl reaction, extremely weak (R0), 9 except 135.1-135.3' and planar to undulating, open <1/4" 136.7-137.1', very fine grained 136.4' - Fracture or mechanical break, 15 R14-NO material with lineations (1/8" thick) of 6 deg, rough, undulating, tight 7 5 ft yellowish gray (5Y 8/1) and light olive gray (5Y 5/2), gray material in few 136.5, 136.6, 136.7, 136.75, 136.95, 137.05, 137.3, 137.55, 137.7, 137.8, 138.05, 138.2, 78% 138.3' - Bedding plane or mechanical break 3 (13), <10 deg, smooth, planar to undulating, open <1/4" No Recovery 138.9-140.0' R14: 5 minutes NR 140 140.0 -99 2 Limestone 140.2, 140.3' - Bedding plane or mechanical 140.0-140.8' - yellowish gray, (5Y >10 break (2), <10 deg, smooth, undulating, tight to open <1/2" 8/1), very fine grained, moderate to strong HCI reaction, strong (R4), 140.5' - Fracture, vertical, rough, undulating, voids (<1/16") over 15% of surface, few cavities of fossil molds 3 open <1/4" 140.7-140.9' - Fracture zone (1/4"x1/2") Driller's Remark: 142-143' R15-NO 141.1, 141.7, 141.95, 142.2, 142.25, 142.35, 140.8-144.0' - yellowish gray, (5Y 12 4 5 ft 142.88, 143.16, 143.42, 143.55' - Bedding 80% 8/1), fine grained, strong HCI plane or mechanical break (10), <10 deg, reaction, very weak (R1), trace rough, undulating, tight to open <1/2" localized medium to coarse grained >10 Driller's Remark: 143.5material, voids (<1/16") over 40% of 143.65-143.85' - Fracture zone 144' soft surface, few cavities, abundant fossil R15: 5 minutes casts NR No Recovery 144.0-145.0' 145 145.0 $-104.\overline{2}$ Limestone 145.05' - Bedding plane or mechanical break, 145.0-146.7' - yellowish gray, (5Y >10 10 deg, smooth to rough, planar to undulating 7/2), fine grained, moderate HCI 145.5-145.6' - Fracture zone 145.7, 145.75, 146.0' - Bedding plane or mechanical break (3), <10 deg, smooth to reaction, strong (R4), voids (1/16") over 15% of surface, few cavities >10 (1/8"x3/4"-elongated) rough, planar to undulating 146.7-149.5' - yellowish gray, (5Y 146.0-146.35' - Fracture zone R16-NO 36 3 146.65' - Mechanical break 7/2), fine to medium grained, strong 5 ft 90% 146.83, 146.86' - Bedding plane or HCI reaction, very weak (R1), trace mechanical break (2), <10 deg, smooth to rough, planar to undulating coarse grained material, voids (<1/16") over 40-50% of surface, 3 147.3' - Bedding plane abundant fossil casts and molds 147.47' - Bedding plane R16: 6 minutes 2 No Recovery 149.5-150.0' NR 150 150.0 Bottom of Boring at 150.0 ft bgs on



PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	B-01	SHEET	9	OF	9	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723999.6 N, 457491.6 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 1.0	ft bgs	s on 5/	23/07 START : 5/23/2007	END : 5/3	0/20	07	LOGGER : R. Bitely	
≥ □ €	. (%			DISCONTINUITIES		9		LITHOLOGY	COMMENTS
ELO N (fill	Ä, AND 3Y (%		ZES T	DESCRIPTION		CLC		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUG	GHNESS,	SYMBOLIC LOG		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SURI ELE/	COR	RQI	FRA(PER	PLANARITY, INFILLING MATERIAI THICKNESS, SURFACE STAINING, AND	L AND TIGHTNESS	SYM		AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
				147.65' - Bedding plane or mechani	cal break,	_	\vdash		Total depth = 150.0'
-				<10 deg, smooth to rough, planar to undulating	-		-		-
1 1				148.35' - Mechanical break, smooth	-		┞		7
1 7				undulating, open <1/8" 148.55, 148.75, 148.9, 149.0, 149.1	5' -				7
				Bedding plane (5), <10 deg, undulat	ting,				7
				smooth to rough, tight			ľ		7
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-02	SHEET	1	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724128.3 N, 457619.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

DRILLIN	G METH	OD AND	EQUIPM	ENT : CME 550 S	/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 4.0 ft bo	s on 4/1	8/07	START : 4/18/2007 END : 4/19/2007 LOGGER : T. Stewart
				STANDARD	SOIL DESCRIPTION COMMENTS
(#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
BEL GE /		RECOVE	RY (ft)	TEGT REGGETS	SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE,
YFA YFA			#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SINSTRUMENTATION
DEPTH BELOW SURFACE AND ELEVATION (ft)			<u>-</u>	(N)	
41.8	0.0				Poorly Graded Sand With Silt (SP-SM) 0.0-1.0' - mottled dark gray, yellowish gray and pale
		1.0	SS-1	2-2-2 (4)	yellowish brown, (N3, 5Y 8/1 and 10YR 6/2), moist,
	1.5			(.,	very loose, very fine to fine grained silica sand, 5-10% NW-Rod (5.0' sections) NW-Rod (5.0' sections)
					\ \ \ \ \ \ \ \ \ \ \ \ \
-					near top 24" split spoon (SS)
-					8:56 Driller's Remark: 3-7/8" tricone roller
-					drill bit in use, 2.0' adaptor length (to help set 5.0' stroke) when drilling
-					Add 1/2 bag bentonite to mud vat
-					- Water level assumed at 4.0' below ground
	F ^				- surface due to moisture content of ŠS-1 and SS-2
5 36.8	5.0				Clayey Sand (SC)
-		0.5	SS-2	2-3-2	─ 5.0-5.5' - moderate yellowish brown and pale green,
-		0.0	33-2	(5)	\(10Y 5/4 and 10G 6/2), mottled, moist to wet, loose, 30-35% medium plastic, fine grained silica sand,
-	6.5				\cohesive, trace rounded concretions up to 1/4" dusky \ -
-					brown (5YR 2/2), trace roots up to 1/16" and 2" 9:32 Driller's Remark: a rock ledge at 6.5"
-					-
_					-
-					-
_					_
_					_
10	10.0				
31.8				1-5-42	Silt With Sand (ML) 10.0-11.2' - grayish yellow to moderate yellow, (5Y 8/4 -
_		1.2	SS-3	(47)	to 5Y 7/6), wet, hard, nonplastic, very rapid dilatancy,
_	11.5			. ,	mild to moderate HCl reaction, 5-10% fine to medium / 10:17 Driller's Remark: switched to 4-3/4" grained silica sand, 20% medium to coarse grained in / tricone roller bit to straighten out the hole,
					\pockets, all carbonate \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
					borehole through confirmed drilling Original B-2 hole has been offset 1.5' NW
					and re-drilled. This redrilled hole will be
					called B-2R ("R" for redrill). Original B-2
					borehole could not be straightened to 90°. Add 1/4 bag bentonite
					11:26 Driller's Remark: 12.5-14.5' soft
15	15.0				drilling, hard slow drilling at 14.5', 2' adaptor and 1-3/8" tricone roller drill
26.8	15.0 15.2	0.1	SS-4	50/2	☐ Limestone Fragments
-				(50/2")	\ 15.0-15.1' - grayish yellow to moderate yellow, (5Y 8/4 / - to 5Y 7/6), moderate to strong HCl reaction, poorly
-					fossiliferous
-					
-					
-					
-					
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-02	SHEET	2	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724128.3 N, 457619.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

DRILLIN	G METH	OD AND	EQUIPM	ENT : CME 550 S	/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 4.0 ft b	gs on 4/1	8/07	START : 4/18/2007 END : 4/19/2007 LOGGER : T. Stewart
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
BEL CE/		RECOVE	ERY (ft)	TEOT RECOETS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT RELATIVE PENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
YFA.			#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY S INSTRUMENTATION
SUI			<i>"</i> ''''	(N)	\s \s \s \s
21.8	20.0				Silty Sand (SM) Driller's Remark: softened drilling at 16.5-
_		1.1	SS-5	10-10-24 (34)	20.0-21.1' - grayish yellow, (5Y 8/4), wet, dense, fine to medium grained, moderate to strong HCl reaction,
_	21.5			(34)	─ 30-40% nonplastic fines, 5-10% fine gravel, trace fine
_					grained silica sand moderate gray (5G 5/6) particles, /- trace fine grained silica sand white particles, all
_					\carbonate 13:27 Driller's Remark: 21.5' hard drilling,
-					- soft again at 23.0'
-					-
-					-
-					-
_					-
25 <u> </u>	25.0			47.50/4	Silt (ML)
10.0	25.8	0.8	SS-6	47-50/4 (100")	25.0`-25.8' - grayish yellow, (5Y 8/4), wet, nonplastic, -
_	25.6			(100)	very rapid dilatancy, moderate to strong HCI reaction,
_					\ \ 10-15% very fine to fine grained, 5-10% fine grained \ \
_					carbonate 13:50 Driller's Remark: 26.5' hard drilling
_					
]
					13:55 Driller's Remark: 28.5-29.5' soft drilling
_					1
30	30.0				1
11.8	00.0				Silt With Sand (ML)
-		1.3	SS-7	48-39-37	30.0-31.3' - Same as 25.0-25.8' except yellowish gray to moderate yellow, (5Y 8/4 to 5Y 7/6), wet,
-	31.5			(76)	nonplastic, very rapid dilatancy, 20-25% very fine to
-	31.5				\medium grained silica sand
-					-
_					-
-					-
_					
_					- 14400 Drillada Danardu hardanad drillian at
_					14:08 Driller's Remark: hardened drilling at 34.0'
35	35.0				
6.8	35.3	0.3	SS-8	50/3 (50/3") /	Silty Gravel With Sands (GM) 35.0-35.3' - moderate yellowish brown, (10YR 5/4),
				(55/5)	\ wet, dense, mild to moderate HCl reaction, fine
					gravel-sized angular to subangular limestone 14:23 Remove silt/sand cuttings from mud ragments, 30% fine to coarse grained silica 14:23 Remove silt/sand cuttings from mud vat, add 1/4 bag bentonite before continuing
					fragments, 30% fine to coarse grained silica vat, add 1/4 bag bentonite before continuing down hole to 40'
_					1
_					1
-					14:34 Driller's Remark: Observe light to
-					moderate drill chatter and bouncing
-					
40					
40					
					I I



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-02	SHEET	3	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724128.3 N, 457619.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION: Vertical												
WATER	WATER LEVELS : 4.0 ft bgs on 4/18/07											
				STANDARD	SOIL DESCRIPTION	U	COMMENTS					
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		SYMBOLIC LOG						
H SE		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	S	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND					
PTF/			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	/MB	INSTRUMENTATION					
				(N)	0.14 MP4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	ίσ						
1.8	40.0			50-46-37	Silt With Limestone Fragments (ML) 40.0-41.5' - moderate olive brown, (5Y 4/4), wet, hard,		_					
-		1.5	SS-9	(83)	nonplastic to low plasticity, rapid dilatancy, mild to	Ш	-					
_	41.5				moderate HCl reaction, 5-10% very fine grained silica sand, 15-25% very fine to fine grained silica sand,	Ш	_					
_					medium dark gray (N4) fragments, 40.0-40.4' lens of		_					
_					\\\\1/8"-1/4" thick limestone disks, all carbonate	1	_					
_					_							
_					_]						
_												
					_							
45	45.0											
-3.2				16-34-50/3	Silty Sand (SM) 45.0-46.1' - moderate olive brown to light olive gray,		15:24 45-50' with very light chatter intermittently					
		1.1	SS-10	(84/9")	(5Y 4/4 to 5Y 5/2), wet, very dense, fine to coarse		intermittently -					
	46.3				grained, mild to moderate HCl reaction, 10% fine gravel-sized, 36% nonplastic fines, trace very fine	1	1					
					black fragments, one 1/2"x1/4" brittle black fragment,	1						
					gray staining near black fragment, all carbonate	1						
					-	1						
-					-	1	1					
-					-	1	Driller's Remark: 48.5' to bottom was soft					
-					-	1	drilling (very soft)					
50	50.0				-	1	1					
-8.2	50.5	0.5	SS-11	40-50/0.5	Silty Sand And Limestone Fragments (SM)	Ш	15:45 Driller's Remark: 50% circulation loss					
-	00.0			(90/6.5")	50.0-50.5' - dusky yellow to moderate olive brown, (5Y 6/4 to 5Y 4/4), wet, very dense, fine to coarse grained,	 	1					
-					mild to moderate HCl reaction, 25% nonplastic fines,	1	1					
-					60% of sample is limestone fragments 1/4"-3/8" thick disks, 1/2" to 1" fragments, trace brownish black (5YR	1	1					
-					2/1) organic staining on limestone, all carbonate	1	15:54 Driller's Remark: 52.0-53.0' soft drilling					
-					-	1	1					
-					-	1	-					
-					-	1	-					
-					-	1	16:22 Driller's Remark: last SS/SPT for B-					
55 -	55.0				-	1	2R, will switch to NQ coring assembly, will install 55' of 3" NW					
-13.2	55.3	0.3	SS-12	50/4	Limestone Fragments	口	8:07 Water level on 4/19/07 is 1.2'					
-				(50/4")	55.0-55.3' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), wet, mild to moderate HCl reaction	\vdash						
-					Begin Rock Coring at 55.5 ft bgs	1	-					
-					See the next sheet for the rock core log	1	-					
-					-	1	-					
-					-	1	-					
-					-	1	-					
-					-	1	-					
-					-	1	-					
					-	\mathbf{I}	-					
60_						\vdash						
	L											



PROJECT NUMBER:

338884.FL

B-02

SHEET 4 OF 8

ROCK CORE LOG

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724128.3 N, 457619.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

WATER	LEVELS: 4.0	ft bgs	s on 4/	18/07 START : 4/18/2007 END : 4/	19/20	07 LOGGER : T. Stewart	
≥¤≎	(%			DISCONTINUITIES	ا ي	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH BI	E RU 3TH, 3VEF	(%) Q	F.S.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SURF SURF SILEV	SORE	ROL	FRAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	3YME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ЦОШ	55.5	IĽ.	шш		0)	No Recovery 55.5-56.7'	3" NW casing is set to
_	00.0		NR	-	Ħ	- No Necovery 33.3-30.7	55.5', 50 lb bags of -
_			\	-	H	_	QuikGel brand bentonite 8:57 Total depth tape
_			3	56.75, 56.85' - Fractures (2), rough,	Ш	Limestone	measured at 55.5' below –
_				undulating, open <1/8"-1/4" 57.0' - Fracture, horizontal, rough, undulating,	世	56.7-57.0' - dusky yellow, (5Y 6/4), mild to moderate HCl reaction,	ground surface
_	R1-NQ 5 ft	62	1	open <1/2"-1/16"	┢	extremely weak to very weak (R0 to	9:12 Added 1/8 bag to mud vat –
_	76%	-	L.	58.1' - Fracture, 60 deg, rough, undulating,	F	R1), friable, 30-35% spheroidal voids - <1/16"	SC-1 collected at 57.0-
_			0	tight		57.0-60.5' - olive gray with yellow	58.15'
_			Ľ		Н	gray mottling, (5Y 3/2 with 5Y 7/2), moderate HCl reaction, highly	
60			2		ш	laminated in black discontinuous	R1: 13 minutes
-18.2	60.5			_	団	ribbons (<1/16" thick), voids <1/16"	
				60.55' - Mechanical break, rough, undulating,	\vdash	up to 20% of surface, 60.0-60.5' is yellowish gray (5Y 7/2) with 10-15%]
			0	tight, fragments in rock matrix to 1/4"	H	fine to medium grained organic black]
_				61.5' - Mechanical break, horizontal	Ш	 fragments horizontally aligned, laminations are horizontal then grade 	1
_			0	62.15' - Mechanical break, horizontal, rough,	Н	to wavy downward	1
_	R2-NQ			undulating, tight	口	 60.5-61.5' - light olive gray, (5Y 5/2), moderate HCl reaction, medium 	1
-	5 ft 90%	75	0	62.4, 62.9 - Mechanical break (2), horizontal, rough, undulating, tight	世	strong (R3), voids <1/16" over	-
_	3070			63.0' - Mechanical break, 3-7 deg, rough,	╁	 20-25% of surface, poorly fossiliferous (casts up to 3/8"), 10% 	-
-			1	undulating, tight	Ħ	short black discontinuous laminae	-
-			1	64.5' - Mechanical break or bedding plane,		- <1/16" thick 61.5-65.0' - dusky yellow, (5Y 6/4),	R2: 3 minutes
-23.2			NR	horizontal, rough, undulating, open 1/4"-1" —	₩	mild HCl reaction, very weak (R1),	_
-	65.5		INIX	64.8' - Fracture or mechanical break, 75-85 deg, rough, undulating, tight	匚	_ 35-40% voids up to 1/16", trace 3/16" elongated cavities, poorly	-
-			1	65.6' - Mechanical break or bedding plane,	団	fossiliferous (casts 3/16"), trace	-
-				horizontal, rough, planar, open 1/4" 66.15' - Mechanical break, horizontal to 5 deg	+	voids infilled with medium gray	-
-			0	-	F	mineralization, medium gray staining over interval	-
_	R3-NQ			67.3, 67.5' - Mechanical break (2)	世	No Recovery 65.0-65.5'	-
-	5 ft	98	0	-	₩	Limestone - 65.5-70.5' - dusky yellow, (5Y 6/4),	-
_	100%		\vdash		仠	very fine grained, mild to moderate	-
_			2	68.55' - Fracture or bedding plane, rough, undulating, tight	口	HCI reaction, very weak to medium strong (R1 to R3), voids up to 1/16"	
_			\vdash	69.4' - Fracture or mechanical break,		over 25-35% of surface, medium	D2: 9 minutos
70			1	horizontal, rough, undulating, open up to 5/8"	F	gray staining over 20% of surface, powdery feel in sections of core run	R3: 8 minutes
-28.2	70.5			69.8' - Fracture or mechanical break, horizontal, rough, undulating, tight to open	H] _
_			0	1/4", vertical stress joints from 69.8-70.35'	世	70.5-73.55' - moderate brown to grayish brown, (5Y 4/4 to 5Y 3/2),]
_			$oxedsymbol{oxed}$	_	F	moderate HCl reaction, medium]
			1		厂	strong to strong (R3 to R4), voids up to 3/16" spheroidal over 30-40% of	
_			<u> </u>	72.1' - Bedding plane, horizontal, rough,	Н	surface, trace 1/4"x3/16" elongated	11:10 Additional 0.35'
_	R4-NQ		0	undulating, carbonate fine infill up to 1/4" thick	F	cavities, poorly fossiliferous (casts up to 1/4") 1" thick extremely weak (R0)	recovered during R5-NQ – core run which belongs in
	5 ft 91%	77	'	72.8, 72.95, 73.1' - Mechanical break (3)	片	rock layer at 72.1'	the R4-NQ data.
_				73.55' - Bedding plane, 20-30 deg, rough,	\vdash	-	Driller's Remark: Able to – identify redrill marks on
_			1	undulating, contact with extremely weak rock (R0) below and medium strong to strong (R3	oxdot		core pieces
75			2	to R4) rock above	口	 	R4: 10 minutes
-33.2	75.5		NR		\vdash	_	-
_	10.0				f		
					1		1



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-02	SHEET	5	OF	8	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724128.3 N, 457619.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

				MENT . CIVIE 350 3/N 186073, Mud Totally, NQ tools, NVV	000		ORIENTATION : Vertical
WATER	LEVELS: 4.0	ft bgs	s on 4	/18/07 START : 4/18/2007 END : 4/	19/20	D7 LOGGER : T. Stewart	
				DISCONTINUITIES	Ι	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)			DECODIDATION	SYMBOLIC LOG		
I A Z	ŽAŽ ŽAŽ		ES	DESCRIPTION	ا ا	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
표일은	R. Æ,Ä	(%) _Q	158	DEDTH TYPE OBJENTATION BOLICHNESS	7 5	MINERALOGY, TEXTURE,	FLUID LOSS, CORING RATE AND
₽₽¥	# <u>P</u>	Ω	Ω×	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	₽ĕ	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
		a Q	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Įξ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ВОВ	014	ш	шш		0)		
				74.65' - Bedding plane or mechanical break,	\vdash	Limestone	
-			3	horizontal, rough, undulating, tight to open	1	- 73.55-75.05' - pale greenish yellow to	1 1
-				1/8"	+-	yellowish gray, (10Y 8/2 to 5Y 7/2),	-
			_	74.75' - Bedding plane or mechanical break,		very fine grained, strong HCI	
-			3	horizontal, smooth, planar, tight	1_	- reaction, very weak (R1), voids /16"	1
-	DE NO.			75.6' - Fracture, 40 deg, smooth, planar, tight, through very weak rock (R1)	╀	over 10-15% of surface, poorly fossiliferous (casts up to 3/8"x1/8",	1 -
	R5-NQ	00	0	75.75' - Fracture, 30 deg, smooth, planar,	Н	powdery feel, trace black staining in	
	5 ft 98%	80	U	tight, through very weak rock (R1)	Τ'	casts)	1
-	90 /0			75.8' - Fracture, 20 deg, smooth, planar,		No Recovery 75.05-75.5'	1 -
			0	tight, through very weak rock (R1)		- Limestone	
			0	76.5' - Fracture or bedding plane, horizontal,	Н	75.5-76.5' - yellowish gray, (5Y 7/2),	
-				rough, undulating, open 5/8"	╁	very fine to medium grained, strong	R5: 11 minutes
80			0	76.8' - Fracture, 20-30 deg, rough, planar, —	+	— HCl reaction, extremely weak to very	T.C. IT Hilliance
-38.2	80.5		Ĭ	open 1/8"		weak (R0 to R1), 35-40% of this	1
-			NR.	77.05' - Fracture or mechanical break,	1—	interval is medium gray (N5),	1
-			1	horizontal-5 deg, rough, undulating, tight	₩	_ medium grained, granular	
				77.95' - Mechanical break, horizontal, rough,	\vdash	appearance	
-				undulating, tight	╁┷	76.5-78.75' - light olive gray to	1 1
-			1	80.9' - Bedding plane or mechanical break,	┸	moderate brown, (5Y 5/2 to 5Y 4/4),	1 -
				horizontal, rough, undulating, tight		medium strong (R3), voids to 1/16"	
-	R6-NQ			81.95' - Fracture, 30 deg, rough, undulating,	╨	over 40% of surface, dark gray (N3)	1 7
-	5 ft	82	0	open 1/8"-5/8"	+	infill, trace casts up to 3/8", trace of	Daille de De see du 5 400/
	88%				\vdash	1/2" organic fragments	Driller's Remark: 5-10% circulation loss during run
						78.75-80.4' - yellowish gray, (5Y 7/2),	circulation loss during run
-			0			very fine grained, strong HCI	1
I _					ш	reaction, medium strong to strong (R3 to R4), trace 1"-1-1/2" cavities	
85			1	84.61' - Fracture or mechanical break,	Н	infilled with secondary mineralization	R6: 3 minutes
-43.2			NR	horizontal, rough, undulating, open 1/8"-1/2"	+ -	No Recovery 80.4-80.5'	1 -
_	85.5		1411		\blacksquare	Limestone	1 4
					—	80.5-84.9' - dusky yellow to moderate	
-			0		╨	olive brown, (5Y 6/4 to 5Y 4/4),	1 7
-					╂┲	 moderate to strong HCl reaction, 	1 -
			0			medium strong (R3), voids up to	
			U		ш	1/16" over 20-25% of surface,	1
-	D7 NO				╁	 moderately fossiliferous (casts up to 	1 -
I _	R7-NQ 5 ft	100	0	87.6, 88.0, 89.7' - Mechanical break (3),	╨	_ 5/8"), trace medium grain black]
	100%	100	0	horizontal, rough, undulating, tight	Н	organic fragments throughout,	
-	.0070				+	 laminations of 3/16" thick over upper 	1
-			0		oxdot	most 0.2'	1
					\vdash	No Recovery 84.9-85.5'	1
					╨	- Limestone	R7: 7 minutes
90			0	-	+	85.5-90.5' - light olive brown mottled	-
-48.2	90.5					olive gray, (5Y 5/6 mottled 5Y 3/2), fine to medium grained, strong HCl	1
1 7					ш	reaction, very weak to weak (R1 to	1
-			0		+-	R2), highly fossiliferous (casts,	-
					\vdash	molds, microforams), yellowish gray	
]						(5Y 8/1) material as replacement infill	1
-			2	91.9-92.0' - Fracture, horizontal,		of echinoderms, 5-10% olive gray	1
_				slickensided, undulating, clay infill, dry, soft	ш	(5Y 4/1) wavy laminations throughout]
	R8-NQ			clay 0.1' thick	\vdash	interval, up to 20% bioturbated zones]
-	5 ft	98	0	92.4, 93.0' - Mechanical break (2), horizontal,	╁	filled with both yellowish gray (5Y	SC-2 collected at 93.0-
-	100%			rough, undulating, tight	╀	_ 8/1) infill around edges and medium	94.1'
						dark gray (N4) infill inside/center,	[*]
-			1	94.0' - Fracture, 40-50 deg, rough,	灴	very light gray (N7) carbonate silt	1
-				undulating, tight to open 1/8" (fossil mold	╀	mottling (hard) over the last 1.0' of	1 40 - 4
95				1-1/4" x 1/2" on fracture surface), fossils are	\vdash	run, 5-10% organics (black medium	R8: 10 minutes
-53.2	05.5		0	whole spiral shaped casts	\mathbb{T}	grain sized fragments) as short	
	95.5		-	· · ·	F	laminations	
					1		1



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-02	SHEET	6	OF	8	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724128.3 N, 457619.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

WATER	LEVELS : 4.0) ft bgs	s on 4/	18/07 START: 4/18/2007 END: 4/	19/200	7 LOGGER : T. Stewart	
< ∩ ⊋	. (%			DISCONTINUITIES	၂ ပွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - -	R9-NQ 5 ft	93	0 0 1	96.2' - Mechanical break, horizontal-5 deg, rough, undulating, tight 97.7' - Fracture, horizontal, rough, undulating,		Limestone 90.5-95.5' - white to yellowish gray, (N9 to 5Y 8/1), very fine grained, strong HCl reaction, weak (R2), voids up to 15% increasing percentage with depth, moderate to highly fossiliferous (microforams, casts up to 3/16", mostly a few larger	- - - -
- 100 -58.2	96%		0 0 NR	tight to open 1/4", breakage in area with 3/4" size fossil casts and 3/8" spiral shaped casts 98.0, 99.0, 99.2' - Mechanical break (3)		fossil casts), organic soil bed 1" thick at 91.95", trace cavities up to 3/8" - rimmed with white, hard mineral (maybe replacement of echinoderms) 95.5-100.3' - Same as 95.5-100.3' — except yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), strong HCI	R9: 4 minutes
-			1 0	100.7' - Fracture or mechanical break, horizontal, rough, undulating, open 1/16"		reaction, very weak (R1), very fossiliferous (microforams, casts and molds), voids or spaces between microforam casts and molds, trace cavities up to 5/8"x1/8" (possible echinoderms with white secondary mineralization as replacement), trace	- - -
- - -	R10-NQ 5 ft 100%	97	0	103.0' - Mechanical break		voids 1/8"x1/8", trace medium dark gray (N4), fine grained fragments in matrix, trace black short 3/8" discontiuous organic laminations, "powdery" chalk-like feel over entire	
105 -63.2	105.5		0		Ħ	No Recovery 100.3-100.5' Limestone - 100.5-105.5' - Same as 105.5-110.5'	R10: 5 minutes —
- - -			2	106.3-109.0' - Fracture, vertical, large >2" sized fossil molds and casts along surface 106.65' - Fracture or mechanical break, horizontal, rough, undulating, tight		except 10% echinoderm molds up to 5/8"x1/8" with white calcite replacement, olive gray mottling (5Y 3/2) as wavy horizontal beds, from 103.0-104.0' trace organic black fragments as medium grained	
-	R11-NQ 5 ft 100%	83	1	106.95' - Fracture or mechanical break, horizontal, rough, undulating, tight 107.65' - Fracture, vertical, rough, undulating, ->2" size fossil casts or molds along surface		fragments throughout run, spheroidal to subrounded voids <1/16" over 20-25% of surface, 130.5-131.2 is without olive mottling	
110			0	108.5' - Fracture or mechanical break, horizontal, rough, undulating, tight 108.7' - Fracture or mechanical break, horizontal, rough, undulating, tight	Ħ	105.5-110.5' - yellowish gray, (5Y - 7/2), strong HCl reaction, very weak (R1), voids up to 1/16" over 35-40%	R11: 7 minutes
-68.2 - -	110.5		1	ionzontai, rougii, unuulaung, ugiit		of surface, from 105.5-107.5' grading to 15%, from 107.5-110.5' chalk-like feel, very fossiliferous (casts from 1/8" to greater than 2"), spiral shaped	
-			0	111.45' - Fracture or mechanical break, horizontal, rough, undulating, tight	Ħ	casts and shell patterns 110.5-115.45' - no visible coral shaped casts, casts of echinoderms/ ostracods 1/4"x1/16" with white	
-	R12-NQ 5 ft 99%	99	0	113.0' - Mechanical break		calcite mineral replacement	
11 <u>5</u> -73.2	115.5		0	114.3' - Fracture, 20 deg, rough, undulating, open 1/8"-1/4"		—	R12: 5 minutes
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PROJECT NUMBER:

33884.FL

B-02

SHEET 7 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724128.3 N, 457619.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

CORING	INLINODA	ND L	ZUILIA	MENT: CME 550 S/N 186073, mud rotary, NQ tools, NW	Casing	<u> </u>	ORIENTATION : Vertical
WATER	LEVELS: 4.0	ft bg	s on 4	/18/07 START : 4/18/2007 END : 4/	19/20	D7 LOGGER : T. Stewart	
	_			DISCONTINUITIES	(1)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		Ś	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표 등 등	Z Y Z	(%	FRACTURES PER FOOT		일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H H H	GTF GOV	Q D (%)	155	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BB	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
E SEP	SEN SEN SEN SEN SEN SEN SEN SEN SEN SEN	a Q	-RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	014			<u> </u>	+ "	No Recovery 115.45-115.5'	SC-3 collected at 114.5-
_			1	115.7' - Bedding plane or mechanical break,		- Limestone	115.5'
				horizontal, rough, undulating, open 1/8",	Щ	115.5-120.5' - yellowish gray, (5Y]
				surfaces of fracture have molds or voids filled with secondary mineralization	Н	7/2), strong HCl reaction, very weak	
-			0	116.9' - Mechanical break, 50-60 deg, rough,		 (R1), very fossiliferous, microforams, casts of echinoderms/ ostracods with 	1 1
-	R13-NQ			undulating, tight	╂┴┤	yellowish gray (5Y 7/2) replacement	1 -
-	5 ft	97	0		-	 mineralization, olive gray (5Y 3/2) 	1 -
_	100%				┦	thin beds and laminations at 116.0',	1 -
			1			medium light gray staining from 118.0-119.0', rock sample contains	
			'		\vdash	25-35% medium grain, medium dark	
120						gray (N4) fragments in rock matrix,	R13: 8 minutes
-78.2			0	_	╂┼┤	— overall the sample has a "gritty" feel	-
-	120.5				\perp	_ 120.5-125.4' - yellowish gray, (5Y] -
-			1		Щ	- 7/2), strong HCl reaction, weak (R2),] -
_				121.35, 121.5, 121.75, 122.05' - Fracture or	Ш	voids <1/16" over 30-40% of surface,]
				mechanical break (4), horizontal, rough,	H	olive gray (5Y 3/2) staining over 20%	1
-			3	undulating, open 1/16"-1/8"	1	 of rock (122.0-122.7' and 124.0-124.45'), extremely weak (R0) 	1 1
-	R14-NQ				┨	rock at 124.35', very fine grained	1 1
-	5 ft	80	2	122.7' - Mechanical break, horizontal, rough,	╂┯┤	 limestone bed from 121.35-121.75', 	1 -
-	98%			undulating, tight 123.0' - Mechanical break	二	medium strong, highly fossiliferous	1 -
_			2	123.35, 124.45' - Bedding plane (2),	Щ	(microforams, casts), trace molds with white mineral replacement]
			_	horizontal, rough, undulating, open 1/16"		Will Write Himeral replacement	1
125				123.5' - Bedding plane or mechanical break, rough, undulating, open up to 1/2"	1—1		R14: 7 minutes
-83.2	405.5		0	123.75' - Mechanical break, horizontal,	世		I
-	125.5			rough, undulating, tight	₩	No Recovery 125.4-125.5'	1 -
-			0			Limestone	1 -
I _					┵	125.5-130.5' - yellowish gray and olive gray, (5Y 7/2 and 5Y 5/2), wavy	_
					Н	bedded, strong HCl reaction, very	1
			0		Ш	weak (R1), voids <1/16" over 5-10%	1 1
-	R15-NQ			127.5, 127.65, 128.0' - Mechanical break (3),	╂┼┤	of surface, trace molds with white	1 1
-	5 ft	97	0	horizontal, rough, undulating	-	calcite mineral replacement at sizes of 5/8"x1/8" and 3/16"x1/16", medium	1 -1
-	100%		_		╂╫	dark gray (N4), medium grain] -
-			1	400 0 400 51 50 115 1 1 (0) 1 1 1 1	\Box	particles over 30-40% of rock matrix]]
			Ŀ	129.0, 129.5' - Bedding plane (2), horizontal, rough, planar, tight	\mathbb{H}]
130				129.75' - Fracture or mechanical break,			R15: 8 minutes
-88.2	130.5		2	horizontal, rough, undulating, open 1/4"	\mathbb{H}		
-	100.0			, 5 , 3,	世	_ 130.5-135.3' - Same as 125.5-130.5']
-			0		+	 except no molds with replacement] -
-					┲	mineralization, casts up to 5/8"	-
_			1		Щ	(spiral shapes without infilling), more thinly bedded than 125.5-130.5']
				132.15' - Fracture, 20 deg, rough, planar,		aminy bouded than 120.0-100.0]
]	R16-NQ			tight	\Box] 1
-	5 ft	78	3	132.75' - Bedding plane or mechanical break,	╁┼┤	_]
-	96%		<u> </u>	horizontal, rough, undulating, tight 132.95, 133.1' - Bedding plane or mechanical	田	_]
-			4	break (2), horizontal, smooth, planar, tight	+	_	-
_				133.7' - Bedding plane or mechanical break,	\Box	_	SC-4 collected at 134.35-
135			0	horizontal, rough, undulating, open 1/2" 133.95, 134.0' - Bedding plane or fracture, —	H		135.3'
-93.2	135.5		بّ	horizontal, smooth, undulating, tight	Ш		R16: 10 minutes
	. 50.0			, , , , , , , , , , , , , , , , , , , ,	\top		



WATER LEVELS: 4.0 ft bgs on 4/18/07

PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-02	SHEET	8	OF	8	

ROCK CORE LOG

LOGGER: T. Stewart

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724128.3 N, 457619.4 E (NAD83)

START: 4/18/2007

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

END: 4/19/2007

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

WALLE	LLVLLS . 4.0	I bg.	3 011 4		10/20		201111::
30₽	<u> </u>			DISCONTINUITIES	- POG	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LC	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- 00 ш	034	ш.	NR/	134.35' - Bedding plane, horizontal, smooth,	0)		
-			0	planar, tight	Ħ	No Recovery 135.3-135.5' Limestone 135.5-136.8' - Same as 125.5-130.5'	_
-			1	136.65' - Bedding plane, horizontal, rough, undulating, tight	H	136.8' - intact discontinuity 136.8-138.6' - yellowish gray, (5Y	_
-	R17-NG 5 ft 100%	100	0		E	7/2), medium to coarse grained, - strong HCl reaction, very weak (R1), chalk-like feel, medium dark gray	-
-			1	138.55' - Bedding plane or mechanical break, rough, undulating, open 5/8", exposed filled cavities on surfaces		(N4) particles over 25-30% of matrix, 5-7% medium dark gray (N4) subrounded cavities up to 5/8"	-
140 -98.2	440.5		0	- Cavilles on surfaces	H	138.6-142.8' - variegated yellowish gray to grayish yellow, (5Y 7/2 to 5Y 8/4), very fine grained, strong HCl	R17: 9 minutes
-	140.5		2	140.35' - Mechanical break, horizontal, rough, undulating, tight 140.85' - Bedding plane or mechanical break,	Ē	reaction, weak to medium strong (R2 to R3), voids increasing with depth (1/16") ranging from 1-2% to	-
-			2	horizontal, rough, undulating, tight 141.55' - Fracture or mechanical break, horizontal, rough, undulating, open up to 3/4"	H	15-20%, fossil molds/casts common with cavities 1-3/16"- 1-9/16" x 3/4"-	-
-	R18-NC 5 ft	 82	1	141.7' - Bedding plane, horizontal, rough, undulating, <1/32" brownish black organic material infill over 100% surface, tight	Ħ	1-3/16" penetrating deep into core, few cavities filled with very weak (R0) limestone with voids more than	-
-	98%		2	142.8' - Bedding plane, horizontal, rough, undulating, tight, horizontal mottling surface		40-50% decreasing with depth 142.8-145.4' - variegated yellowish gray to dusky yellow to light olive	-
145 <u>-</u> -103.2			0	144.2' - Fracture, 30 deg, rough, undulating 144.4' - Fracture or mechanical break, horizontal, rough, undulating, open 1/2"	H	gray, (5Y 7/2 to 5Y 6/4 to 5Y 5/2), strong HCl reaction, medium strong (R3), voids over less than 1-2% of	Driller's Remark: 144.0- 144.5' 50-75% loss of circulation in a void (space approximately 80%)
-103.2	145.5		1	145.7' - Bedding plane or mechanical break,		surface becoming more common with depth, thin black organic laminae from subhorizontal to	R18: 9 minutes - SC-5 collected at 144.4-
-			0	horizontal, rough, undulating, open 1/2"	Ħ	vertical throughout interval, thin subvertical to vertical fractures (tight), unbroken, permeate nearly	-
-	R19-NG 5 ft	 92	0	147.7, 147.9' - Mechanical break (2),	Ħ	full length of interval, trace fossil casts/molds predominantly in last 0.3' of interval	_
-	100%		2	horizontal, rough, undulating, tight 148.55, 148.6' - Bedding plane (2), horizontal, rough, undulating, crumbled rock	E	No Recovery 145.4-145.5' Limestone 145.5-148.7' - yellowish gray mottled	_
- 150_			0	fragment between surfaces		with light gray, (5Y 7/2 mottled with N7), fine to medium grained, strong HCI reaction, very weak (R1), sharp	R19: 5 minutes
-108 <u>.2</u> _	150.5				H	contact at 146.4' with rocks above containing abundant lithoclasts up to 1/2" (well rounded to rounded	Total depth is 150.5' on
-					1	nodules), possibly bioclastic, lithoclasts less apparent below contact, appears to be very thinly	4/19/07 -
-					1	laminated, voids and trace cavities >3/8"x1/16" over 1-3% of surface 148.7-150.5' - yellowish gray, (5Y]
-					1	7/2), very fine grained, mild HCl reaction, medium strong to weak (R3 to R2), very faintly mottled, voids up	
-					1	to 1/16" over 3-5% of surface, cavities rare (<1/16"x3/16") Bottom of Boring at 150.5 ft bgs on	
				_	1	4/19/2007	
					1		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-03	SHEET	1	OF	8	

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724210.1 N, 457702.3 E (NAD83)

ELEVATION: 43.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 4-3/4" tri-cone bit

WATER	LEVELS	: 3.0 ft bo	gs on 3/26	6/07 S	START : 3/26/2007 END : 3/26/2007 LOGGER : T. Stewart
				STANDARD	SOIL DESCRIPTION COMMENTS
AND (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	
ACE ATIO		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
43.9	0.0			(14)	Poorly Graded Sand With Organics (SP) 24" split spoon, 5' AWJ rod
-		0.5	SS-1	1-1-1	0.0-0.5' - medium gray to dusky brown, (N5 to 5YR / 2/2), moist, very loose, very fine to fine silica sand,
-	1.5			(2)	organics are fines and roots
-	1.0				Driller switch to N-rod, 4.75" tricone roller
-					drill bit add 12.5lb quick gel bentonite
-					1
_					Water level reached at ~3.0' below ground
_					- surface based upon SS-1 and SS-2 on - 3/26/07 at 12:00
] [
5_	5.0				
38.9				670	Poorly Graded Sand With Silt (SP-SM) 5.0-5.9' - very pale orange to grayish orange, (10YR -
_		0.9	SS-2	6-7-9 (16)	_ 8/2 to 10YR 7/4), wet, medium dense, very fine to fine
_	6.5				rounded silica sand, 5% nonplastic fines as black particles and pale yellowish orange (10YR 8/6)
-					particles, trace fine gravel-sized concretions with moderate yellowish brown (10YR 5/4) centers and
-					grayish brown (5YR 3/2) rims, trace roots up to 3" -
-					
-					
-					
-					
10 33.9	10.0				Poorly Graded Sand (SP)
-		0.8	SS-3	5-6-7	10.0-10.8' - very light gray to light gray. (N8 to N7).
-	44.5	0.0	33-3	(13)	wet, medium dense, no HCl reaction, very fine to fine rounded silica sand, trace nonplastic fines that are
-	11.5				\predominantly black particles -
-					- 1
-					- 1
-					Driller's Remark: Hitting hard rock at 13'
-					drilling slow
-					 1
15	15.0				 1
28.9					Fat Clay With Sand (CH) 15.0-15.4' - medium light gray, (N6), wet, stiff,
		1.1	SS-4	6-4-5 (9)	medium to high plasticity, no to low dilatancy, mottled
_	16.5			1.57	with greenish gray (5G 6/1) and light olive brown (5Y 6/6), 20-25% very fine to fine rounded silica sand,
_					trace very fine sand-sized black particles
l _					Fat Clay (CH) 15.4-16.1' - bluish white, (5B 9/1), moist, stiff, medium
-					to high plasticity, no to low dilatancy, no HCl reaction, _
-					mottled with grayish blue (5PB 5/2) streaks, 10% fine to medium sand-sized white particles
-					
-					
20					



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-03	SHEET	2	OF	8

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724210.1 N, 457702.3 E (NAD83)

ELEVATION: 43.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 4-3/4" tri-cone bit

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 1860/3, mud rotary, cathead, AWJ rods, 4-3/4" tri-cone bit ORIENTATION: Vertical									
WATER	LEVELS	: 3.0 ft bo	gs on 3/26	5/07	START: 3/26/2007	END: 3/26/2007	LOGGEF	? : T.	ı
>				STANDARD		SOIL DESCRIPTION		ဖွ	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)			PENETRATION TEST RESULTS	COLL NAME TIGOGO OBOLID SYMBOL COLLOD			SYMBOLIC LOG	DEDTH OF 0 4000
HSE		RECOVERY (ft)		1	SOIL NAME, USCS GROUP SYMBOL, COLOR MOISTURE CONTENT, RELATIVE DENSITY O			O L K	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTF/			#TYPE	6"-6"-6"	CONSISTENCY	, SOIL STRUCTURE, MINE	ERALOGY	/WB	INSTRUMENTATION
E S D				(N)		2 1/01)		Ś	
23.9	20.0			6-5-5	Lean Clay With S 20.0-21.2' - light of	sand (CL) gray, (N7), wet, stiff, 30%	very fine to		_
_		1.2	SS-5	(10)	fine grained, low	plasticity, slow to no dilata	ancy, no		_
l _	21.5			, ,	HCI reaction, pale	e green (10GB 8/2) mottli trace of black particles, 5	ng, mottled	Y///	_
						sand, trace fine gravel-siz			
							-	1	_
-							-		_
								1	_
_							-	1	-
25	25.0						-	1	-
25 <u> </u>	20.0				Silty Sand (SM)			m	
-		1.3	SS-6	2-1-2	25.0-26.25' - yello	owish gray, (5Y 7/2), wet, no HCl reaction, very fine	very loose,	1	-
-		1.0		(3)		nd, 20-30% nonplastic fin		Ш	-
-	26.5					zed black particles		ł	-
-							-	ł	-
-							-	ł	-
_							-	ł	-
-							-		-
_							-		_
_							-		_
30	30.0							777	
13.9 - - - -				0.00	Clayey Sand (SC	;) olive gray mottled with gre	enish arav -		_
		1.2	SS-7	2-2-3 (5)	and purple streak	s, (5Y 6/1 with 5GY 6/1),	wet, loose,		_
	31.5			. ,		very fine to fine rounded s stic fines, trace very fine s		////	_
					black particles	suc inies, trace very line s	sailu-sizeu		
							-		_
1 7							-		
							-	1	_
-							-	1	-
35	35.0						-	1	-
8.9	00.0				Silt (ML)			1 111	
-		1.0	SS-8	14-28-7	35.0-36.0' - light o	olive gray with olive black (5Y 5/2 with 5Y 2/1 and 1	and dark -	1	-
-	26.5			(35)	wet, hard, low pla	asticity, rapid dilatancy, 5-	10% fine	╫	-
-	36.5					particles, mild HCl reaction		1	-
-						nate material, organic sea and brown mottling, stror		1	-
-					odor		-	1	-
-							-		-
-							-	-	-
-							-	-	-
-							-		-
40								\vdash	
								<u> </u>	



PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	B-03	SHEET	3	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724210.1 N, 457702.3 E (NAD83)

ELEVATION: 43.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 4-3/4" tri-cone bit

ORIENTATION : Vertical

DHILLIN	GIVILITI	JD AND	EQUIFIVI	EINT : CIVIE 550 S	in 186073, mud rolary	v, cathead, AWJ rods, 4-3/4"	tri-cone bit		ORIENTATION : Vertical
WATER	LEVELS	: 3.0 ft bo	gs on 3/26	5/07	START: 3/26/2007	END: 3/26/2007	LOGGEF	: T.	Stewart
				STANDARD		SOIL DESCRIPTION		(n	COMMENTS
SP(£)	SAMPLE	INTERVA	L (ft)	PENETRATION				Ĭĕ	
E A O		DECOVE	-DV (#)	TEST RESULTS		USCS GROUP SYMBOL, C		익	DEPTH OF CASING, DRILLING RATE,
ATE		RECOVE	ΗΥ (Π)			CONTENT, RELATIVE DENS		<u>B</u>	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	CONSISTENCY	/, SOIL STRUCTURE, MINE	:RALOGY	SYMBOLIC LOG	INSTRUMENTATION
3.9	40.0			(N)	C:IA /MIL \			0)	
3.9	40.0			20 41 46	Silt (ML) 40.0-41.3' - light (olive gray, (5Y 5/2), wet, v	erv dense	!	_
		1.3	SS-9	30-41-46 (87)	fine to medium gr	rained, mild to moderate H	HCI		
1 7	41.5			(01)		nplastic fines, trace fine g		Ш	1
-	41.5					any sand-sized particles ca	an be /-	l	1
-					\broken into silt si	zed by nand	/ -	1	-
-							-		-
_							_		_
							-	1	1
-							-	1	1
-							-	l	-
45 -1.1	45.0				Cillar C1 (O.5.1)			191111	_
-1.1				29-40-46	Silty Sand (SM) 45.0-46.4' - light (olive gray, (5Y 5/2), wet, v	erv dense -		_
		1.4	SS-10	29-40-46 (86)	fine to medium gr	rained, mild to moderate H	HCI		
1 7	46.5			(00)		0% coarse sand-sized, 35	-40%]
-	10.0				nonplastic fines,	all carbonate			1
_							-	ł	-
-							-		-
_							-		_
							_	1	1
-							-	1	1
							-	1	-
50 -6.1	50.0			50/6	Candy Cilt With	Limestone Fragments (M		Ь	Start of sampling on 3/27/07
-0.1	50.5	0.5	SS-11	(50/6")		wish gray, (5Y 7/2), wet, h		Ш	Driller's Remark: Soft drilling
				(33.5)	nonplastic, rapid	dilatancy, mild to moderat	e HCI		
						e to coarse sand-sized, 1/			
-					carbonate	at top and bottom of sam	pie, aii -	1	1
-					carbonate			l	1
-							-	•	-
-							-		-
I _							_		
1 7							-		1
	EE ^						-	1	1
55 <u> </u>	55.0 55.4	0.3	SS-12	50/4.5	Silt With Sand (N	ML)		Ш	Light to moderate bit chatter over 1st foot
-	33.4	0.5	30-12	(50/4.5")	55.0-55.3' - yellov	wish gray, (5Y 7/2), wet, h	ard, \int -	l	(drilling from 51.5-55.0')
_					\ nonplastic, rapid	dilatancy, mild to moderat	e HCI		_
					reaction, 20% tine	e to medium sand-sized, a	ali / _		
					Carbonale]
							-	1	Driller's Remark: Hard at 57', soft at 57.5',
-	00.0						-	1	hard again at 58.3'
-	60.0	0.2	SS-13	50/2.5	Limestone Fragr	ments			-
_	60.2	\	20-13	(50/2.5")	\ 60.0-60.2' - light o	olive gray to olive gray, (5)	Y 5/2 to 5Y /-		_
_				(/	\ 3/2), moderate to	strong HCI reaction, foss	iliferous]
					(molds), trace me	edium grain sized black fra	agments,]
60					very tine (1/32") s	spheroidal particles are the	e matrix -	1	1
30					Begin Rock Corir	ng at 60.0 ft bas			-
					See the next she	et for the rock core log			
					1			_	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-03	SHEET	4	OF	8	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724210.1 N, 457702.3 E (NAD83)

ELEVATION: 43.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

			<u> </u>	TENT . CIVIE 350 3/N 160073, Mud Totally, NQ tools, HV	000	9	ORIENTATION : Vertical
WATER	LEVELS: 3.0	ft bgs	s on 3	/26/07 START: 3/26/2007 END: 3	/26/20	07 LOGGER : T. Stewart	
				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE OOLOD	
UN N N	₹ <u>₹</u> ₩	<u></u>	FRACTURES PER FOOT	BEOGRAF HON	<u></u>	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
ASE		(%) Q		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	١ď	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
F 두 것	8885	g	AC R	PLANARITY, INFILLING MATERIAL AND	Σ	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
교외교		Ř	E H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Š	CHARACTERISTICS	BROFG, TEOT REGGETO, ETG.
-16.1	60.0 R1-NQ					Limestone	R1: 1 minute
I -	1 ft	85	0		+-	- 60.16-61.0' - dusky yellow, (5Y 6/4),	-
l _	61.0 85%			60.65' - Mechanical break	\bot	fine grained, mild to moderate HCl	
					Н	reaction, very weak to weak (R1 to	Start at drilling 3/28/07,
-			2			R2), voids up to 1/16" on 15-20% of	water level at surface -
l -					\bot	surface, no fossils	(mud) at 7:55 =3/28/07
			ا م		\vdash	61.0-65.9' - dusky yellow, (5Y 6/4), mild to moderate HCl reaction, weak	
-			2		1	to medium strong (R2 to R3), voids	
-	R2-NQ			62 OFL 62 41 Machanical break	$-\Box$	up to 3/16"x3/16" (some infilled with	-
l _	5 ft	65	0	63.05', 63.4' - Mechanical break	-	very fine to medium grain	_
	98%	00	ਁ		\vdash	mineralization) voids up to 25% of	
_						surface, extremely weak carbonate	1
-			3		-	 silt interval from 64.3-64.6' mottled 	-
65				_	╨	gray from 63.5-64.5', very poorly	
-21.1					\vdash	fossiliferous (trace molds)	R2: 12 minutes
1 -			1			†	-
I -	66.0		NR.		\perp	No Recovery 65.9-66.0'	-
			0		\vdash	Limestone	
-			0		1—	66.0-71.0' - Same as 61.0-65.9'	1
-						except very weak rock (peels with	-
l _			0		_	knife over first foot) grades to	_
					\vdash	medium strong over last 3.0' of run,	
_	R3-NQ				1	extremely weak rock (compressed by	1
l -	5 ft	78	2	69 E' 69 6' Fractures EO 60 deg rough	-	_ thumb) from 68.95' to 69.15', 10%	-
l _	100%			68.5', 68.6' - Fractures, 50-60 deg, rough, undulating, tight, black particles on surface	╨	unfilled spheroidal cavities up to	
				68.95' - Bedding plane, <10 deg, top of	\vdash	1/2"x1/2", stratified with black laminations from 69.4-70.8', 5-10%	
			3	extremely weak rock	+-	medium grain black particles, some	
70 <u> </u>				69.15' - Bedding plane, 40 deg, base of	$-\Box$	voids (<1/16") in lower half infilled	D2: 40 minutes
-20.1			1	extremely weak rock	\vdash	with gray mineral moderately	R3: 13 minutes Driller's Remark:
I -	71.0		'	69.5' - Bedding plane or mechanical break,	1	fossiliferous (casts, molds), up to	Maintaining circulation
-	7 1.0			horizontal, rough, undulating, tight		- 3/8" fragment molds	Waintaining Circulation
I -			>10	70.0' - Fracture, 60-70 deg, rough,	\perp	71.0-71.5' - yellowish gray, (5Y 7/2),	-
				undulating, medium black particles 71.15'-71.7' - Fracture zone, fractured rock	\vdash	moderate to strong HCl reaction,	
-				core black stains on fractures	1	 voids (mostly <1/16") up to 45% surface, gray staining, moderately 	1
-			2	72.15' - Bedding plane, 0-5 deg, rough,		fossiliferous (mold, casts),	-
I -				undulating, open 5/8"	\bot	- 71.0-72.75' and 74.7-75.7' very weak	_
	R4-NQ		_	72.75' - Bedding plane or mechanical break,	\vdash	rock (R1) peels with knife,	
I -	5 ft 94%	72	2	horizontal, rough, planar		72.75-74.7' medium strong rock (R3)	1
-	9470		\vdash	73.35'-74.35' - Fracture, rough, planar, no	$+\Box$	 cannot be scraped with knife 	-
I -			1	stains, curved fracture	_	72.5-75.7' - Same as 71.0-71.5'	
75				73.95' - Fracture, 40 deg, rough, planar, tight, (bisecting curved fracture)	_	except moderate to strong HCI	
-31.1				74.7' - Bedding plane or mechanical break,	仜	reaction	R4: 23 minutes
-			0	horizontal, rough, undulating, open up to 1/2"	+-	 	-
	76.0		NR	discontinuity between rock	╨	No Recovery 75.7-76.0'	
				.,		·	1
-			2			ŀ	-
I -				76.7' - Fracture, 80-90 deg, rough,	╨	-	-
				undulating, tight	\vdash		
1 -			1	76.95' - Fracture, horizontal, rough,		Γ	1
-	ם אס		\vdash	undulating, open up to 1" 77.25' - Fracture or mechanical break,	ፗ	ŀ	-
I -	R5-NQ 5 ft	90	1	horizontal, rough, undulating, open 1/4"	_	L	
	98%	50		78.35' - Bedding plane or mechanical break,	\vdash		
-				horizontal, rough, undulating, open 1/2"	口	<u> </u>	1
I -			1	79.3' - Bedding plane or mechanical break,	+	ŀ	-
80				horizontal, rough, undulating, open 1/2"	\perp		
			_		_		



PROJECT NUMBER:

338884.FL

B-03

SHEET 5 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724210.1 N, 457702.3 E (NAD83)

ELEVATION: 43.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

-				IENT . CIVIE 550 5/N 180075, HIND TOTALLY, INQ TOOLS, HVV			ORIENTATION : Vertical
WATER	LEVELS: 3.0	ft bg	s on 3		26/20		
> ^ ~	(9)			DISCONTINUITIES	O	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	OLZE AND DEDENIES CONTROL
岩병흔	₹,4 1,7 1,4	(%) _Q	N N		1 9	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
F X X	SOV	0	SCT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	₽ B	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
		a Q	FR/	THICKNESS, SURFACE STAINING, AND TIGHTNESS	l \	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-36.1					H	Limestone	R5: 7 minutes
_			2	-		- 76.0-80.9' - dusky yellow to moderate	-
l .	81.0		ND	80.5' - Fracture, 30-40 deg, rough, undulating, tight	\vdash	olive brown, (5Y 6/4 to 5Y 4/4),	
			NR)	80.6' - Fracture, 10-15 deg, rough,	Н	moderate to strong HCl reaction,	
-			2	undulating, tight		 spherical voids up to 1/16"x1/16" covering up to 30% of core surface, 	1
-				81.0'-81.2' - Fracture zone	╫	5-10% irregularly shaped cavities up	-
-			0	-		 to 1-1/4", no infill, predominantly 	-
l _				_	┢	weak rock (R2), gray mottling of	_
	R6-NQ	00				stains at 80.5', zone of brown	
-	5 ft 96%	90	0		Ш	 lamination (very weak rock R1 at 78.35'), moderate olive brown 	1
-	0070			-	\vdash	interval from 76.0-76.6'	SC-1 collected at 84.2-
1 -			0	-	广	- No Recovery 80.9-81.0'	85.15' –
85					₽	Limestone 81.0-85.8' - dusky yellow, (5Y 6/4),	Driller's Remark: 100%
-41.1			0	85.15' - Mechanical break	厂	mottled, mottled, irregular shaped	loss of circulation at 84.5' R6: 8 minutes -
	86.0		ND		Н	cavities infilled with medium gray	No. 6 minutes
-	00.0		NR.	86.1' - Bedding plane or mechanical break,		(N5) mineral and extremely weak	1
-			2	horizontal, rough, undulating, open 1/4"	ш	rock (R0) yellowish gray in color, voids up to 3/16"x3/16", spheroidal	-
-				86.3' - Mechanical break or bedding plane,	╁╌	cavities covering 15% of the surface	-
l _			0	horizontal, rough, undulating, open 1/8"-1/4"		of first 2.5' of run, infilled cavities up	
					Н	to 2"x1/2" over bottom 2.5' of run,	
-	R7-NQ			88.05' - Fracture, 15-20 deg, rough,		entire run moderately fossiliferous	1
-	5 ft	88	2	undulating, tight	╁	_ (molds and casts), yellowish gray (5Y 8/1) clay seam at 83.2'	1
-	100%			88.35' - Mechanical break, 5-10 deg, rough, planar, black stain, tight		No Recovery 85.8-86.0'	1 -1
-			3	88.5' - Mechanical break	\perp	Limestone	-
90				88.95' - Fracture, 70-80 deg, rough,	一	86.0-88.0' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), strong HCl	
-46.1				undulating, black staining		reaction, very fine wavy very thinly	R7: 12 minutes
-	91.0		0	89.5', 89.6' - Bedding plane or mechanical	╨	bedded (1/16" thick) containing dark	1 1
-	91.0			break, 5-10 deg, rough, planar, black stains, tight	仜	brown and white fossil, voids	1
-			1	90.65' - Mechanical break	+	covering 40-50% of surface, 1"x1/2" cavity infilled with soft gray clay,]
1 -				91.6' - Fracture, 60-70 deg, rough,	亡	- trace medium grain black particles,	
1			0	undulating, tight	Щ	medium to highly fossiliferous (casts,	
1 -			"		Н	molds, mostly whole fossil), weak	1
1 -	R8-NQ			-	匚	- rock (R2) 88.0-91.0' - Same as 86.0-88.0'	1
1 -	5 ft	100	0	-	╀	except dusky yellow, (5Y 6/4), very	-
1 -	100%			-	\Box	 fine grained, weak (R2), poorly] -
1 -			0		\vdash	fossiliferous (molds, casts, whole]
95			Ľĺ			fossil), 5-10% black particles, organic bedding/lamination at 89.5-98.0'	
-51.1				_	\vdash	91.0-96.0' - Same as 88.0-91.0'	R8: 6 minutes
1 -	06.0		0	-	ഥ	except discontinuous wavy black] 1
1 -	96.0			-	H	lamination at 92.0', highly	-
1 -			2	96.3', 96.85', 96.55' - Fractures (3),	ᡛ	fossiliferous 96.0-100.9' - Same as 88.0-91.0'] -
I -				horizontal, rough, undulating, tight	\Box	except highly fossiliferous at]
					\vdash	98.5-99.7'	SC-2 collected at 96.85-
-			0	_			97.8'
-	R9-NQ			·	╙	-]
1 -	5 ft	88	1	-	世	-]
1 -	98%			09 05' Frosturo borizantal rough		-	-
1 _			1	98.95' - Fracture, horizontal, rough, undulating, 1/8" relief	\vdash	_	
100					Ш		1
1					1		
					1		
					-	•	-



PROJECT NUMBER:

338884.FL

B-03

SHEET 6 OF 8

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724210.1 N, 457702.3 E (NAD83)

ELEVATION: 43.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing

			<u> </u>	112141 : OIVIE 330 3/14 1000/3, Hidd Totally, 14Q tools, 11W	000		ONLIVIATION: Vertical
WATER	LEVELS: 3.0	ft bgs	s on 3	/26/07 START : 3/26/2007 END : 3/3	26/200	D7 LOGGER : T. Stewart	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		· ·	DESCRIPTION	SYMBOLIC LOG		
N A A	Ž,₹,Ž		띘늗	DESCRIPTION	ت ا	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
# # # # # # # # # # # # # # # # # # #	N F.E	(%) Q	28	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	F	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
E F X	850 800	αD	R P.	PLANARITY, INFILLING MATERIAL AND	MB I	AND ROCK MASS	SMOOTHNESS, CAVING ROD
SSE	SER	R	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-56.1				99.7' - Fracture, 10 deg, rough, undulating,	ш		R9: 8 minutes
_			2	open -		_	-
1	101.0		L	100.65', 100.75' - Bedding plane, rough,	ш		
1 7			NR.	planar, 1/16" relief (bedding plane fracture)	Н	No Recovery 100.9-101.0'	
1 -	1		1	101.2' - Mechanical break	ш	_ Limestone 101.0-106.0' - Same as 88.0-91.0'	
-				101.25' - Bedding plane or mechanical break,	ш	except highly fossiliferous at	_
1			0	horizontal, rough, undulating, open 1/4"	Н	101.3-102.1' and 103.5-104.2'	
1 7]		"		Н		
-	R10-NQ			·	ш	_	-
-	5 ft	96	0	400 51 404 01 Markariaal kasala (0)	Н	_	-
l _	100%			103.5', 104.2' - Mechanical break (2)	ш		
1				404 251 404 71 405 251 405 651 Machanical	ш		
405			0	104.25', 104.7', 105.25', 105.65' - Mechanical break (4), horizontal, rough, undulating, tight	+	_	1 1
105 <u> </u>				- Sical (7), Horizontal, Tought, undulating, tight	ᡛ╣	<u> </u>	D10: 9 minutes
-01.1]		0		Ш	_	R10: 8 minutes
1	106.0		"		Н		
1 -	100.0			·	т	106.0-109.0' - yellowish gray, (5Y	1
-			0	-	Ш	- 7/2), strong HCl reaction, very weak] -
l .]				Н	to weak (R1 to R2), gray mottling,	
1			_		Н	staining over 106.0-109.0', 10-15%	
-	1		0	·	ш	- spherical voids (<1/16"), poorly	1
-				-	Ш	fossiliferous (molds mostly casts up to 1/8" in size), 25-30% very fine	-
l .	R11-NQ 5 ft	92	1		Н	grain white and dark gray particles	
1	100%	52	'	108.6' - Fracture, 60-70 deg, rough,		gram mine and adm gray parables	
1 -	1			undulating, tight	ш	109.0-111.0' - Same as 106.0-109.0'	1
-	-		2	109.0' - Bedding plane or mechanical break,	Н	 except yellowish gray, (5Y 8/1) 	-
110_				horizontal, smooth, planar	ш		
-66.1				109.8' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/4"	Н		R11: 7 minutes
1 -	11110		2	110.2' - Bedding plane or mechanical break,	Н		1
-	111.0			horizontal, smooth, planar, open 1/8"	Ш	_ 111.0-113.0' - yellowish gray, (5Y	-
l -			1	110.35' - Bedding plane or mechanical break,	Ш	- 8/1), strong HCl reaction, very weak	_
1				horizontal, rough, undulating, open up to 5/8"	Н	to weak (R1 to R2), up to 10%	
-				111.3' - Bedding plane or mechanical break,	ш	elongated cavities up to 1/4"x1/2"	
-	1		2	horizontal, rough, undulating, 1/8" open 111.6' - Mechanical break, <10 deg, rough,	П	 rimmed with secondary 	-
1 -	!			undulating, tight	₽₩	mineralization, trace fossil casts up	1 -
	R12-NQ	80	2	112.0' - Mechanical break, <10 deg, rough,	Н	to 1/2" - 113.0-116.0' - white, (N9), strong HCl	
1	5 ft 100%	00	_	undulating, tight		reaction, very weak to weak (R1 to	1
1 -	1			112.9' - Mechanical break or bedding plane,	Ш	R2), mottled with soft white clay,	1 -
1 -			1	<10 deg, rough, undulating, tight		 poorly fossiliferous (casts and molds] -
115_]			113.7-113.95' - Fracture zone, rough, undulating, gray stains, also brown stains —	口	up to 1/4") more larger voids, voids	
-71.1				114.4' - Bedding plane or mechanical break,	$\vdash \vdash$	are spheroidal and up to 1/16", no	R12: 5 minutes
1 -	1,,,,		1	horizontal, rough, undulating, tight	\Box	– infill	1 1
-	116.0		-	115.35' - Bedding plane or mechanical break,	口	116.0.110.5!vollowish.grov. (5V	SC 3 collected at 115 1
1 _]		1	rough, undulating, tight to 1/8" gap	Ш	116.0-119.5' - yellowish gray, (5Y - 7/2), strong HCl reaction, very weak	SC-3 collected at 115.1- 116.0'
			'	116.45' - Bedding plane or mechanical break,	H	to weak (R1 to R2), grades from	110.0
1 -				horizontal, rough, undulating, open up to 1/4"	\Box	moderate to highly fossiliferous from	1 1
1 -			5	117.2' - Bedding plane or mechanical break,	Ш	 116.0-119.0' (casts, molds) up to 	-
Ι.				horizontal, rough, undulating, tight 117.4' - Fracture, 60-70 deg, rough,	H	1/2"x1/2" micro fossils, gray staining]
	R13-NQ			undulating, open 1/8"	Ш	predominantly over 117.0-119.0']
1 -	5 ft	72	1	117.55' - Bedding plane or mechanical break,	Щ	_	1 1
-	100%		-	horizontal, rough, undulating, open 1/8"	+	_] -
I -]		2	117.65' - Mechanical break, horizontal,		_]
120				smooth, planar, open 1/8"	Ш		
					П		



PROJECT NUMBER:

338884.FL

B-03

SHEET 7 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724210.1 N, 457702.3 E (NAD83)

ELEVATION: 43.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS: 3.0	ft bgs	on 3/	26/07 START: 3/26/2007 END: 3/	26/20	D7 LOGGER : T. Stewart		
≥ ∩ ∷	(9)			DISCONTINUITIES	Ğ	LITHOLOGY	COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		SL	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,	
H BE ACE	TH.	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,] Sel	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND	
EPT URF LEV	ORE	ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.	
-76.1	OIK	ď	шД		S		R13: 7 minutes	
-70.1			1	117.9' - Mechanical break or bedding plane, rough, undulating, tight	井	Limestone - 119.5-120.5' - Same as 116.0'-119.5'	R13: 7 minutes	
-	121.0			118.25' - Mechanical break or bedding plane,	₽₩	except grayish yellow, (5Y 8/4), up to	Ob alla libra an a accedentible	
-			2	<10 deg, rough, undulating, tight 119.45' - Mechanical break or bedding plane,	\blacksquare	25% spheroidal voids (<1/16") - 120.5-121.0' - Same as 116.0'-119.5'	Chalk like or powder like rock, this run contains rock -	
_				<10 deg, rough, undulating, dark gray stains,	Ш	except yellowish gray, (5Y 8/1), very	with vertical fractures-	
_			0	open up to 1/2" 119.65' - Bedding plane, horizontal	\Box	fine grained, trace voids, 15% elongated cavities up to 1/8"x1/2",	possible stress related to over burden -	
				120.3' - Bedding plane or mechanical break,		poorly fossiliferous	_	
	R14-NQ 5 ft	75	2	horizontal, rough, undulating, open 1/8" gap 121.75' - Bedding plane or mechanical break,		121.0-125.0' - yellowish gray, (5Y - 8/1), strong HCl reaction, very weak		
	80%	13		horizontal, rough, undulating, tight	\vdash	to weak (R1 to R2), 10% voids up to		
			1	121.85' - Bedding plane or mechanical break, horizontal, rough, undulating, tight	Ш	1/16", wavy bedded discontinuity 1/2" thick at 122.0', gray staining over		
125			1	123.05' - Bedding plane or mechanical break,	Ш	entire interval, poorly fossiliferous	SC-4 collected at 124.5-	
-81.1				horizontal, rough, planar, tight 123.35, 123.55' - Mechanical break	\mathbb{H}	(casts), trace dark gray very fine particles, upper most 1' is the same	125.0' — R14: 5 minutes	
	126.0		NR	123.9' - Mechanical break, rough, planar,	Ħ	as the bottom of R13	Driller's Remark: Soft	
-				tight 124.05' - Mechanical break or bedding plane,		No Recovery 125.0-126.0' Limestone	drilling at 124.5-125.0' -	
-			1	smooth, planar, tight	11	126.0-129.6' - yellowish gray with	1 1	
-				126.5' - Mechanical break or bedding plane,	\Box	moderate gray staining, (5Y 8/1), strong HCl reaction, 126-128.5' is	1	
-			2	horizontal, rough, planar, open 1/16" 127.0' - Mechanical break, horizontal, rough,	世	very fine chalk-like feel, poorly	1	
-	I R15-NQ			undulating, tight	\Box	fossiliferous (trace casts), 25%	1	
-	5 ft 72%	52	2	127.3-127.45 - Fracture zone 128.3' - Mechanical break or bedding plane,	╁┼	spheroidal voids (mostly 1/16"x1/16"), trace cavities up to	1	
-	12/0		2	horizontal, rough, undulating, open 1/16"	\Box	- 1/2"x1/4"	-	
400				128.8' - Mechanical break, horizontal, rough, undulating, tight	Ш	_ 128.5-129.6' highly fossiliferous (casts, molds, micro fossil), 20-25%	-	
130 -86.1			ND	129.02-129.05' - Fracture zone -	╂┴┤	cavities partially filled (rimmed with	R15: 7 minutes	
-			INIX	NR	129.4' - Bedding plane or mechanical break, horizontal, rough, undulating, tight, assume	田	calcite) No Recovery 129.6-131.0'	Driller's Remark: Soft lense -
-	131.0		-	core loss from bottom of run	世	Limestone	from 127.0-128.0' Appears similar to 90-115',	
-			>10	131.0-135.0' - Sa except bottom m	+	131.0-135.0' - Same as 126.0-128.5' a verti	a vertical fracture in this -	
-					except bottom most 0.5' returns to "clean" un-stained yellowish gray (5Y	interval is over 1.5' long		
-			>10	planar, for horizontals, vertical stained set of		- 8/1)	-	
-	D16 NO			fractures at 132', 80-100% surface covered.	₽₩	_	-	
-	R16-NQ 5 ft	10	>10		\blacksquare	_	-	
_	80%				口	_	-	
-			2		+	_	-	
135_				_	Ħ	N- D	D40: 7	
-91.1			NR			No Recovery 135.0-136.0'	R16: 7 minutes	
	136.0				Ш	<u> </u>] _	
			0		H	Limestone - 136.0-137.45' - light olive gray, (5Y		
					Щ	6/1), strong HCl reaction, strong		
			>10	107.451. B. 11.	Ш	(R4), wavy black mineralization laminae, trace cavities up to 1-1/2"		
			10	137.45' - Bedding plane, 15-20 deg, brownish black stains, tight	\Box	long		
	R17-NQ 5 ft 64 96%		>10	137.8-138.15' - Fracture zone, up to 2"				
]		04	-10	subrounded pieces 138.35' - Fracture or mechanical break,	\vdash]	
]		70-80 deg]		
140			4		Ш		1	



PROJECT NUMBER:

33884.FL

B-03 SHEET 8 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724210.1 N, 457702.3 E (NAD83)

ELEVATION: 43.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

MATERIAL PLANS 3.0 ft top on 92-807 START 326-2007 START 326-2007 SECONTINUTES DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, 180 ft 18	CORING	NETHOD A	ND EC	אורווטג	MENT: CME 550 S/N 186073, mud rotary, NQ tools, HW	casin	<u> </u>	ORIENTATION : Vertical
DESCRIPTION ROCK TYPE, COLOR, MINERALOGY, TEXTURES, AND ROCK MASS PLANARITY, INFILLING INMERALAND PLANARITY, INFILLING IN	WATER	LEVELS: 3.0	ft bgs	s on 3	/26/07 START : 3/26/2007 END : 3/2	26/20	D7 LOGGER : T. Stewart	_
1 138.5-138.75 - Fracture zone, brownish black stains 139.35 - Bedding plane or mechanical break, horizontal, rough, undulating, open up to 1/2" 139.55 - Fracture or mechanical break, 40-50 deg, rough, undulating, open up to 1/2" 140.25 - Mechanical break or bedding plane, horizontal, rough, undulating, 1/16" clay infilling, open 1/2" 142.8 - Bedding plane or mechanical break, 100% 1143.5 - Bedding plane or mechanical break, 100% 1143.5 - Bedding plane or mechanical break, 100% 1143.5 - Bedding plane or mechanical break, 100% 1144.55 - Bedding plane or mechanical break, 100% 1145.8 - Bedding plane or mechanical break, horizontal, rough, undulating, tight 144.55 - Bedding plane or mechanical break, horizontal, rough, undulating, tight 144.56 - Bedding plane or mechanical break, horizontal, rough, undulating, tight 144.56 - Bedding plane or mechanical break, horizontal, rough, undulating, tight 144.56 - Bedding plane or mechanical break, horizontal, rough, undulating, tight 144.56 - Bedding plane or mechanical break, horizontal, rough, undulating, tight 144.56 - Bedding plane or mechanical break, horizontal, rough, undulating, tight 144.56 - Bedding plane or mechanical break, horizontal, rough, undulating, tight 144.56 - Bedding plane or mechanical break, horizontal, rough, undulating, tight 144.56 - Pellowing travel tight of the properties o	> -				DISCONTINUITIES	ניו	LITHOLOGY	COMMENTS
1 138.5-138.75 - Fracture zone, brownish black stains 139.35 - Bedding plane or mechanical break, horizontal, rough, undulating, open up to 1/2" 139.55 - Fracture or mechanical break, 40-50 deg, rough, undulating, open up to 1/2" 140.25 - Mechanical break or bedding plane, horizontal, rough, undulating, 1/16" clay infilling, open 1/2" 142.8 - Bedding plane or mechanical break, 100% 1143.5 - Bedding plane or mechanical break, 100% 1143.5 - Bedding plane or mechanical break, 100% 1143.5 - Bedding plane or mechanical break, 100% 1144.55 - Bedding plane or mechanical break, 100% 1145.8 - Bedding plane or mechanical break, horizontal, rough, undulating, tight 144.55 - Bedding plane or mechanical break, horizontal, rough, undulating, tight 144.56 - Bedding plane or mechanical break, horizontal, rough, undulating, tight 144.56 - Bedding plane or mechanical break, horizontal, rough, undulating, tight 144.56 - Bedding plane or mechanical break, horizontal, rough, undulating, tight 144.56 - Bedding plane or mechanical break, horizontal, rough, undulating, tight 144.56 - Bedding plane or mechanical break, horizontal, rough, undulating, tight 144.56 - Bedding plane or mechanical break, horizontal, rough, undulating, tight 144.56 - Bedding plane or mechanical break, horizontal, rough, undulating, tight 144.56 - Pellowing travel tight of the properties o	DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%	Ø	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
141.0 NR 139.35' - Bedding plane or mechanical break, horizontal, rough, undulating, open up to 1/2' 139.55' - Fracture or mechanical break, 40-50 deg, rough, undulating, open up to 1/2' 140.25' - Mechanical break of bedding plane, horizontal, rough, undulating, 1/16' clay infilling, open 1/8' 142.8' - Bedding plane or mechanical break, 10.0% 110.11 145 - 101.11 145 - 101.11 150 - 106.11 151.2 151.2 151.2 151.2 151.2 151.2 151.2 151.2 151.2 151.2 151.2 151.2 151.2 151.2 151.2 151.2 151.3 152.3 153.85' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/16' clay infilling, open 1/8' 142.8' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/16' clay infilling, open 1/8' 142.8' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/16' clay infilling, open 1/8' 142.8' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/16' clay infilling, open 1/8' 142.8' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/16' clay infilling, open 1/8' 142.8' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/16' clay infilling, open 1/8' 142.8' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/16' open 1/45.8' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/16' open 1/48.0', 1/48.5', 1/48.4' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/16' open 1/48.0', 1/48.5', 1/48.4' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/16' open 1/48.0', 1/48.5', 1/48.4' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/16' open 1/48.0', 1/48.5' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/16' open 1/48.0', 1/48.5' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/16' open 1/48.0', 1/48.5' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/16' open 1/48.0', 1/48.5' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/16' open 1/48.5' - Sedding plane or mecha					138.5-138.75' - Fracture zone, brownish		Limestone	R17: 8 minutes
142.8' - Bedding plane or mechanical break, <10 deg, rough, undulating, tight to 1/4" open 143.4', 143.5', 143.8', 144.55' - Mechanical break (5), horizontal, rough, undulating, tight 144.55' - Bedding plane or mechanical break, horizontal, rough, undulating, tight 144.55' - Bedding plane or mechanical break, horizontal, rough, undulating, tight 145.8' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/8" gap between weaker rock above and stronger rock below 147.55' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/8" gap between weaker rock above and stronger rock below 147.55' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/8" gap between weaker rock above and stronger rock below 147.55' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/8" gap between weaker rock above and stronger rock below 147.55' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/8" gap between weaker rock above and stronger rock below 147.55' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/8" gap between weaker rock above and stronger rock below 147.55' - Sedding plane or mechanical break, horizontal, rough, undulating, 1/8" gap between weaker rock above and stronger rock below 147.55' - Sedding plane or mechanical break, horizontal, rough, undulating, 1/8" gap between weaker rock above and stronger rock below 147.55' - Sedding plane or mechanical break, horizontal, rough, undulating, 1/8" gap between weaker rock above and stronger rock below 147.55' - To plow in thick 141.60' - light olive gray, 157.10% spherical voids up to 1/8"x1/8" laminated im x-1/16" thick over entire interval, trace cavities up to 3/8"x1/16" elongated with secondary white mineral immed (60% infill), bottom most 0.15' is a very light gray redums trong (R3) to R4, voids up to 3/16"x1/8" in size, trace fossil (casts/mods) 148.5-149.45' - very weak (R1), stratified section of yellowish gray and brownish black lamination, rock has powdery feel to to	- - - -	141.0		NR 1	139.35' - Bedding plane or mechanical break, horizontal, rough, undulating, open up to 1/2" 139.55' - Fracture or mechanical break, 40-50 deg, rough, undulating, open up to 1/2" 140.25' - Mechanical break or bedding plane, horizontal, rough, undulating 141.35' - Bedding plane, horizontal, rough,		gray, (N9 to 5Y 8/1), strong (R4), voids up to 1/16"x1/16" over 25% of surface, cavities up to 2"x1-1/2" irregularly shaped filled with a weak secondary mineral, poorly to moderately fossiliferous (casts, molds), fossils up to 3/4"	on 3/28/07 Starts drilling from 141.0' on 3/29/07, 08:01 water level to 3'10" below ground
horizontal, rough, undulating, tight 146.0 146.0 146.0 145.8' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/8" gap between weaker rock above and stronger rock below 147.55' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/8" gap between weaker rock above and stronger rock below 147.55' - Bedding plane or mechanical break, horizontal, rough, undulating, tight of live gray, (5Y 7/2 to 5Y 5/2), very medium strong (R3) limestone 146.0-148.5' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very fine grained, strong HCl reaction, medium strong to strong (R3 to R4), voids up to 3/6"x1/8" covering 20-30% of surface, trace cavities elongated horizontally 1"x1/4" in size, trace fossil (casts/molds) 148.5' - 149.4' - Bedding plane or mechanical break, horizontal, rough, undulating, tight white mineral rimmed (60% infill), bottom most 0.15' is a very light gray medium strong (R3) limestone 146.0-148.5' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very medium strong (R3 to R4), voids up to 3/6"x1/8" covering 20-30% of surface, trace cavities elongated horizontally 1"x1/4" in size, trace fossil (casts/molds) 148.5' - 149.45' - very weak (R1), stratified section of yellowish gray and brownish black lamination, rock has powdery feel to touch 149.45-151.2' - fine grained, very thinly bedded, voids up to 1/8"x1/8", some infilled with white mineral rimmed (60% infill), borton of Boring at 151.2 ft bgs on		5 ft		-	142.8' - Bedding plane or mechanical break, - <10 deg, rough, undulating, tight to 1/4" open 143.4', 143.5', 143.85', 144.15', 144.55' - Mechanical break (5), horizontal, rough, undulating, tight		 Limestone 141.0-146.0' - light olive gray, strong HCI reaction, weak (R2), 5-10% spherical voids up to 1/8"x1/8" laminated rim <1/16" thick over entire 	- - -
between weaker rock above and stronger rock below 1	-	146.0			horizontal, rough, undulating, tight - 145.8' - Bedding plane or mechanical break, -		 3/8"x1/16" elongated with secondary white mineral rimmed (60% infill), bottom most 0.15' is a very light gray 	-
horizontal, rough, undulating, tight 148.05', 148.5', 149.4' - Bedding plane or mechanical break (3), horizontal, rough, planar, 148.5' has organic black infill <1/16" 150 -106.1 0 horizontal, rough, undulating, tight 148.05', 148.5', 149.4' - Bedding plane or mechanical break (3), horizontal, rough, planar, 148.5' has organic black infill <1/16" thick SC-5 collected at 148.5- 149.45' SC-5 collected at 148.5- 149.45' SC-5 collected at 148.5- 149.45' R19: 10 minutes Driller's Remark: Circulation loss has been continuing (60-100%) during core runs, total depth tape measured at 151.0', borehole open to total depth	- -				between weaker rock above and stronger rock below		146.0-148.5' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very fine grained, strong HCl reaction,	<u>.</u>
1 plantal, 148.5 has organic black initial 1716 150 -106.1 -101 -101 -101 -101 -101 -101 -101 -1	_	5.2 ft		2	horizontal, rough, undulating, tight 148.05', 148.5', 149.4' - Bedding plane or mechanical break (3), horizontal, rough,		voids up to 3/16"x1/8" covering 20-30% of surface, trace cavities elongated horizontally 1"x1/4" in size,	
thinly bedded, voids up to 1/8"x1/8", some infilled with white mineralization, rock has powdery feel to touch Bottom of Boring at 151.2 fi bgs on Circulation loss has been continuing (60-100%) during core runs, total depth tape measured at 151.0', borehole open to total depth		_ 100% _ 0_					 148.5-149.45' - very weak (R1), stratified section of yellowish gray and brownish black lamination, rock has powdery feel to touch 	
		151.2					thinly bedded, voids up to 1/8"x1/8", some infilled with white mineralization, rock has powdery feel to touch Bottom of Boring at 151.2 ft bgs on	Circulation loss has been continuing (60-100%) during core runs, total depth tape measured at 151.0', borehole open to



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-04	SHEET	1	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724317.2 N, 457809.8 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

					orientation venical
WATER	LEVELS	: 3.0 ft b	gs on 4/1	U/U7 S	START : 4/10/2007 END : 4/17/2007 LOGGER : R. McComb
≥∩≎				STANDARD PENETRATION	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY BOTO DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
A B B B B B B B B B B B B B B B B B B B		RECOVE	ERY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
FE FE			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
333				(N)	
42.8	0.0			1-2-2	Topsoil \[\sqrt{0.0-0.15'} - brownish black, (5YR 2/1), moist, 30-35\% \] \[\sqrt{\frac{14.7}{3}} \] Samples taken using 5' sections of N-rod, 3-7/8" tricone drag bit, 50 lb bags of quick gel
l _		1.1	SS-1	(4)	roots
_	1.5			. ,	Poorly Graded Sand With Organics (SP) 0.15-1.1' - gravish black to very light gray. (N2 to N8).
					\ \ 0.15-1.1' - grayish black to very light gray, (N2 to N8), \ \ moist, very loose, very fine to fine grained, silica sand, \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
					\trace nonplastic fines, 10% organics decreasing with / \
-					\depth
-					1
-					
-					
	F.0				
5 37.8	5.0				Poorly Graded Sand (SP)
-		1.0	SS-2	2-2-2	5.0-6.0' - grayish orange to pale yellowish brown
-		1.0	33-2	(4)	mottled with trace dusky brown, (10YR 7/4 to 10YR 6/2 with 5YR 2/2), wet, very fine to fine grained, trace
-	6.5				\to 3% nonplastic fines, trace very fine sand-sized / -
-					\black particles, silica sand
-					
-]]
l -]
l -					<u> </u>
l _]
10	10.0				
32.8					Poorly Graded Sand To Clayey Sand (SP-SC) 10.0-10.9' - yellowish gray, (5Y 7/2), wet, very fine to
		0.9	SS-3	4-6-7 (13)	fine grained, grading from sand (SP) to clayey silt
	11.5			(10)	│ (SC) with depth, trace nonplastic fines in SP, 25-30% │
-					\low to medium plastic fines in SC, trace of angular \ - \ \shaped black particles
-					1
-					1
1 -					1
-					
-					
	45.0				
15 <u> </u>	15.0				Silty Sand (SM)
-		1.2	SS-4	7-10-12	15.0-16.2' - yellowish gray, (5Y 7/2), wet, medium -
-		1.2	33-4	(22)	dense, very fine to fine grained, 25-30% nonplastic fines, very fine black particles, 3/8" thick vertically
-	16.5				│ \ oriented seam of SP as above (10.0-10.9'), trace │
-					moderate yellow (5Y 7/6) staining over last 1/3 of sample, silica sand
-					Sample, silica saliu
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-04	SHEET	2	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724317.2 N, 457809.8 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLIN	G METH	<u>OD AND</u>	EQUIPM	ENT : CME 550 S	/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 3.0 ft b	gs on 4/10	0/07	TART : 4/10/2007 END : 4/17/2007 LOGGER : R. McComb
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	AL (ft)	PENETRATION	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
BEL 10N		RECOVI		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE,
TH VAT				6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY BY INSTRUMENTATION
SUF			#TYPE	(N)	Solidio Elitor, Solizio in Gorona, minicio Esseri
22.8	20.0			, ,	Silty Sand (SM)
-	1	1.2	SS-5	9-10-9	20.0-21.2' - yellowish gray, (5Y 7/2), wet, very fine to fine grained, 14% nonplastic fines, trace very fine
-	04.5			(19)	angular black particles, silica sand
-	21.5				-
-	-				
-					
_					
-					
-					. .
_					
25	25.0				
17.8				F.C.5	¬ Clayey Sand (SC) ¬\ 25.0-25.1' - dark yellowish orange, (10YR 6/6), moist,
_		1.3	SS-6	5-6-5 (11)	│\very fine to fine grained, 30-35% medium plastic
	26.5				fines, silica sand
					Sandy Fat Clay (CH) 25.1-25.4' - greenish gray, (5GY 6/1), moist, stiff,
	1				medium to high plasticity, no to slow dilatancy, 30%
-	1				fine silica sands laminated with very light gray (N8), very fine to fine silica sands about 1/6" thick, light
-	1				brown (5YR 5/6) laminations <1/16" thick
-	1				Fat Clay (CH)
-	1				25.4-25.7' - grayish black, (N2), moist, high plasticity, no dilatancy
					Silty Sand (SM)
30 <u> </u>	30.0				25.7-26.0' - light brown, (5YR 5/6), wet, fine to medium grained, strong HCl reaction, 25-30% low 09:36 Driller's Remark: Will change to 3-
-	-	1.4	SS-7	7-11-41	plastic fines carbonate derived 7/8" tricone roller bit
-		1.4	33-1	(52)	Silty Sand (SM)
-	31.5				26.0-26.3' - grayish yellow, (5Y 8/4), wet, fine to medium grained, strong HCl reaction, 25% nonplastic
-					fines, pockets of yellowish gray (5Y 8/1) material
-					Silty Sand With Gravel (SM) 30.0-31.4' - yellowish gray with moderate yellow and
_	ļ				yellowish gray staining, (5Y 8/1 with 5Y 7/6 and 5Y
_					7/2), wet, fine to coarse grained, strong HCl reaction,
_					angular to subrounded sand-sized, 23% low plastic fines, 20% fine to coarse gravel, all carbonate
_					
35	35.0				
7.8					Interbedded Silt With Sand (ML) 35.0-36.5' - medium light gray mottled with medium
		1.5	SS-8	3-4-14 (18)	dark gray interbedded with very pale orange mottled
1 7	36.5			(10)	with yellowish gray, (N6 mottled with N4 interbedded 7
	T				with 10YR 8/2 mottled with 5Y 8/1), moist, low - plasticity, strong to very strong HCl reaction, 20-25%
-	1			l	\very fine to fine grained sand, 1" angular limestone / T
-					fragments at bottom of sample
-					
-					
-					
-					
40					
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PROJECT NUMBER:	BORING NUMBER:					
338884 FI	B-04	SHEET	3	OF	Q	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724317.2 N, 457809.8 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

ORIENTATION : Vertical

						cathead, NW rods, 3-7/8" tr			ORIENTATION : Vertical
WATER	LEVELS	: 3.0 ft bo	gs on 4/10		START : 4/10/2007	END : 4/17/2007	LOGGEF	(∶R. 	McComb COMMENTS
≥□₽				STANDARD PENETRATION		SOIL DESCRIPTION		<u>8</u>	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	• •	TEST RESULTS	SOII NAME I	JSCS GROUP SYMBOL, CO	OLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H BI ACE ATIC		RECOVE	RY (ft)		MOISTURE CO	ONTENT, RELATIVE DENS	ITY OR	30L	DRILLING FLUID LOSS, TESTS, AND
EV.			#TYPE	6"-6"-6"	CONSISTENCY,	SOIL STRUCTURE, MINE	RALOGY	₹	INSTRUMENTATION
<u> 2.8</u>	40.0			(N)	Silt With Sand (M	1)		1111	
	40.0	, ,	SS-9	5-5-9	40.0-41.4' - light gı	ray mottled with yellowish	gray, (N7	Ш	-
-		1.4	33-9	(14)	mottled with 5Y 7/2	wet, nonplastic, rapid of action, 20% very fine to fit	dilatancy, ine sand	$\ \ $	-
-	41.5				all carbonate	dollori, 20 % very line to il	/-	ш	-
-								-	-
-							-	-	-
-							-	Į.	-
-							-	1	-
_							-		_
-							-		_
45	45.0							L.	_
-2.2				6-10-14	Elastic Silt With S	and And Limestone Fra	gments		
_		1.5	SS-10	(24)	45.0-46.5' - mediu	m light gray, (N7), wet, lo		Ш	_
l _	46.5				medium plasticity,	rapid dilatancy, very stroit to medium grained sand	ng HCl 10-15% -	Ш	_
_					fine to coarse grain	ned gravel limestone frag	ments, all		
l _					\carbonate				
-							- -	1	
-							-	1	
50	50.0						-	1	
-7.2					Silty Sand (SM)	(15)			
-		1.0	SS-11	17-17-18 (35)	50.0-51.0' - mediu coarse grained, ve	m gray, (N5), wet, dense, ery strong HCl reaction,	, fine to	1111]
-	51.5			(33)	nredominantly fos	sils including shell fragme	ents, 20%	T	1
-					\low plastic fines			1	1
-							-	1]
-							-	1	1
-							-	1]
-							-	1]
-							-	1	1
55	55.0						-	1	1
-12.2	55.0				Sandy Silt (ML)			Ш	-
-		1.5	SS-12	15-24-33	55.0-56.5' - very lig	ght gray, (N8), wet, low pl ry strong HCl reaction, 30	asticity,	1	-
-	56.5	"		(57)	coarse grained sa	nd, fossils and fossil fragi	ments	1	-
-	50.5				ranging from yellow 5/1 to 5Y 8/1)	wish gray to medium dark	gray (5Y	┸	1
-					(3/110 31 6/1)			1	-
-							-	1	-
-							-	1	-
-							-	1	-
-							-	ł	-
-							-	1	-
60							_	\vdash	_



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-04	SHEET	4	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724317.2 N, 457809.8 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

ORIENTATION · Vertical

DRILLIN	G METH	OD AND	EQUIPM	ENT : CME 550 S	S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 3.0 ft bo	s on 4/10	D/07 S	START : 4/10/2007 END : 4/17/2007 LOGGER : R. McComb
				STANDARD	SOIL DESCRIPTION O COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
BEL JGF/J		RECOVE	RY (ft)	TEGT REGGETO	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
PTH EVA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY CONSISTENCY, SOIL STRUCTURE, MINERALOGY
SU ELE				(N)	
-17.2	60.0			00.07.04	Silty Sand With Gravel (SM) 60.0-61.5' - medium light gray, (N6), wet, very dense, add 1/4 bag (50 lb), quick gel bentonite
		1.5	SS-13	28-27-24 (51)	fine to coarse grained, very strong HCl reaction,
	61.5			(= 1)	predominantly fossil fragments, 25-30% low to medium plastic fines, 15% fine gravel-sized fragments
					Composed of shale fragments
					1
-					1
-					1
-					1
-					1
65	65.0				1
-22.2	00.0	0.0	CC 11	37-50/4.0	Silty Sand (SM)
-	65.8	0.8	SS-14	(87/10")	65.0-65.8' - very light gray to light gray mottled with medium gray, (N8 to N2 mottled with N5), wet, very
-					\ dense, fine to coarse grained, very strong HCl
-					reaction, fossil fragments and carbonate material, 43% low to medium plastic fines, 10-15% fine
-					gravel-sized fragments
-					- 1
-					<u> </u>
-					-
-					
70 <u> </u>	70.0				Silty Sand (SM)
-		1.5	SS-15	24-26-30	70.0-71.5' - Same as 65.0-65.9'
-		1.5	00-10	(56)	
-	71.5				
-					
-					-
-					-
-					
-					-
-					
75 <u> </u>	75.0				Clay With Sand (CL)
-52.2			00.45	11-12-15	75.0-75.8' - grayish green mottled with grayish green
-		1.5	SS-16	(27)	and brownish black, (10GY 5/2 mottled with 10G 4/2 and 5Y 2/1), moist, very stiff, high plasticity, no
-	76.5				In \ dilatancy, mild HCl reaction, 25% very fine to fine
-					silica sand; irregular shaped, laminated bedding;
-					Elastic Silt With Sand (MH)
-					75.8-76.5' - yellowish gray, (5Y 8/1), moist to wet, low
_					to medium plasticity, rapid dilatancy, mild HCl reaction, 25% fine silica and carbonate sands, 1-1/2"
_					lens of sandy fat clay at bottom of sample, same as
					[75.7-75.8']
80					
					1



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-04	SHEET	5	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724317.2 N, 457809.8 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

WATER	LEVELS	: 3.0 ft bo	gs on 4/10		START: 4/10/2007 END: 4/17/2007 LOGGER: R. McComb
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
A BE		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
EPTI URF.			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
-37.2	80.0			18-50/4.5	Clayey Sand (SC) /// 14:29 Driller's Remark: Observed hard
-	80.9	0.9	SS-17	(68/10.5")	80.0-80.9' - light olive gray mottled with dusky yellow green, (5Y 5/2 mottled with 5BG 3/2), wet, very dense,
-					fine grained, predominantly clayey sand (SC) with
					pockets of clay (CH) and silt (ML), 35% medium -
					CH- dusky blue green, (5BG 3/2), with very shiny appearance, no HCl reaction
_					ML- yellowish gray (5Y 8/1), same as 45.0-46.5', mild HCl reaction, olive gray (5Y 2/1) organic pockets at
-					bottom of sample, high plastic, no HCl reaction
-					
	05.0				-
-42.2	85.0 85.2	0.1	SS-18	50/2	Limestone Fragments 14:49 Driller's Remark: Light rig bouncing
-				(50/2")	\\ 85.0-85.1' - light olive gray, (5Y 5/2), moderate to \\ -\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
-					
]
_]]
-					-
-					-
-					-
90	90.0				-
-47.2	90.0	0.3	SS-19	50/4	Silt (ML)
-				(50/4")	90.0-90.3' - yellowish gray mottled with medium dark gray, (5Y 7/2 mottled with N4), moist, low plasticity,
					rapid dilatancy, strong HCl reaction, brownish black irregular laminations, organics at bottom of sample,
_					carbonate derived
-					-
-					-
-					-
-					-
95	95.0				
-52.2		0.7	SS-20	40-50/4.5	Sandy Silt (ML)
	95.9	0.7	55-20	(90/10.5")	95.0-95.7' - yellowish gray, (5Y 8/1), wet, low plasticity, rapid dilatancy, strong HCl reaction, 25-30%
-					\fine to medium grained sand, 5% coarse grained
-					
-					
-					-
-					-
-					
100					1
					1 1



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-04	SHEET	6	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724317.2 N, 457809.8 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

ORIENTATION · Vertical

DRILLIN	G METH	DD AND	EQUIPM	<u>ENT : CME 550 S</u>	S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION :	Vertical
WATER	LEVELS	: 3.0 ft bo	gs on 4/10)/07 S	START : 4/10/2007 END : 4/17/2007 LOGGER : R. McComb	
				STANDARD	SOIL DESCRIPTION COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING F DRILLING FLUID LOSS, TESTS, INSTRUMENTATION	
BEL CE /		RECOVE	RY (ft)	TEOT REGOLTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT BELATIVE PENCIFY OR DEPTH OF CASING, DRILLING F	
YFA YFA			#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SINSTRUMENTATION	, AND
SUI			<u>-</u>	(N)		
-57.2 - - - -	100.6	0.3	SS-21	50/4 (50/4")	Sandy Silt (ML) 100.0-100.3' - Same as 95.0-95.7' except limestone lens 0.1' thick at bottom of sample 16:10 Driller's Remark: Last samp 4/10/07, end of drilling 08:15 Water level at 2.5' below grosurface on 4/11/07 4/11/07 Adding 5' sections of AWJ depth	ound _
- - - 105_ -62.2	105.0				Silt With Sand (ML) O9:44 Starting drilling to 105' added	- - - -
-02.2	106.0	0.8	SS-22	41-50/5.5 (91/11.5")	105.0-105.8' - yellowish gray mottled with gray, (5Y 8/1 mottled with N5), moist, low plasticity, rapid bentonite	u 1/2 bag - -
-					dilatancy, strong HCl reaction, 20% fine to medium grained sand, trace wafer shaped limestone lenses <1/8" thick, one 1/2" dark yellowish orange coarse fragment, all carbonate	- - -
- - 110	110.0				- - - -	- - - -
-67.2 - -	110.9	0.8	SS-23	33-50/5 (83/11")	Silty Sand (SM) 110.0-110.8' - yellowish gray, (5Y 8/1), wet, fine to coarse grained, strong HCl reaction, 10-15% fine gravel-sized, 25-30% low to medium plastic fines, all	33/11") - -
-					carbonate	-
-]	- - -
-					<u> </u>	-
115 <u></u> -72.2	115.0				Sandy Clay With Site (CL MIL)	_
-12.2	110 5	1.5	SS-24	1-1-3 (4)	Sandy Clay With Silt (CL-ML) 115.0-116.5' - olive gray mottled with greenish black, (5Y 4/1 mottled with 5GY 2/1), low plasticity, slow dilatancy, moderate to strong HCl reaction, 15-20% of	- -
-	116.5				clay is fine to coarse grained sand; fossils and fossil fragments; the clay is irregularly interbedded with 30% light olive gray (5Y 6/1) fine grained, poorly graded	- -
-					silica sand (SP)	- -
-						- -
					-	-
120						_



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-04	SHEET	7	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724317.2 N, 457809.8 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

ORIENTATION: Vertical

						y, cathead, NW rods, 3-7/8") . D	ORIENTATION : Vertical McComb
WATER	LEVELS	. 3.0 11 09	gs on 4/1		START : 4/10/2007	END: 4/17/2007 SOIL DESCRIPTION	LUGGER		COMMENTS
§8€	SAMPLE	INTERVA	AL (ft)	STANDARD PENETRATION				68	
BEL CE A TON		RECOVE		TEST RESULTS	SOIL NAME,	USCS GROUP SYMBOL, (CONTENT, RELATIVE DEN	COLOR,	22	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)		Y, SOIL STRUCTURE, MINE		SYMBOLIC LOG	INSTRUMENTATION
-77.2	120.0	0.3	SS-25	50/5	Silt With Sand A	and Limestone Fragment	s (ML)	Ш	
				(50/5")	HCI reaction, 509	ellowish gray, (5Y 8/1), mo % limestone fragments, 2	0% fine to]	
					\medium sand-siz	zed material, all carbonate			
_							-		_
_							-		_
-							-	-	-
-							-	-	-
-							-	1	-
405	405.0						-	1	-
125_ -82.2	125.0 125.3	0.2	SS-26	50/3	── Silt (ML)		Г	ш	
-				(50/3")	125.0-125.2' - ye	ellowish gray, (5Y 8/1), mo lilatancy, strong HCl react	ist, low /-	1	-
-						and-sized, all carbonate		1	-
							_]	
							_		_
_							-	1	_
_							-	-	-
-							-	-	-
-							-	┨	-
130 -87.2	130.0 130.3	0.3	SS-27	50/3	Silt With Sand (I	ML)		Ш	14:20 Driller's Remark: Light rig chatter at
-				(50/3")	/\ 130.0-130.3' - Sa	amé as 125.0-125.2' exce nd-sized material	pt 20-25%	1	133.5', 131.5'
-					line to coarse sai	na-sizea material		1	-
-							-	1	-
							-	1	
_									
_							-		_
_							-	-	-
-							-	-	-
135 <u> </u>	135.9	0.1	SS-28	50/1	│ │ Limestone Fragi	ment		┢	
-			(33 23)	(50/1")	1 \ 135.0-135.1' - ve	ellowish gray, (5Y 7/2), mo ion, trace olive gray (5Y 3	derate to	┨	coring, last soil sample for B-4 boring
-					fossil casts, fragr	ment is a 1" disc shaped	72) Stairing,	1	
-						ng at 136.0 ft bgs eet for the rock core log		1	-
-					Coo the next sile	oction the rook done log	-	1	_
							-		
_							-		
_							-	1	-
-							-	-	-
140					-			\vdash	
								•	•



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-04

SHEET 8 OF 8

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724317.2 N, 457809.8 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

	LEVELS : 3.0			/10/07 START: 4/10/2007 END: 4/		07 LOGGER : R. McComb	
				DISCONTINUITIES	П	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-	136.0		2	136.5, 136.9' - Fractures (2), horizontal,		Limestone 136.0-137.35' - light olive gray, (5Y 5/2), fine to medium grained, strong	4/12/07 Start coring at 09:40:15 from 136-141' - The interval from 135.0-
-			2	rough, undulating 137.3' - Fracture or bedding plane, horizontal,	Ē	HCl reaction, medium strong (R3), voids (<1/16") on 20% of surface,	136.0' was drilled down to set a 5' stroke; no data for
-	R1-NQ 5 ft 92%	74	1	smooth 137.35' - Fracture, horizontal, smooth 137.8, 138.5' - Fractures (2), horizontal, rough, undulating		cavities (3/16" - 1-3/4"), secondary crystallization in 35-40% of surface, fossiliferous 137.35-137.39' - light olive gray, (5Y	135.0-136.0' is available 07:45 Water level at 7' 10"
140 -97.2			2			5/2), very fine grained, moderate to mild HCl reaction, extremely weak (R0), fine wavy laminations 137.39-140.6' - yellowish gray, (5Y	R1: 25 minutes
-	141.0		NR	140.4' - Fracture, 20-30 deg, rough, undulating	E	 7/2), fine to medium grained, strong to extremely strong HCl reaction, weak to medium strong (R2 to R3), 	R2-NQ is the first run on
-			>10	- 141.6-142.6' - Fracture zone, 70-80 deg, rough, <20 deg at 142.6' and 146.6', rough,	Ħ	 weaker with depth, voids (<1/16") on <5% of surface, irregular laminations, powder feel increases 	4/17/07 - 08:45 Water level at 6.5' below ground surface
-			>10	undulating -	Ħ	with depth, shell fragments, fossiliferous (casts, molds) No Recovery 140.6-141.0'	
-	R2-NQ 5 ft 98%	78	0	143.1, 143.5' - Mechanical break (2)	Ė	Limestone 141.0-145.9' - transition from	-
- - 145			1	144.0' - Mechanical break or bedding plane, horizontal, open 3/8", clay infill, very soft	H	yellowish gray to light olive gray, (5Y 8/1 to 5Y 5/2), fine to medium grained, extremely strong HCl	
-102.2 -	146.0		2		Ħ	reaction, very weak to weak (R1 to R2), fines increase with depth, voids (<1/16") over 40-50% of surface,	R2: 8 minutes
-			NR) >10	on 70% surface 145.75' - Bedding plane or fracture, vertical, rough, undulating, black stains on 60-70% of		fossiliferous casts and molds mainly in weaker rock 144.0-145.9', dark gray stains at 144.5' No Recovery 145.9-146.0'	Driller's Remark: Loss of circulation 100% at 146.5'
_ _			2	surface, tight 146.1, 146.2, 146.45, 146.55' - Mechanical break or bedding plane (4), rough,	Ħ	Limestone 146.0-149.6' - yellowish gray, (5Y 7/2), fine to medium grained, strong	SC-1 collected at 147.35- 148.4'
-	R3-NQ 5 ft 72%	19	5	undulating, tight, broken along wavy bedded laminations, organic beds (<1/16") 147.05' - Fracture or bedding plane,		HCI reaction, very weak to weak (R1 to R2), voids to <1/16" over 20% of rock, black organic staining,	
150			4	horizontal, rough, undulating, open 1/8", black stains over 25% of surface 147.4' - Fracture, 20-30 deg, rough,	Ħ	secondary crystallization in voids, poorly fossiliferous (casts/molds)	
-107.2 -	151.0		NR	undulating, black staining over 100% of surface, open 1/32"	Ħ	No Recovery 149.6-151.0' 	R3: 4 minutes End of B-4 boring at 151.0' below ground surface on
- - - - - -	1151.0			148.5' - Fracture, 40 deg, rough, undulating, 100% black staining, tight 148.55' - Fracture or mechanical break, rough, undulating, black staining over 100% of surface, tight 148.7, 148.8, 149.0' - Mechanical break or bedding plane (3), rough, undulating, tight to open 1/16" 149.15' - Fracture or mechanical break, horizontal, black stains on 80% surface, open 1/4"-1/2" 149.45' - Fracture or mechanical break, 40-50 deg, rough, undulating, tight 149.55' - Mechanical break or bedding plane, horizontal, rough, undulating, open 1/2"- 5/8"		Bottom of Boring at 151.0 ft bgs on 4/14/2007	delow ground surface on 4/17/07
					t	_	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-04A	SHEET	1	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724269.5 N, 457868.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

					_	r, cathead, NW rods, 3-7/8			ORIENTATION: Vertical
WATER	LEVELS	: 25.0 ft k	ogs on 6/	14/07	START : 6/12/2007	END : 6/13/2007	LOGGE	R : A.	
300				STANDARD PENETRATION		SOIL DESCRIPTION	چ ا	COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	COIL NAME	LICCO CDOLID CVMDOL	COLOR	SYMBOLIC LOG	DEDTIL OF CACING DRILLING DATE
		RECOVE	ERY (ft)			USCS GROUP SYMBOL, CONTENT, RELATIVE DEN		l log	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
JRF.			#TYPE	6"-6"-6"	CONSISTENCY	/, SOIL STRUCTURE, MIN	YMB	INSTRUMENTATION	
42.0				(N)	D 1 0 1 10			Ś	
42.0	0.0			1-2-3	Sand With Silt (S	Sand Grading To Poorly SP)	Graded		"Water level is based on Ground Water Monitoring at LNP site (FSAR Table -
_		1.3	SS-1	(5)	0.0-1.3' - light gra	ay grading to dark yellow	ish orange,]	2.4.12.08)"
_	1.5			, ,		, moist, no HCl reaction, ic fines, very fine to fine		1	_
					trace roots	io inico, very inic to inic	Silica Saria,	_	
								1	_
-								1	-
_								1	-
-								1	-
5	5.0							1	-
37.0	5.0				_ Silty Sand (SM)				Sand in 5.0-5.3' may be pyrite
-		0.9	SS-2	3-6-7	_\ 5.0-5.3' - black w	ith orange staining, matr		1///	-
-		0.9	00-2	(13)	yellowish orange, reaction, predom	, (10YR 6/6), wet, loose, inantly coarse sand to 3/	110 HCI /16", 20%	₹''	-
-	6.5				nonplastic fines,	angular to rounded sand		1	-
-					Clayey Sand (SC	ċ) rellow green, (5GY 5/2), ı	moist no	4	-
-					HCl reaction, ver	y fine to fine silica sand,	35% stiff	4	-
_					clay with medium			4	-
_					Silt With Sand (M	ML) sh gray, (5Y 8/1), wet, no	nnlastic	4	<u>-</u>
_					mild HCI reaction	, 15-20% very fine sand	-sized,	1	
_					carbonate materi sand-like 5.0-5.3'	al, trace fine to medium	black	1	Driller's Remark: change at 9.0'
10	10.0							1	
32.0				0.07		nl) To Silty Sand (SM) sh orange, (10YR 7/4), v	vot modium /	Ш	
		0.4	SS-3	9-8-7 (15)	\ dense, very fine t	to fine grained, mild to m	oderate HCI	_	
	11.5			(- /		tic fines, carbonate mate 0% SM, trace black sand			_
					lis 30 % IVIL and 30	0 % Sivi, trace black sairc	<u>, </u>	1	
									_
-								1	_
-								1	-
-								1	-
-								1	-
1 _F	15.0							1	-
15 <u> </u>	15.0				Silty Sand (SM)				_
-		1.0	SS-4	2-3-11	15.0-16.0' - yellov	wish gray, (5Y 8/1), with	mottling and	1	-
-		1.0	00-4	(14)		onplastic, mild to modera e sand, trace fine gravel		11.1.1.	-
-	16.5					nents, carbonate materia		-	Driller's Remark: 10-15% circulation loss at
-								-	16.5' -
-								4	-
-								-	-
-								4	-
-								4	-
								1	_
20							_	1	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-04A	SHEET	2	OF	9	

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724269.5 N, 457868.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

WATER	LEVELS	: 25.0 ft b	gs on 6/	14/07 S	START : 6/12/2007 END : 6/13/2007 LOGGE	R	: A.	Teal
				STANDARD	SOIL DESCRIPTION	Ţ	ŋ	COMMENTS
LOW AND N (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		1	C LO	DEDTIL OF GAGNIG DRILLING DATE
H BE ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	ı	3OLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	١	SYMBOLIC LOG	INSTRUMENTATION
22.0	20.0			(14)	Silty Sand (SM)	\dagger	Ш	Blind drill to 20.0' after moving drill rig due to
-		0.7	SS-5	22-22-12	20.0-20.7 - pale yellowish gray, (5Y 8/1), wet, dense, medium to coarse grained, mild HCl reaction, 45%	4	Ш	split spoon shoe lost in previous hole - Begin SPTs at 20.0'. Each of the following
-	21.5			(34)	nonplastic fines, carbonate material	1		samples belong to the redrilled hole B-04A.
_	21.0					1		1
						1		1
]		
_						1		_
-						4		_
-						4		-
25 17.0	25.0	0.4	SS-6	50/5.5	Silt (ML)	+	ш	-
-	25.5	0.4	55-6	(50/5.5")	\uparrow 25.0-25.4' - grayish orange, (10YR 7/4), wet,	Ħ	ш	-
-					nonplastic, mild to moderate HCl reaction, trace to 10% fine to medium sand-sized material, streaks of	1		-
-					white in matrix and trace fine sand-sized green material, carbonate material	1		-
-					inatorial, carbonate material	1		1
						1		1
]		
						1		
_						1		_
30 12.0	30.0				C:la M/sab Cound /Adl \	4	П	_
12.0			00.7	13-8-3	Silt With Sand (ML) 30.0-30.6' - grayish orange, (10YR 7/4), wet,	4		-
_		0.6	SS-7	(11)	nonplastic, mild HCl reaction, up to 25% fine to coarse sand-sized material decreasing with depth,	4		-
-	31.5				carbonate material	1		-
-						1		-
-						1		1
-						1		1
						1		1
]		
35	35.P	0.0	00.0	F0/4 F		1		
7.0		0.0_/	SS-8	50/1.5 (50/1.5")	No Recovery 35.0-35.1'	7		Driller's Remark: some chatter at 35.0-36.0'
_						1		-
_						$\frac{1}{2}$		-
-						+		
-						+		-
-						1		Driller's Remark: smooth at 38.0'
-						1		1
-						1		1
40						1		
						T		



PROJECT NUMBER:	BORING NUMBER:		
338884 FI	R-04Δ	SHEET	3 OF 0

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724269.5 N, 457868.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

						ary, carriedu, invi rous, 5-7/6			ONIENTATION : Vertical
WATER	LEVELS	: 25.0 ft k	ogs on 6/	14/07	START : 6/12/2007	END : 6/13/2007	LOGGEF	} : A.	
> 0 0				STANDARD		SOIL DESCRIPTION		ာ	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		F 11000 000110 0144001	001.00	SYMBOLIC LOG	DEDTIL OF GAOING DRIVING DATE
월병은		RECOVE	RY (ft)		SOIL NAM MOISTLIRE	IE, USCS GROUP SYMBOL, E CONTENT, RELATIVE DEN	COLOR, ISITY OR)T(DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTH EVA			#TYPE	6"-6"-6"		ICY, SOIL STRUCTURE, MIN		MB	INSTRUMENTATION
SU				(N)				SΥ	
2.0	40.4	0.4	SS-9	50/5	Silt With Sand	I (ML)			Driller's Remark: 35.0-40.0' fairly hard
_				(50/5")	\ 40.0-40.4' - 0li\	vè gray, (5Y 4/1), wet, nong to moderate HCl reaction,	plastic to low /-	1	=
-					fine sand, carb	onate material	20-23 /8 Very / _	1	=
-									-
-							-		-
-							_		_
							_		_
							_	1	
_							-	i	=
	45.0						-	1	-
45 -3.0	45.0 45.2	0.1	SS-10	50/2.5	Limestone Fra	arments			
5.5 -		\	00-10	(50/2.5")	\ 45.0-45.1' - oli\	ve gray, (5Y 4/1), mild HCl	reaction, a		-
-					\few limestone t	fragments and silt as in 40.	.0-40.4'		_
I _							_		_
_							_	1	-
-							-	1	-
-							-		-
-							-		=
_							_		_
50_	50.0								
-8.0				48-50-50/1	Silty Sand (SM	/)	(5)/ 4/4		Driller's Remark: drilling remains fairly hard
	F4.4	1.0	SS-11	(100/7")	50.0-51.0° - 01\ mottled with 5\	ve gray mottled with light gr Y 6/1), wet, very dense, fine	ray, (5 Y 4/1 - e to coarse		-
-	51.1			, ,	grained, mode	rate HCI reaction, 30-40%	low plastic /		-
-					\fines, carbonat	te material			-
-							=		-
_							_		_
I _							_		_
							_	1	_
_							-	1	-
	55.0						-	1	-
55 <u> </u>	55:P	0.1	\SS-12	50/1	\ \ Limestone Fra	adments			A few limestone fragments and silt
-			(00 .2)	(50/1")	│ \ 55.0-55.1' - oli\	ve gray, $(5Y 4/1)$, mild to m	oderate HCI /-		- Triow infloctorio magniforito and oil
_					reaction, limes	tone fragments			_
_							_		
]							_		
-							-		-
-							-		-
-							-		-
-							-		-
-							-		_
60									



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-04A	SHEET	4	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724269.5 N, 457868.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

						iary, cameau, invi rous, 5-7/6				ONIENTATION : Vertical
WATER	LEVELS	: 25.0 ft l	ogs on 6/	14/07	START : 6/12/2007		LOGG	<u>ER : </u>	Α.]	
1.				STANDARD		SOIL DESCRIPTION		_] ,	<u>5</u>	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		<u> </u>		7	SYMBOLIC LOG	
HH HO		RECOVE		IESI NESULIS	SOIL NAM	ME, USCS GROUP SYMBOL,	COLOR,	9	일	DEPTH OF CASING, DRILLING RATE,
AFE		RECOVE			MOISTURE	E CONTENT, RELATIVE DEN	ISITY OR		ਕੂ	DRILLING FLUID LOSS, TESTS, AND
무유리			#TYPE	6"-6"-6"	CONSISTEN	NCY, SOIL STRUCTURE, MIN	IERALOGY		∑ ≻	INSTRUMENTATION
		0.1	00.40	(N)				<u> </u>	S	D. III
-18.0	60.0	0.1	SS-13	50/1 (50/1")	Limestone Fra	agments ive gray, (5Y 4/1), moderate	LICI	Л		Driller's Remark: 60.0-65.0' drilling slows and becomes much harder
				(30/1)	reaction limes	stone fragments	; noi /	7	- 1	and becomes much harder
-					podotion, iiinoo	storio riagriforito	/	1	- 1	7
-								+	- 1	-
-								4	- 1	
									- 1	
1 7								1	- 1	-
-								1	- 1	Driller's Remark: very hard at 63.0'
-								4	- 1	-
1 _									- 1	
									- 1	
65	65.0							1	-	
-23.0	65.1	0.1	SS-14	50/1	\ Limestone Fra	agments ame as 60.0-60.1'		7	↰	switch to rock coring, see rock core log
-				(50/1")	\65.0-65.1' - Sa	ame as 60.0-60.1'	/	′ ┨	-	
					Begin Rock Co	oring at 65.0 ft bgs	_	1	-	_
					See the next s	sheet for the rock core log			- 1	
1 7								1	- 1	-
-								+	- 1	-
-								4	- 1	-
_								_	- 1	_
									- 1	
1 7								1	- 1	_
-								1	- 1	-
-								4	- 1	=
70								_	- 1	
-28.0									- 1	
									- 1	
								1	- 1	7
-								-	- 1	-
-								4	- 1	=
									- 1	
									-	
1 7								1	-	
-								+	-	-
-								+	-	-
								1	-	
75									-	
-33.0								\neg	-	\neg
-								1	-	7
-								+	-	-
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80								1	-	-
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PROJECT NUMBER: BORING NUMBER:

338884.FL B-04A

SHEET 5 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724269.5 N, 457868.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION : Vertical

WATER	LEVELS : 25.	0 ft bo	gs on (6/14/07 START : 6/12/2007 END : 6/	13/20	07 LOGGER : A. Teal	
>00	(9)			DISCONTINUITIES	Ó	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ZES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH BE	E RU STH, OVEF	(%) Q	FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
JEPT SURF	SOR! ENG	RQD	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	3Y ME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-23.0	65.0					Limestone	Installed HW casing to
-			2	05.7.05.05.00.01.5	F	 65.0-65.4' - pale yellowish brown, 	65.0' – Driller's Remark: 65.5-67.0'
-				65.7, 65.85, 66.2' - Fractures (3), <10 deg, rough, undulating, open 3/16"	Ħ	(10YR 6/2), medium grained, moderate HCl reaction, very weak	very soft (silt lense)
-			3	66.25-66.7' - Fracture, vertical, rough,	Ħ	- (R1), voids (up to 1/8") over 30% of surface, trace casts/cavities (up to	
-	R1-NQ			undulating, changing to 30 deg over last 1" from 66.6-66.7', open 1/8"		3/8"x1/4"), poorly fossiliferous	1
-	5 ft 38%	19		66.9' - Fracture zone	世	 65.4-66.9' - light olive gray, (5Y 5/2), fine to medium grained, moderate 	1
-					╨	HCl reaction, very weak to weak (R1	Driller's Remark: 68.0-68.5'
-			NR		Ш	 to R2), voids (up to 3/16") over 30% of surface, trace linear casts 	very soft (silt lense)
-					Ш	(1/16"x1/16"), poorly fossiliferous No Recovery 66.9-70.0'	R1: 10 minutes
70	70.0				厂		1
-28.0			>10		口	Limestone - 70.0-70.6' - light olive gray, (5Y 5/2),	Driller's Remark: Approximately 3.0' of R2-
l _			- 10	70.0-70.6' - Fracture zone	上	strong HCl reaction, medium strong	NQ lodged in core barrel,
-					╁	(R3), voids (1/16") over 5% of surface, trace spherical	driller removing string of NQ rod to retrieve sample -
-					F	casts/cavities (3/8"), partial infill with	(14:38)
-	R2-NQ 5 ft	0			H	material similar to 65.4-66.9', trace thread-like black (organic) inclusions	Driller's Remark: unable to retrieve sample from core -
-	12%		NR		片	at 70.5' No Recovery 70.6-75.0'	barrel
-					世	-	-
-					世	_	R2: 6 minutes
					₩	_	-
75 -33.0	75.0				厂	Limestone	-
-			>10		╆	- 75.0-79.2' - moderate yellowish brown, (10YR 5/4), mild HCl reaction,	
-				75.8-76.0, 76.0-76.2' - Fractures (2), 60 deg, smooth, undulating, tight	口	very weak to weak (R1 to R2),	Driller's Remark: medium
-			>10	76.6-76.7' - Fracture, 45 deg, smooth,	世	- 77.95-78.05' is extremely weak to very weak (R0 to R1), voids (up to	to hard -
-	R3-NQ		4.0	undulating, tight	世	1/8") over 20% of surface, trace	17:00 stop due to lightning
_	5 ft 84%	51	>10	77.5' - Mechanical break	Ъ	 cavities, large cavity (1-9/16"x1-3/16") partially infilled with 	1
-			2	77.7' - Fracture, horizontal, rough, undulating, open	 	soft (R0) carbonate at 77.2'	17:30 shut down for day
				77.85-78.05' - Fracture zone 78.05-78.8' - Fracture, vertical, smooth,	F		6/14/07 water level at 25.0'
			0	undulating, open 1/8"	F	No Recovery 79.2-80.0'	R3: 6 minutes
	80.0		NR	78.8' - Fracture, <5 deg, rough, undulating, — open 3/8"	片	L	
-38.0			1	80.1' - Fracture, no discerning orientation	片	Limestone - 80.0-84.7' - Same as 75.0-79.2'	Driller's Remark: "stiff" run except soft at last 2.0'
-					世	except moderate HCl reaction,	-
-			2	81.25' - Fracture, 30 deg, rough, undulating,	\vdash	extremely weak to weak (R0 to R1) at 82.9-83.5', trace casts/cavities (up	-
-	D4 NO			open 81.5' - Mechanical break	\vdash	to 3/4"x9/16")	-
-	R4-NQ 5 ft	67	1	81.5-82.4' - Fracture or mechanical break,	厂	-	-
-	94%			vertical and terminating at 60 deg, rough, undulating, tight	口	_	-
-			>10	82.5' - Mechanical break 82.9-83.1' - Fracture zone	士	_	-
-				83.35-83.5' - Fracture zone	\vdash	-	R4: 5 minutes
	05.0		0	83.8-84.0' - Fracture zone	\vdash	h	-
85	85.0		NR		F	No Recovery 84.7-85.0	



PROJECT NUMBER: BORING NUMBER: 338884.FL

B-04A

SHEET 6 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724269.5 N, 457868.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION: Vertical

WATER	LEVELS: 25.	0 ft b	gs on 6	S/14/07 START : 6/12/2007 END : 6/	13/20	07 LOGGER : A. Teal	
≥∩≘				DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) Q	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
-43.0	COR	R Q	\Box	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS Limestone	DROPS, TEST RESULTS, ETC.
-			>10	85.0-85.5' - Fracture zone 85.7' - Fracture, horizontal, rough, undulating, open	Ħ	 85.0-86.35' - Same as 75.0-79.2' except cavities (1-3/16"x3/8") at 86.3' over 50% of surface 	-
-	R5-NQ		1	86.2-86.3' - Fracture, 30 deg, rough, undulating, open		 86.35-87.65' - yellowish gray, (5Y 7/2), fine grained, moderate HCI reaction, medium strong (R3), trace 	SC-1 collected at 86.35- 87.4' Driller's Remark: 87.0-87.5'
-	5 ft 78%	41	2	87.35-87.55' - Fracture, 60 deg, smooth, stepped, tight	77	voids (up to 1/16"), trace cavities (5/16"x1/16") Fat Clay (CH)	soft -
-			3	88.25-88.35' - Fracture, 30 deg, rough, undulating, open 88.35-88.9' - Fracture, vertical, smooth,		\\\87.65-87.8' \\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	R5: 6 minutes
90 <u> </u>	90.0		NR	undulating, tight 88.7' - Fracture, horizontal, rough, undulating, tight	Ħ	fine grained, moderate HCl reaction, very weak to weak (R1 to R2), trace voids (up to 1/16"), <2% casts (up to	
- -			>10	90.0-90.2' - Fracture zone 90.5-90.95' - Fracture zone		1/4"x1/4") No Recovery 88.9-90.0' 90.0-91.9' - yellowish gray, (5Y 7/2),	soft - SC-2 collected at 90.9-
-	R6-NQ		1	91.8' - Fracture, horizontal, rough, undulating, open	Ħ	fine to medium grained, very strong HCl reaction, very weak (R1), voids (up to 3/16") over 15-20% of surface,	91.8' _
-	5 ft 38%	25		орен		trace spherical casts and cavities (up to 3/8") No Recovery 91.9-95.0'	- -
-			NR			- ····································	R6: 3 minutes
-					世	-	-
95 <u> </u>	95.0		-	_	L	Limestone	_
-			3	95.4' - Bedding plane, horizontal, smooth, planar, tight	H	95.0-100.0' - very pale orange to yellowish brown, (10YR 8/2 to 10YR	-
-			4	95.65-95.8' - Fracture, 30 deg, smooth, undulating, open	片	6/2), fine to medium grained, strong HCl reaction, very weak to weak (R1	-
-	R7-NQ			96.05' - Fractures (2), <30 deg, smooth, undulating, open		to R2), voids (up to 3/16") over 15-20% of surface, no visible cavities	-
_	5 ft 100%	61	>10	96.4' - Fracture, 25 deg, smooth, stepped, tight	」	except 98.0-98.6' 10% casts/cavities (up to 1"x3/8"), poorly fossiliferous,	-
_			1	96.6-96.7' - Fractures (2), horizontal, smooth, undulating, open 97.0-97.7' - Fracture zone (8), 0-30 deg,		black (organic) laminae at 97.9'	-
100	100.0		1	rough, undulating, open 98.35, 98.45' - Fractures (2), <10 deg, rough, undulating, tight			R7: 5 minutes
-58.0			>10	99.55' - Bedding plane, horizontal, rough, undulating, tight 100.2, 100.4' - Fractures (2), horizontal,	Ħ	100.0-100.55' - Same as 95.0-100.0' 100.55-103.4' - very pale orange,	
-			2	smooth, undulating, open 100.55, 100.9' 101.4, 101.85, 102.35, 102.55, 102.7, 102.9' -		(10YR 8/2), fine to medium grained, strong HCl reaction, very weak to weak (R1 to R2), trace voids (up to	_
-	R8-NQ 5 ft 68%	26	5	Fractures (6), horizontal, smooth, undulating, open	+	- 1/16"), no visible casts/cavities -	-
-			2	102.95-103.15' - Fracture zone, black staining over 75% of surface		No Recovery 103.4-105.0'	-
_			NR		\Box	-	R8: 4 minutes
105	105.0		\square		⊭		



PROJECT NUMBER:

33884.FL

BORING NUMBER:

B-04A

SHEET 7 OF 9

ROCK CORE LOG

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724269.5 N, 457868.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

CORING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, NQ tools, NW casing

				ILINT : OME 330 3/N 100073, Midd Totally, NQ 10013, NW			ONENTATION: Vertical
WATER	LEVELS: 25.	.0 ft b	gs on	6/14/07 START : 6/12/2007 END : 6	/13/20	D7 LOGGER : A. Teal	
>	[DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SUR	COF	A Q	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-63.0 -			>10	105.2-106.15' - Fracture zone or bedding plane, horizontal, smooth, undulating, open		Limestone 105.0-107.5' - very pale orange, (10YR 8/2), fine to medium grained,	-
-			>10	106.15-106.4' - Fracture zone 106.5, 106.7, 106.95, 107.0, 107.05, 107.3, 107.4' - Bedding plane (7), horizontal,	\pm	strong HCl reaction, very weak to weak (R1 to R2), trace voids (up to 1/16"), no visible casts/cavities	-
-	R9-NQ 5 ft 50%	0	5	smooth, planar to undulating, open		No Recovery 107.5-110.0'	_
-			NR			- -	R9: 3 minutes
	110.0			_		_	_
-68.0 -			NA		-	Carbonate Silts And Sands (SP-SM) 110.0-111.4' - yellowish gray to light	Unclear if material is cuttings or very poorly indurated rock that was destroyed by drilling action
-			NA	111.65, 111.95' - Fractures (2), <10 deg,		olive gray, (5Y 7/2 to 5Y 5/2), very strong HCl reaction, grades from 60% silt-sized particles to 40% sand-sized particles to 80% medium	destroyed by drilling action
-	R10-NQ 5 ft 74%	12	>10	rough, undulating, open (small rock fragments associated with fracture) 112.5' - Mechanical break 112.8-113.3' - Fracture zone, possibly due to	臣	sand-sized particles and 20% silt-sized	-
-			>10	casts/cavities	\pm	Limestone 111.4-113.7' - very pale orange, (10YR 8/2), fine to medium grained,	
115_ -73.0	115.0		NR	445 0 445 01 Freshure Tone		extremely weak to weak (R0 to R2), 111.4-112.0' no visible voids or cavities, at 112.0-113.7' voids (up to	R10: 3 minutes
-75.0			>10	115.0-115.2' - Fracture zone 115.2-115.4' - Bedding plane (3), horizontal, smooth, planar, open 115.55, 115.75, 115.95' - Fractures (3),		3/16") over 15-20% of surface, 10% - casts/cavities (up to 9/16"x3/4") No Recovery 113.7-115.0' Limestone	-
-	R11-NQ		1	horizontal, rough, undulating, open 116.55' - Fracture, <10 deg, rough, undulating, open		 115.0-116.8' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), medium to coarse grained, strong 	Driller's Remark: 116.5- 120.0' very soft
-	5 ft 36%	11	NR	andading, opon		HCl reaction, very weak (R1), voids over 30-60% of surface (as spaces between fossil fragments; almost "coquina" appearance), trace cavities (up to 3/8"x5-7/8"), highly	- -
120	120.0				H	fossiliferous No Recovery 116.8-120.0'	R11: 3 minutes
-78.0 -				-		No Recovery 120.0-125.0'	Driller's Remark: no recovery 6/14/07
-						- -	-
-	R12-NQ 5 ft 0%	0	NR		揖		
-					声	_	-
					H	-	R12: 2 minutes
125	125.0				╫		-



PROJECT NUMBER: BORING NUMBER: 338884.FL

B-04A

SHEET 8 OF 9

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724269.5 N, 457868.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

				inti . Civin 330 3/14 100073, mad rotary, NQ tools, NVV			ONENTATION: Vertical
WATER	LEVELS : 25	.0 ft b	gs on (/13/20		
≥∩₽	, ©			DISCONTINUITIES	<u>ق</u>	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEDTIL OF CASINO
불병은	RUN H, 4	(%) Q	URI	DEDTIL TYPE OPIENTATION POLICUNIESS	- 5	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
T F F X	RE COO	αD	ACT R F(DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	MB(WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
HSH	SHR	R	FR. PE	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SY	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-83.0				125.0-125.9' - Fracture zone	\top	Limestone	
-			>10		╁	- 125.0-125.35' - Same as	-
-					-	_ 115.0-116.8' 125.35-125.6' - yellowish gray, (5Y	-
-					╨	- 7/2), fine grained, strong HCl	_
I -					上	reaction, very weak (R1), trace voids	_
	R13-NQ 5 ft	0			ᅪ	(up to 1/16"), no visible cavities - 125.6-125.9' - Same as 115.0-116.8'	
	18%	U	ND			No Recovery 125.9-130.0'	
			NR		₽		
-					世	-	Driller's Remark: very soft
-					╁	-	to 128.5'
-					믚	_	R13: 4 minutes
130 <u>-</u> -88.0	130.0			-	+	Coulomate Cilta Av. J. Co. J. (CAR)	
-08.0			NA		111	Carbonate Silts And Sands (SM) - 130.0-131.6' - yellowish gray to light	possible alluvial/fluvial deposit -
1			, .]	olive gray, (5Y 7/2 to 5Y 5/2), loose,	,000
						strong HCl reaction, fine to medium	
-			NA		11111	grained sands Limestone	1
-	R14-NQ			131.85-132.25' - Mechanical break	厈	131.6-132.8' - yellowish gray, (5Y	=
-	5 ft	0	>10	132.0-132.9' - Fracture, vertical, rough, undulating, open	╂┷	 7/2), strong HCl reaction, extremely 	-
-	56%			132.25-132.5' - Fracture zone	丌	weak to weak (R0 to R2), voids (up to 1/16") over 5-10% of surface and	-
-				133.2, 133.3, 133.4' - Fractures (3), <10 deg,	┸	- increasing with depth, no visible	_
l _			NR	rough, undulating, healed	尸	_ casts except 133.55-133.8' 20-30%	
						casts (up to 1-3/4"x1")	R14: 5 minutes
135	135.0				Ш	- No Recovery 132.8-135.0'	7
-93.0				_	111	Carbonate Silts And Sands (SM)	Possible cuttings or infill
-			NA		1111	- 135.0-136.35' - Same as	-
-						_ 130.0-131.6'	-
-			>10	136.35-136.7' - Fracture zone	- 1	- Limestone	-
-				126 05' Fracture or machanical brook	ᅪ	_ 136.35-137.6' - yellowish gray, (5Y	_
_	R15-NQ 5 ft	10	1	136.95' - Fracture or mechanical break, horizontal, smooth, planar		7/2), fine grained, strong HCl reaction, medium strong (R3), no	
	52%	10		137.05' - Fracture, horizontal, rough,	Н	visible voids or cavities except 10%	
1 -				undulating	Ш	voids at 137.4' and 137.6'	1
I -			NR		1-	- No Recovery 137.6-140.0'	-
-			INIX		1	-	R15: 26 minutes
1					+	-	-
140_ -98.0	140.0			-	1	Carbonate Silts And Sands (SM)	Possible cuttings or infill
-30.0			NA		111	- 140.0-141.5' - Same as 130.0-131.6'	- Cossible cuttings of Ittilli
I -					1	except grades from 60% fines to fine	
			NA			sand at top to 80% medium sand and 20% fines at bottom	
1 -			>10	141.5-141.9' - Fracture zone	\Box	Limestone	1
-	R16-NQ			141.9-142.6' - Fracture, vertical, rough,	1	141.5-142.9' - yellowish gray, (5Y	
-	5 ft	0	>10	undulating, open 142.35' - Fracture, horizontal, rough,	厈	 7/2), fine to medium grained, strong 	-
-	58%			undulating, open	╁┷	HCl reaction, very weak (R1), trace voids (up to 1/16"), no visible cavities	-
-				142.45' - Fracture, horizontal, rough,	\blacksquare	- No Recovery 142.9-145.0'	-
-			NR	undulating, open 142.6-142.9' - Fracture zone	<u>_</u>	_]
I -				1 12.0 172.0 1 Tablate 20116			R16: 4 minutes
145	145.0				\vdash		
					1		



PROJECT NUMBER: BORING NUMBER:

338884.FL B-04A

ROCK CORE LOG

SHEET 9 OF 9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724269.5 N, 457868.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

WATER	LEVELS : 25	.0 ft b	gs on (6/14/07 START : 6/12/2007 END : 6/1	13/20	07	LOGGER : A. Teal	
≥ ∩ ⊕	6)			DISCONTINUITIES	Ğ		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	C LOG		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	E RU	(%) 🛛	E.0	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
LEV EV	SORE	RO	RAC ER I	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	3 V ME		AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-103.0	016	ш.	шш		0)	⊢	145.0-146.5' - pale yellowish brown,	SC-3 collected at 145.0-
-			0	-	Ħ	₽	(10YR 6/2), fine grained, moderate	145.95'
-				145.95' - Mechanical break	Ħ	₽	HCl reaction, weak to medium strong (R2 to R3), trace voids (up to 1/16"),	-
-			2	- 146.5, 146.75, 147.2, 147.85, 147.95' -	世	┢	trace casts and cavities (up to	-
-	D17 NO		\vdash	Fractures (5), horizontal, rough, undulating, -	Н	╁	1/8"x3/16") 146.5-147.2' - Same as 145.0-146.5'	-
-	R17-NQ 5.2 ft	51	3	open	匚	₽	except voids (1/16") over 10-15% of	-
-	100%			147.6-147.8' - Mechanical break, extremely weak section	世	ŀ	surface 147.2-150.15' - pale yellowish brown	-
-			3	147.85-148.15' - Fracture, vertical, rough, undulating, open	団	ŀ	to very pale orange, (10YR 6/2 to	-
-				148.15, 148.5' - Fractures (2), horizontal,	╁	╁	10YR 8/2), fine grained, strong HCI reaction, very weak (R1), thin	R17: 4 minutes
450			3	rough, undulating, open 149.05' - Bedding plane, smooth, planar to	F	ŀ	alternating bands of pale yellowish brown to very pale orange (10YR 6/2	-
150 <u> </u>	150.2			undulating, open —		1	to 10YR 8/2) from 147.7-148.45',	Total depth of boring
-				\ 149.45' - Bedding plane, smooth, planar to \ \ \ \ undulating, open	1	$\vdash \setminus$	extremely weak (R0) rock from 147.6-147.8', voids (up to 1/16") over	150.15' below ground surface at 14:10
1 -				\149.8' - Bedding plane, smooth, planar to	1	┟╽	5-15% of surface and decreasing	First batch grout: 32
-				undulating, open	1	F	with depth, trace casts/cavities (up to 3/8"x3/16")	gallons water, 6 47-lb bags - of Portland cement up to
-				-		ŀ	Bottom of Boring at 150.2 ft bgs on	approximately 100.0' below
-				-		ŀ	6/13/2007	ground surface - Second batch grout: 32
-				-		ŀ		gallons water, 6 47-lb bags
-				-		ŀ		of Portland cement up to approximately 40.0' below
-				-	1	ŀ		ground surface - pull
-				-	1	ŀ		casing up to 25.0' below - ground surface
-					1	Г		Third batch of grout: 32
-				-	1	r		gallons water, 5 47-lb bags - of Portland cement up to
-				-	1	r		ground surface Total grout: 96 gallons of
-				-	1	r		water, 17 47-lb bags of
-				-		r		Portland cement
1 -				-	1	r		-
_				-	1	r		-
-				-	1			-
-				_	1			-
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PROJECT NUMBER:	BORING NUMBER:					
338884 FI	B-05	CHEET	4	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724427.7 N, 457904.5 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

						ary, auto nammer, AVVJ rous,			ORIENTATION : Vertical
WATER	LEVELS	: 4.0 ft b	us on 5/8/		START : 5/7/2007	END: 5/9/2007	LUGGE	:K : N.	Jarzyniecki COMMENTS
30₽				STANDARD PENETRATION		SOIL DESCRIPTION		- 8	COIVIIVIEN 15
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	SOIL NAM	ME, USCS GROUP SYMBOL	COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
A B B B B B B B B B B B B B B B B B B B		RECOVE	ERY (ft)		MOISTURI	E CONTENT, RELATIVE DE	NSITY OR	Ğ	DRILLING FLUID LOSS, TESTS, AND
E R S			#TYPE	6"-6"-6"	CONSISTEN	NCY, SOIL STRUCTURE, MI	NERALOGY	Ĭ,	INSTRUMENTATION
<u> </u>				(N)	Doorly Credo	d Cand (CD)		S	
42.9	0.0			1-2-1	Poorly Grade 0.0-1.0' - light	t gray, (N7), dry to moist, v	erv loose.		_
l -		1.5	SS-1	(3)	very fine silica	a sand, trace nonplastic fine	es, trace very		_
	1.5					lack particles, roots	/		
-					Silty Sand Wi	ith Organics (SM) xy yellowish brown grading	to dark	T]
-					\ vellowish brow	vn, (10YR 2/2 to 10YR 4/2)), moist, very	1]
-					loose, very find	le to fine grained, silica sar	nd, 15-20%	1	1
-					monplastic org	gariic iiries		1	-
-								1	-
-								-	-
-								-	-
5 37.9	5.0				Boorby Credo	d Cand With Cilt (CD CM)		16.17	_
37.9				5-6-4		ed Sand With Silt (SP-SM) e with dark yellowish orang		411	
l -		1.1	SS-2	(10)	yellowish brow	vn staining, (N9, with 10YR	R 6/6 and	111	_
l _	6.5				10YR 6/2), we	et, loose, very fine to fine g plastic fines, trace angular	rained, silica black coarse	T^{-}	_
l _						aterial (pyrite), trace roots	black source /	J	
-								1	1
-								1	1
-								1	-
-								1	-
								-	-
10 32.9	10.0				Silty Sand (SI	M)		111	-
-		1	000	3-3-3	10.0-11.3' - pa	alé yellowish brown, (10YR		-	-
-		1.3	SS-3	(6)		e to fine grained, silica sar es, trace very fine sand-siz		4111	-
-	11.5				particles	es, trace very fille safiu-siz	eu black	1	-
_								1	_
l _]	_
l _								_	
-								1]
-								1]
-								1]
15	15.0							1	
27.9	13.0				Silty Sand (SI	M)		111	-
-		1.1	SS-4	3-2-2	15.0-16.1' - Sa	ame as 10.0-11.3' except v	very loose	1	
-		'.'	33-4	(4)				411	-
-	16.5	-		-				-	-
-								4	
-								4	
I -				1				1]
I -								1	
				1]
]
20								1]
							_	\top	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-05	SHEET	2	OF	10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724427.7 N, 457904.5 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

						ry, auto hammer, AWJ ro			ORIENTATION : Vertical
WATER	LEVELS	: 4.0 π b	gs on 5/8		START : 5/7/2007	END: 5/9/2007 SOIL DESCRIPTION		R : N.	Jarzyniecki COMMENTS
> 및 글 글	CAMPLE	INTERVA	11 (6)	STANDARD PENETRATION		JOIL DESCRIPTION		8	COMMENTS
ON (SAIVIPLE		. ,	TEST RESULTS	SOIL NAM	IE, USCS GROUP SYME	BOL, COLOR,	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
FAC		RECOVE			MOISTURE	E CONTENT, RELATIVE ICY, SOIL STRUCTURE,	DENSITY OR	ID II	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTEN	ICT, SOIL STRUCTURE,	WIINLIVALOGT	SYN	INSTRUMENTATION
22.9	20.0				Sandy Fat Cla	y (CH)	0/4) / 1/5		
-		1.4	SS-5	2-3-4 (7)	20.0-21.4' - light	ht greenish gray, (5GY no dilatancy, no HCl re	8/1), wet, stiff,		-
-	21.5			(1)	mottled with da	ark yellowish orange (1	0YR 6/6), 30%		-
-						silica sand, 5-10% ver , scattered pockets of i		1	_
-						ite particles throughout	t, up to 1/8" in	1	_
					size			1	_
]	
]	
25	25.0						_		_
17.9				5-6-5	Silty Sand (SN 25.0-25.7' - vel	/l) llowish gray, (5Y 7/2), v	wet loose verv		_
l -		0.7	SS-6	(11)	fine to fine grain	ined, silica sand, 15-20)% nonplastic /	1	_
-	26.5				\tines, trace ver	ry fine sand-sized blacl	k particles	1	_
-								1	_
-								-	_
-								4	-
-								-	-
-								-	-
-								-	-
30 <u> </u>	30.0				Silty Gravel W	/ith Sand (GM)			
-		1.0	SS-7	1-3-3	30.0-30.95' - ye	ellowish gray, (5Y 8/1),	wet, stiff, low to	╢	-
-		1.0	33-1	(6)	medium plastic	city, rapid dilatàncy, no ind laminated appearar	HCI reaction, nce. 50% of	╂╨	-
-	31.5			 	sample is fine	to coarse gravel-sized	material, trace	┨	-
-					of fine grained	stone appearance, also conglomerate	nas appearance	┨	-
-								┨	-
-								┨	-
-								┨	-
-								1	-
35	35.0							1	-
7.9	00.0				Sand With Silt			111	
-		1.2	SS-8	4-6-5 (11)	35.0-36.15' - ye dense very fin	ellowish gray, (5Y 7/2), ie to fine grained, no H	wet, medium		<u> </u>
-	36.5			(11)	sand, with trac	e medium dark gray (N	14) mottling, 10%	11:11	-
-	- 3.0				nonplastic fine	S	/	1	_
-								1	_
_								1	_
-]	_
]]
40								\perp	
									<u> </u>



PROJECT NUMBER:

338884.FL

B-05

SHEET 3 OF 10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724427.7 N, 457904.5 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

						iry, auto nammer, AvvJ rous,			ORIENTATION : Vertical
WATER	LEVELS	. 4.U π b	gs on 5/8/		START : 5/7/2007	END: 5/9/2007 SOIL DESCRIPTION	LUGGE	₹ : N.	Jarzyniecki COMMENTS
≥©£	- · · · - ·	- 151	1 (6)	STANDARD PENETRATION		JUIL DESURIPTION		8	COMMEN 12
N AN	SAMPLE	INTERVA	L (ft)	TEST RESULTS	SOIL NAM	ME, USCS GROUP SYMBOL	COLOR	CLC	DEPTH OF CASING, DRILLING RATE,
ACE		RECOVE	ERY (ft)			E CONTENT, RELATIVE DEI		30 N	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6"	CONSISTEN	ICY, SOIL STRUCTURE, MI	NERALOGY	SYMBOLIC LOG	INSTRUMENTATION
<u>о</u> мш 2.9	40.0			(N)	Elactic Silt An	nd Fat Clay (CH)		0)	Driller's Remark: Loss of circulation after
	40.0	l		1-2-2	40.0-41.5' - gra	ayish olive green, (5GY 3/2	2), wet, soft,		pulling up SPT sampler –
-		1.5	SS-9	(4)	high plasticity,	no dilatancy, materials are	layered in		_
-	41.5					ay giving a mottled appeara clay, mottled with another			_
l _					clay is olive gra	ay (5Y 3/2), high plastic, no	o dilatancy,	1	_
l _						n, silt is yellowish gray (5Y c, rapid dilatancy, very milo			
					reaction	o, rapid dilatarioy, very friid			
								1	
-							•	1	
-								1	1
45	45.0							1	
-2.1	10.0					d Sand With Silt (SP-SM)			-
-		1.3	SS-10	3-5-5		lle yellowish brown with me (10YR 6/2 with N4 staining		11	-
-	40.5	1.0	00 10	(10)	very fine to fine	è grained, no HCl reaction	silica sand,	111	-
-	46.5				10-15% nonpla	astic fines, 1/2" lens of gra	yish olive	\mathbf{I}^{-}	-
-					sand-sized pyr) fat clay (CH), trace very fi rite fragments	ne to coarse	┨	-
-					(ос.та опдострут			┨	-
-								-	-
-								-	_
-							,	1	_
l -								1	_
50	50.0							.	_
-7.1				4.0.0	Sandy Lean C	Clay (CL) eenish gray and grayish oli	ve green		_
l _		1.5	SS-11	1-2-3 (5)	(5GY 6/1 and 5	5GY 3/2), wet, stiff, high pl	asticity, no		
l _	51.5			,		HCI reaction, 40% very fine and pockets of other mater			
						s than 10% of sample, yell			
-						seam, pocket of medium	sand-sized	1	
-					white particles	, pockets of silty material		1	_
-								1	- T
-							,	1	-
-								1	-
	^							1	-
55 <u> </u>	55.0				Poorly Grader	d Sand With Clay (SP-SC)		17.1	-
-		1.5	SS-12	1-1-2	55.0-56.5' - gre	eenish gray and grayish oli	ve green,		-
-		1.5	33-12	(3)	(5GY 6/1 and 5	5GY 3/2), wet, stiff, no to n hite particles, lenses of gra	niid HCl ivish green		-
-	56.5					ay (CH) similar to 40.0-41.	ɔ̄' materials, ┌	177	-
-						nic lens, lenses of other ma e, sample has mottled app		-	_
-					1070 OF Sample	o, sample has mouleu app	Jaiance J		_
-							,	1	_
-									
I -									
60							·		
								Г	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-05	SHEET	4	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724427.7 N, 457904.5 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

			gs on 5/8/		START: 5/7/2007	ry, auto hammer, AW			. NI	ORIENTATION : Vertical
	LEVELS	. 4.0 11 0	ys 011 3/6/		START . 5/1/2007	END : 5/9/20 SOIL DESCRIPTI		LUGGER		Jarzyniecki COMMENTS
§₽£	SAMPI F	INTERVA	AL (ft)	STANDARD PENETRATION					F00	
BEL SE A TON		RECOVI	, ,	TEST RESULTS	SOIL NAM	IE, USCS GROUP SY	YMBOL, COLOR	R,	CIC	DEPTH OF CASING, DRILLING RATE,
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)		E CONTENT, RELAT ICY, SOIL STRUCTU			SYMBOLIC LOG	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
-17.1 - - -	60.0	1.5	SS-13	0-1-2	no HCl reaction	/I) Illowish gray, (5Y 7/2 n, silica sands, 30% sand-sized black p	√ nonplastic fir	oose, - nes, _		- - -
- - - 65_ -22.1	65.0			2-1-3	Clayey Sand (: 65.0-66.5' - ve	SC) Ilowish gray, (5Y 7/2	2), wet. verv lo	- - - - -		- - - -
- - - -	66.5	1.5	SS-14	(4)	no HCl reaction	n, with trace gray sl ls, 35% medium pla	taining, very fir	ne to		- - - - -
70 -27.1	7 9:9	0.0	∧SS-15,	50/1	No Recovery 7	70 070 1'		-		- - 18:42 Water level 5.0' below ground surface,
		0.0	33-13	(50/1")	No Recovery	70.0-70.1				Driller's Remark: 70-71.5' hard material, maybe rock layer, soft easy Driller's Remark: Drilling with intermittent light chatter, switch to newer tricone roller Driller's Remark: Drill bit 2-7/8" in diameter
-7532.1	75.0 75.3	0.3	SS-16	50/3.25 (50/3.25")	moderate gray	agments Ilowish gray, light ol , (5Y 7/2, 5Y 8/8, ar lar and subangular	nd N5), mild H		_	5/8/07, 07:45 Water level 4.0' below ground surface, 4" HW casing installed to 70' below ground surface Driller's Remark: rock fragments are caving into bottom of borehole, advanced 4" HW casing to 75' below ground surface
80									Ш	
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PROJECT NUMBER:

33884.FL

B-05

SHEET 5 OF 10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724427.7 N, 457904.5 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER	LEVELS	: 4.0 ft bo	gs on 5/8/	07 S	START : 5/7/2007 END : 5/9/2007	LOGGEF	R : N.	Jarzyniecki
				STANDARD	SOIL DESCRIPTION		П	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	RECOVE		PENETRATION TEST RESULTS 6"-6"-6"	SOIL NAME, USCS GROUP SYMBOL, COLC MOISTURE CONTENT, RELATIVE DENSITY CONSISTENCY, SOIL STRUCTURE, MINERAL	OR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
-37.1 - - - - -	80.0		(SS-17)	(N) 50/2 (50/2")	Limestone Fragments 80.0-80.1' - greenish gray, (5GY 6/1), moderate reaction, 15% voids/casts on surface, very poorecovery Begin Rock Coring at 81.0 ft bgs See the next sheet for the rock core log	e HCI		Driller's Remark: Advanced 4" HW casing to 78.6' below ground surface, switch to NQ wireline coring assembly
85 -42.1 - - - - - -						- - - - - - -		- - - - - - - -
90 -47.1 - - - -						- - - - - - - -		- - - - - - - - -
95_ -52.1 - - - - - -						- - - - - - -		- - - - - - - - - -
100							$ldsymbol{f eta}$	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-05	SHEET	6	OF	10	

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724427.7 N, 457904.5 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

			<u> </u>	NENT : CIVIE 33 3/N 3 10023, Mud 10tally, NQ 10018, HW 0	aon ig		ORIENTATION . Vertical
WATER	LEVELS: 4.0	ft bgs	s on 5	/8/07 START: 5/7/2007 END: 5/	9/200	7 LOGGER : N. Jarzyniecki	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		رم	DESCRIPTION	SYMBOLIC LOG		
N N N	ĭÃ≿	_	ES -	DESCRIPTION	_ _	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
# # # # # # # # # # # # # # # # # # #	지 된 프로 트로 기	(%) Q	128	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	<u> </u>	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
E F >	#98	Ω	P P F	PLANARITY, INFILLING MATERIAL AND	₩	AND ROCK MASS	SMOOTHNESS, CAVING ROD
SSE	899	8	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S≺	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
_	81.0				+	Limestone	First core run on 5/8/07
l -	01.0		1			- 81.0-85.3' - light olive gray, (5Y 5/2),	Thist core full on 5/6/07
			'	81.7' - Bedding plane, rough, undulating,	ш	moderate HCl reaction, weak to	
1 -				organic material (brownish black) covering	Н	medium strong (R2 to R3),	1 1
-			2	80% surface, open 5/8"	₽	 spheroidal voids up to 25% surface 	1 -
1				82.3' - Bedding plane or mechanical break,	Н	(<1/16") in size, moderately	
1 -	R1-NQ			horizontal, rough, undulating, open up to 1"		fossiliferous (casts, molds, up to	1 1
-	5 ft	90	1	82.6' - Fracture, 80 deg, rough, undulating,	ш	 3/8"), trace irregularity shaped 	1 -
I _	100%			tight	$oldsymbol{H}$	cavities 25% infilled with very fine]
1				83.6' - Bedding plane, horizontal, rough,	Н	grain yellowish gray (5Y 7/2)	
l			3	undulating, tight	ш	- material, trace to 7% organics,	1 1
85				84.3' - Fracture, 25 deg, rough, undulating,		brownish black (5YR 2/1) lamination	
-42.1				fossil casts/molds on fracture surface	$\vdash \vdash$	at 81.7', 83.6' and 84.2' and short (1" long), discontinuous lamination	R1: 9 minutes
1 -			0	84.8' - Bedding plane, horizontal, rough,	1-1	85.3-86.0' - Same as 81.0-85.3'	1 1
1 -	86.0			undulating, 1" thick, tight 84.9' - Fracture, vertical, rough, undulating,		except yellowish gray, (5Y 8/1),	Drillor's Pomark: 96 51 <50/
Ι _			2	grayish, staining 10% surface, tight	Ш	strong HCl reaction, medium strong	Driller's Remark: 86.5' <5% circulation loss, regained at -
1			-	85.3' - Mechanical break	H	to strong (R3 to R4), 5-10% voids	87'
1 -				86.1' - Mechanical break	┰	(<1/16"), very fine grain interval	~ ·
I -			2	86.3' - Fracture, 80-90 deg, rough,	┸	_ 86.0-87.1' - yellowish gray, (5Y 8/1),	-
			_	undulating, gray staining over 15-20%		very fine to fine grained, strong HCl	
_	R2-NQ		0 /	surface, tight	1Ш	reaction, medium strong (R3), trace	1 1
-	5 ft	30		86.85' - Bedding plane, horizontal, smooth,	+	voids (1/16"), organics rich carbonate	1 -
l _	42%			planar, 1/4" carbonate silt infill, tight	╨	silt bed (1/4" thick)	
				87.1' - Bedding plane, horizontal, rough,		87.1-88.1' - Same as 86.0-87.1'	
I			NR	undulating, open 1"	╁	 except very weak (R1), moderately fossiliferous (casts, shells, molds), 	1
90				87.75' - Fracture, 10-15 deg, rough,	щ	10-15% fine to medium grained sized	
-47.1				undulating, tight	Н	_ medium dark gray (N4) particles in	R2: 8 minutes
1 -						rock matrix, 20-25% elongated and	1 1
-	91.0				ш	spherical shaped void/casts (<1/16),	1 -
I _			0		Н	yellowish gray discoloration on	
			0		Н	30-40% of material	
-				1	ш	 No Recovery 88.1-91.0' 	1 -
I -			0		\perp	Limestone	-
1					Н	91.0-95.9' - yellowish gray, (5Y 8/1),	
-	R3-NQ			93.1' - Fracture or mechanical break, 20 deg,	т	- medium grained, strong HCI	1 1
-	5 ft	98	1	rough, undulating, tight		reaction, very weak to weak (R1 to R2), highly fossiliferous (casts ,	I -
	98%			93.5' - Mechanical break	Щ	molds) fossils up to 1/2" in size,	
1 -				33.3 Modiamodi Siodit	H	voids (<1/16") up to 25% surface,	1
			0		╂╫	trace micro (<1/16" thick) lamination	-
95				-	Ð	— - brownish black in color - from	I ₂₀ ,
-52.1			0			91.0-92.0' and 93.5-99.0', trace	R3: 4 minutes
1 -			U		14	spherical cavities up to 3/8" partially	1 1
-	96.0		NR	1	+	 filled with black very soft fine material] -
I .			0	96.2' - Mechanical break, horizontal, rough,		organics), medium gray (N5) fine	l J
1			١	undulating, open 1/2"	\square	grain particles in rock matrix,]
1 -				1	╂┼┤	powder/chalk like texture to rock	-
1 -			2		₽₩	No Recovery 95.9-96.0' Limestone	1 -
			-	97.65' - Bedding plane or mechanical break,		_ 96.0-104.0' - Same as 91.0- 95.9'	
1 -	R4-NQ			horizontal, rough, undulating, tight	П	except large 1-1/4" cavity at 96.6',	1 1
1 -	5 ft	90	1	97.8' - Bedding plane or mechanical break,	₩	80% filled with carbonate silt, light	SC1 collected at 09 5 00 6!
	100%			horizontal, rough, undulating, brownish black	\mathbb{H}	_ olive gray (5Y 6/1) from 96.2-96.8'	SC1-collected at 98.5-99.6'
1 -				(organic) covering <50-60% surface, open	H	and 97.3-98.7', organics also	1
1			1	1/16"	田	appears up to 1" long <1/32" thick	1 -
100_				98.0' - Fracture or mechanical break,	\Box	laminations at 96.3' and 97.3'	1
-57.1				horizontal, rough, undulating, tight	H		R4: 6 minutes
1 -			1	98.5' - Mechanical break	1-1	-	1 1
	101.0				一		
1							
			1	I	1		1



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-05

SHEET 7 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724427.7 N, 457904.5 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

CORING	INE I HOD A	ND EC	JUIPIV	MENT: CME 55 S/N 316625, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
WATER	LEVELS: 4.0	ft bgs	s on 5	/8/07 START : 5/7/2007 END : 5/	9/200	LOGGER : N. Jarzyniecki	
>	(0			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS.	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
DEPTH SURFA ELEVA	CORE LENGT RECO	R Q D (%)	FRACT PER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMB0	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-			0	99.6' - Fracture, 10-15 deg, rough, undulating, tight 101.2' - Mechanical break, horizontal, rough,		Limestone - 101.0-105.0' - yellowish gray, (5Y 8/1), strong HCl reaction, very weak	-
-			2	planar, <1/16 gap 102.2' - Fracture, 45 deg, rough, undulating,	H	to weak (R1 to R2), over all powder/chalk-like feel, 15-20%	-
-	R5-NQ 5 ft	36	>10		Ħ	voids/casts, highly fossiliferous (forams and foram casts), 10% fine grain medium dark gray, (N4)	-
-	80%		8	103.05, 103.15, 103.25, 103.3, 103.35, 103.45, 103.5, 103.6, 103.7, 103.8, 104.0, 104.1, 104.2, 104.25, 104.35, 104.5, 104.6,	Ħ	particles (probably pyrite), yellowish gray (5Y 7/8) staining from 101.0-103.0', voids tend to be	_
105 <u> </u>				104.7' - Bedding plane or mechanical break	H	concentrated in a horizontal orientation	R5: 8 minutes
-	106.0		NR	undulating, open 1/16" 106.1' - Mechanical break, horizontal, rough,		No Recovery 105.0-106.0' Limestone	_
-			>10	undulating, open 1/8" 106.3-106.45' - Fracture zone, 1"-1-3/8" sized	Ħ	106.0-107.0' - yellowish gray, (5Y 8/1), very fine grained, strong HCI reaction, very weak to weak (R1 to	-
-			2	rock fragments 106.5' - Fracture, 80 deg, smooth, planar, <1/22" organics on surface, tight	Ħ	 R2), stained light gray (N7) over 40% of entire sample, highly fossiliferous 	-
-	R6-NQ 5 ft 90%	56	2	106.9' - Fracture, 50 deg, rough, undulating, tight 107.4' - Fracture or mechanical break,	Ħ	(forams and foram casts,echinoderms), 20-25% fine grainedpyrite in rock matrix, gradational with	-
			2	horizontal, rough, undulating, tight 107.8' - Fracture, 50-60 deg, rough,	H	107.0-110.5' - 107.0-110.5' - Same as 106.0-107.0' except fine grained, molds and casts	-
110 -67.1 -			1	undulating, tight 108.3' - Fracture or bedding plane, 15-20 deg, rough, undulating, open 1/8"	Ħ	up to 1/32"-3/8" No Recovery 110.5-111.0'	R6: 5 minutes
-	111.0		NR >10	108.65-108.8' - Fracture zone 109.1' - Fracture, 10-15 deg, rough, undulating, tight	拝	Limestone - 111.0-115.4' - yellowish gray, (5Y	-
-				109.4' - Fracture, 80-90 deg, rough, undulating, open 1/2"	F	_ 7/2), medium to coarse grained, strong HCl reaction, weak (R2),	-
-	R7-NQ		1	110.1' - Fracture, 60-65 deg, rough, undulating, tight 110.0-111.25' - Fracture zone	H	 becoming mottled moderate yellow (5Y 7/6) with depth, voids rare to absent except from 115.0-115.4' 	SC-2 collected at 112.5- 113.6'
-	5 ft 88%	79	1	111.35' - Mechanical break, 50 deg, rough, undulating, tight 111.75' - Fracture, 50 deg, rough, undulating,	F	 where voids <1/16" cover 1-3% of rock surface, cavities rare (3/16" in diameter), rare echinoderms, fossil 	-
115 704			2	tight 112.5' - Fracture or mechanical break, 5-10	Ħ	 voids/casts rare to absent, thick bedded except from 115.3-115.4' 	-
-72. 1 -	116.0		0 NR	deg, rough, undulating, tight 113.6' - Fracture, 50 deg, rough, undulating, tight		which is laminated, fine grained (sharp contact with overlying massive bedded limestone	R7: 4 minutes
-			3	114.4' - Fracture, 0-5 deg, rough, undulating, tight 114.8, 114.9' - Mechanical break or fractures	H	No Recovery 115.4-116.0' Limestone 116.0-120.5' - yellowish gray, (5Y]
-			2	(2), horizontal, rough, planar 115.0' - Mechanical break, 30 deg, rough, undulating		7/2), medium to coarse grained, very weak to weak (R1 to R2), except from 116.1-116.15' which is very fine	_
-	R8-NQ 5 ft	76	2	116.1' - Bedding plane, 0-5 deg, rough, undulating, open 1/8", fine infilling	Ħ	grained and medium strong rock (R3), voids (<1/16") over 5% or less	-
-	90%		2	116.25-116.35' - Fracture zone 116.7' - Fracture or mechanical break, horizontal, rough, planar, 1/8" open	Ħ	of rock surface, some cavities up to 3/16" over 1-2% of rock surface to 120.4', fossils (molds/casts) rare to	_
120 <u></u> -77.1			0	117.2' - Fracture, 20-25 deg, rough, undulating, open up to 1/8"	Ħ	absent, rare echinoderms, some lithoclast (1"-1-1/2" long) from 120.0-120.5', cavities common from	R8: 7 minutes
	121.0		NR		Ħ	120.4-120.5'	
<u> </u>							
		_	_		_		



FRACTURES PER FOOT

3

1

2

0

>10

2

2

1

NR

3

>10

>10

NR

3

3

0

1

0

NR

23

open

tight

planar, tight

undulating, tight

undulating, tight

RQD(%)

77 4

WATER LEVELS: 4.0 ft bgs on 5/8/07

CORE RUN, LENGTH, AND RECOVERY (%)

R9-NQ

5 ft

100%

R10-NO

5 ft 92%

R11-NO

5 ft

50%

R12-NO

5 ft 66

84%

52 1

126.0

131 0

136.0

141.0

DEPTH BELOW SURFACE AND ELEVATION (ft)

125

-82 1

130

-87.1

135

-92 T

140

 $-97.\overline{1}$

PROJECT NUMBER: BORING NUMBER: 338884.FL **B-05** SHEET 8 OF 10

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724427.7 N, 457904.5 E (NAD83)

DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler ELEVATION: 42.9 ft (NAVD88)

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

DISCONTINUITIES

117.5' - Fracture or mechanical break,

horizontal, rough, undulating, tight to 1/2"

118.65' - Fracture or mechanical break.

horizontal, rough, undulating, tight 118.85' - Fracture, 20-25 deg, rough,

119.45' - Fracture, 35-40 deg, rough,

123.4' - Fracture, 5-10 deg, rough,

horizontal, smooth, planar, tight

deg, rough, planar, tight

horizontal, open up to 1"

undulating, tight

open 1/16"

rock

open

tight

tight

smooth, planar, multiple breaks along

128.5' - Bedding plane, horizontal, rough,

129.2' - Fracture or mechanical break,

centimeter spaced parallel fracture

137.3' - Bedding plane, horizontal, rough,

mechanical break (3), horizontal, rough,

120.35' - Mechanical break

undulating, open 1/8"

START: 5/7/2007

DESCRIPTION

ORIENTATION: Vertical END: 5/9/2007 LOGGER: N. Jarzyniecki LITHOLOGY COMMENTS 90 ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS No Recovery 120.5-121.0 Water level 10.8' below Limestone ground surface in outer 121.0-123.4' - yellowish gray, (5Y (4"HW) casing, 3.8' below 8/1), medium to coarse grained. ground surface in borehole strong HCl reaction, very weak to weak (R1 to R2), voids (<1/16") over 5-10% of rock surface, cavities (uncased) common (up to 3/8"-3/4"), fossiliferous (echinoderms) and casts/molds, some areas where rock 119.95' - Fracture, 20 deg, rough, undulating, is fine-grained and stronger (R2-R3), some rip-up clasts/intraclasts 121.1, 121.3, 121.5, 121.6' - Bedding plane especially at 121.3-121.5' R9: Runtime not recorded or mechanical break (4), horizontal, rough, 123.4-126.0' - yellowish gray, (5Y 8/1), very fine to fine grained, 122.5' - Fracture, 40 deg, rough, undulating, alternating beds several inches thick, voids (<1/16") over 1-3% of rock surface, some cavities up to 3/4" undulating, open <1/16" 123.55, 123.75, 123.95' - Bedding plane or (especially at 124.7-124.9'), fossils (molds/casts) rare to absent 126.0-127.8' - Same as 123.4-126.0' except rare fossil echinoids 127.8-128.5' - yellowish gray, (5Y 8/1), medium grained, strong HCl 124.3' - Bedding plane or mechanical break, horizontal, rough, undulating, tight 124.95' - Bedding plane or mechanical break, reaction, very weak (R1), voids (<1/16") over 5% or less of rock 125.9' - Mechanical break, 50 deg, rough, surface, cavities rare to absent undulating 126.0-127.0' - Mechanical break, horizontal, (<3/16" in diameter), fossil R10: Runtime not recorded molds/casts rare, some laminations 128.5-130.6' - yellowish gray, (5Y bedding planes, tight 127.55' - Fracture or mechanical break, 0-5 8/1), fine to medium grained, strong First core run on 5/9/07. HCl reaction, voids (<1/16") over water level at 4.1' below 3-5% of rock surface, some cavities ground surface up to 3/8"-3/4" in diameter (typically Driller's Remark: NO core elongated), fossiliferous (molds/casts barrel has snapped in two and rare echinoids), very rare pieces (<1/16") dark gray argillaceous SC-3 collected at 131.85-129.7' - Bedding plane or mechanical break, grains 132.6' horizontal, rough, planar, tight to 1/4" gap 130.15' - Fracture, 70-75 deg, rough, No Recovery 130.6-131.0' Limestone undulating, tight 131.15, 131.4' - Bedding plane or mechanical 131.0-132.6' - yellowish gray, (5Y 8/1), strong HCl reaction, very weak break (2), horizontal, smooth, planar, tight to to weak (R1 to R2), R11: 23 minutes powder/chalk-like feel, highly 131.85' - Bedding plane, horizontal, rough, undulating, tight, 3/4" sized exposed medium light gray (N6) filled voids on surface fossiliferous (forams), voids/casts (<1/16") over 10-15% of surface, 15-20% cavities infilled with medium light gray (N6) fine grained mineral 132.6' - Fracture zone, angular fragments of with stong HCl reaction, cavities are 136.1, 136.05' - Bedding plane or mechanical irregularly shaped to spherical and break (2), horizontal, rough, undulating, 1/8" range in size from 3/16"- 1-3/8". horizontal aligned fossil (casts/shells) 136.3' - Fracture, 60 deg, rough, undulating, and gray cavities, bedding/discontinuity at 131.65' 137.1' - Fracture, 45 deg, rough, undulating, undulating, light olive gray hard mineralization over 38% surface, 1/32" thick, R12: 15 minutes



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-05	SHEET	9	OF	10	

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724427.7 N, 457904.5 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

WATER	LEVELS : 4.0	ft bgs	s on 5/	/8/07 START : 5/7/2007 END : 5/	9/2	007	LOGGER : N. Jarzyniecki	
>00	(9)			DISCONTINUITIES	\int	5	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES T	DESCRIPTION		SYMBOLIC LOG	ROCK TYPE, COLOR,_	SIZE AND DEPTH OF CASING,
H BE ACE ATIC	TH, TH,	D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	7		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EPT URF LEV	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS		¥ M M	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ООШ	074	ď	ш а.		,	S)		
_			3	137.35' - Mechanical break, 40-50 deg, rough, planar, tight	₽	⇉	Limestone 132.6-133.5' - medium light gray to	-
_				137.65' - Bedding plane or mechanical break,	₽	4	medium gray, (N6 to N5), very fine	-
_			1	horizontal, rough, undulating, exposed molds on surface, open 5/8"	F	4	grained, strong HCl reaction, medium strong to strong (R3 to R4),	_
_				138.5' - Mechanical break	ŧ	ヰ	trace voids/casts (<1/16"), poorly	_
_	R13-NQ 5 ft	50	3	139.25' - Fracture, 40 deg, rough, undulating, tight	Ł	┰	fossiliferous (1" molds), very fine grain pyrite grains in rock matrix	
_	94%			140.1' - Mechanical break, horizontal, rough,	₽	\dashv	(5-7%), 10-15% cavities from 1/8" to	_
_			3	undulating, tight 141.25' - Mechanical break or bedding plane,	₽	1	1" in size, oval in shape unfilled to partially filled with a yellowish gray	_
145_				horizontal, rough, planar, tight	┢	Ц	(5Y 7/2) very fine grained material	
-102.1			2	141.65' - Fracture, vertical, rough, undulating, brown staining over surface (100%), <1/32"	F	Ц	that is 40-45% voids <1/16" No Recovery 133.5-136.0'	R13: 11 minutes
	146.0		NR	infill over 98% surface	j	耳	Limestone	
			3	141.75' - Fracture or mechanical break, horizontal, rough, undulating, tight	E	Д	136.0-137.5' - yellowish gray and light olive gray, (5Y 7/2 and 5Y 5/2),]
			3	142.5' - Fracture or mechanical break,	╊	+	strong HCl reaction, medium strong	1
]				horizontal, rough, undulating, tight 143.3, 143.5' - Fractures or mechanical break	1	⇉	to strong (R3 to R4), thin bedded alternating with very fine grained rock	1
-			4	(2), 5-10 deg, rough, undulating, tight	t	Ⅎ	with medium grain-sized particles in	00.4 11 1- 1- 1- 1- 1- 1- 1- 1- 1- 1-
-	R14-NQ			143.85' - Fracture or mechanical break, 0-5 deg, rough, undulating, tight	╊	H	the laminated (<1/16") beds 137.5-140.2' - yellowish gray, (5Y	SC-4 collected at 147.8 148.7'
-	5 ft 96%	60	1	144.45' - Fracture or mechanical break,	F	Ц	7/2), fine to medium grained, strong	1 1
-				horizontal, rough, undulating, tight 144.6' - Bedding plane or mechanical break,	t	巾	HCl reaction, very weak (R1), 7-10% coarse grain-sized flat angular fossil	1 7
150			2	horizontal, rough, undulating, 1/8" open	╊	H	fragments horizontally aligned,	1
-107.1				144.8' - Bedding plane or mechanical break, — horizontal, rough, undulating, 1/16" open	F	7	 15-25% medium to coarse grain-sized medium dark gray (N4), 	R14: 8 minutes
-	151.0		2	144.9, 144.95' - Mechanical break (2), rough,	t	⇉	subrounded particles also	1
-	131.0		NR.	undulating, open <1/16" 145.1, 145.35' - Bedding plane (2), 0-5 deg,	t	7	horizontally aligned, highly fossiliferous, trace voids (<3/16"),	
-				rough, undulating, wavy bed of organics,	1	ı	sharp discontinuity at 139.5'	1
-				100% surface coverage with brownish black organics	1	ı	No Recovery 140.2-141.0' Limestone	1
-				146.5' - Bedding plane, 15-20 deg, rough,	1	ı	141.0-142.6' - yellowish gray, (5Y	1 1
-				undulating 146.6' - Fracture, 50 deg, rough, undulating,	1	ŀ	8/1), very fine to medium grained, strong HCl reaction, very weak (R1),	1
-				tight	1	ı	texture coarsening with depth to	1
-				146.8' - Fracture, 70 deg, rough, undulating, black stains over 100% surface, tight	1	ŀ	sharp contact at 142.6', interval of moderate yellow brown and light	-
-				147.0' - Bedding plane or mechanical break,	1	ŀ	brown (5Y 7/6 and 5Y 5/6) fine to	
-				horizontal, rough, undulating, tight 147.3' - Bedding plane or mechanical break,	1	ŀ	medium grained rounded grains, powder to chalk-like texture	-
-				0-5 deg, rough, planar, tight	1	ŀ	142.6-145.0' - Same as 141.0-142.6'	-
-				147.5' - Fracture, 60 deg, rough, undulating, black staining 80-90% surface, tight	+	\mathbf{l}	except light olive gray, (5Y 5/2),	-
-				147.8' - Fracture, 15-20 deg, rough,	+	\mathbf{I}	moderate to strong HCl reaction, medium strong (R3), voids 10-15%	-
-				undulating, tight 148.7' - Fracture or mechanical break,	+	\perp	(<1/16") spheroidal trace elongated cavities 3/16"x1/16"	-
-				horizontal, rough, undulating, tight	+	ŀ	145.0-145.7' - Same as 141.0-142.6'	-
-				149.25' - Fracture, 40 deg, rough, undulating, tight to 1/8" open	+	ŀ	except yellowish gray, (5Y 8/1), very weak to weak (R1 to R2), 25-30%	-
-				149.45' - Fracture, 10-15 deg, rough, planar,	+	ŀ	olive black (5Y 2/1) laminations	-
-				tight 150.3' - Fracture or mechanical break.	+	ŀ	No Recovery 145.7-146.0' Limestone	-
-				horizontal, rough, undulating, hard mineral	+	ŀ	146.0-146.5' - Same as 145.0-145.7'	-
-				infill covering 30-40% surface 1/16' thick,	┨	ŀ	_	
-				open 1/8" 150.6' - Fracture or mechanical break,	+	ŀ		-
				horizontal, smooth, planar, open 1/16"	╀	+		
					_	_		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-05	SHEET	10	OF	10	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724427.7 N, 457904.5 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 4.0) ft bgs	on 5/	8/07 START : 5/7/2007	END : 5/9	/200	7 LOGGER : N. Jarzyniecki	
30₽	(%			DISCONTINUITIES		9	LITHOLOGY	COMMENTS
N AN	AND 3≺ (%		ZES T	DESCRIPTION		CLC	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BI	E RU STH, OVEF	(%)	FS	DEPTH, TYPE, ORIENTATION, ROUG	SHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL THICKNESS, SURFACE STAINING, AND	. AND TIGHTNESS	SYMBOLIC LOG	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
БОШ	0116	14	ш.п.			0)	Limestone	
-					-		 146.5-150.8' - yellowish gray, (5Y 	-
-					-		8/1), very fine to medium grained, strong HCl reaction, very weak (R1),	-
-					_		 highly fossiliferous (molds, forams, 	-
-					_		fragments), sharp contact between medium grained limestone above	-
-					_		 and fine grained limestone below at 	-
-					_		150.0', from 149.0-150.0' casts/ fossil fragments give the rock interval	_
-					-		 gritty/friable texture, very fine grained 	-
-							weak rock (R2) from 150.0-150.8' No Recovery 150.8-151.0'	_
-					_		- Bottom of Boring at 151.0 ft bgs on	-
					-		_ 5/9/2007	-
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-06	SHEET	1	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724172.6 N, 457791.6 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

	WATER LEVELS: 4.4 ft bgs on 4/26/07 START: 4/24/2007 END: 4/26/2007 LOGGER: B. Ellis									
WATER	LEVELS	. 4.4 IT DO	is on 4/20			END : 4/26/2007 DESCRIPTION	LUGGER	(. B.	Ellis COMMENTS	
≷Ç€	CAMPIT	INTERVA	I (A)	STANDARD PENETRATION	SOIL	DEGOLUL HOM		98	OUNIINIENTO	
ELC ON (SAMPLE		, ,	TEST RESULTS					DEPTH OF CASING, DRILLING RATE,	
H B		RECOVE			MOISTURE CONTE	ENT, RELATIVE DENSIT	TY OR	BOL	DRILLING FLUID LOSS, TESTS, AND	
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOI	L STRUCTURE, MINER	ALOGY	SYMBOLIC LOG	INSTRUMENTATION	
42.5	0.0			(14)	- Topsoil			11,	16:51 Begin drilling, sample SS-1 taken; first	
-		1.0	SS-1	0-1-2	\0.0-0.2'		/ -	1	6"=weight of hammer -	
-		1.0	33-1	(3)	Poorly Graded Sand (0.2-1.0' - light brownish	SP) n gray (5VR 6/1), mois	et ven.		-	
-	1.5				loose, very fine to fine	grained, silica sand wi	ith -	ł	-	
-					medium dark gray (N4) mottling, trace of non	nplastic _	-	-	
-					fines, roots and organi	cs decreasing with dep	- pui	-	-	
-							-		-	
-							-		-	
_							-		_	
_							_		_	
5	5.0							,,,		
37.5				4.4.4	Clayey Sand (SC) 5.0-6.1' - greenish gray	/ (5G 6/1) moist to we	et loose -		4/25/07, 07:38 Begin drilling to 5' using tricone bit	
_		1.1	SS-2	4-4-4 (8)	very fine to fine graine	d, no HCl reaction, silic	ca sand,		07:40: SS-2 taken	
	6.5			. ,	20% low plasticity fines	s, trace very fine sand-	-sized			
					black particles					
							-	1	1	
-							-	1	1	
-							-	1	1	
10	10.0						-	1	1	
32.5	10.0				Silty Sand (SM)				07:48: SS-3 taken	
-		1.3	SS-3	3-3-4	10.0-11.25' - light olive to 5GY 6/1), wet, loose	gray to greenish gray	, (5Y 6/1 -		1	
-	11.5			(7)	_ HCl reaction, silica sar	nd, 15% low plasticity f	fines, _	Ш	-	
-	11.5				trace very fine black pa	articles, trace organics	;/-	1	-	
-							-	1	-	
-							-	1	-	
-							-	1		
-							-	1		
-							-	1	-	
							-	1	-	
15 <u> </u>	15.0				Silty Sand (SM)				SS-4 is less plastic than SS-3	
		4.5	CC 4	4-4-4	15.0-16.5' - light olive of	gray to light gray, (5Y 6	6/1 to -		-	
-		1.5	SS-4	(8)	N7), wet, loose, very fireaction, silica sand, 3				-	
-	16.5				very fine sand-sized bl				-	
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-06	SHEET	2	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724172.6 N, 457791.6 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

						auto hammer, AWJ rods, 3			ORIENTATION : Vertical
WATER	LEVELS	: 4.4 ft b	gs on 4/2	6/07 I	START : 4/24/2007	END : 4/26/2007	LOGGEF	R : B.	ı
≥□=				STANDARD PENETRATION		SOIL DESCRIPTION		၂ ဗွ	COMMENTS
A N	SAMPLE	INTERVA	AL (ft)	TEST RESULTS SOIL NAME LISCS GROUP SYMBOL COLOR OF DEPTH OF			DEDTH OF CASING DOULING DATE		
A S S S S S S S S S S S S S S S S S S S		RECOVE	ERY (ft)		MOISTURE C	ONTENT, RELATIVE DEN	ISITY OR	OLI	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY	, SOIL STRUCTURE, MIN	ERALOGY	SYME	INSTRUMENTATION
22.5	20.0			(14)	Clayey Sand (SC	3)		(///	
-		1.2	SS-5	2-5-4	20.0-21.0' - yellov	vish gray to light gray, (5	Y 8/1 to N7), -		-
-		1.2	33-3	(9)	moist, loose, high reaction, 28% fine	plasticity, no dilatancy,	no HCI		-
-	21.5				Fat Clay (CH)		/ -		-
-					21.0-21.2' - light b	oluish gray, (5G 7/1), mo ancy, no HCl reaction	oist, stiff, high/ $_{\scriptscriptstyle -}$		-
-					piasticity, no dilate	ancy, no norreaction			-
-							-		-
-							-		-
-							_		-
-							-		_
25	25.0				01			7772	
17.5				1-2-2	Clayey Sand (SC 25.0-26.4' - yellov	') vish gray, (5Y 8/1), wet, '	very loose		_
-		1.4	SS-6	(4)	very fine to fine g	rained, no HCI reaction,	25%		_
_	26.5				medium plasticity silica sand	fines, increasing to 40%	by 26.2',		_
l _					(550 50.10				_
_							_		_
l _							_		_
l _							_		_
-							_		_
30	30.0						_		_
12.5					Silty Sand (SM)	(40)(D 7(4)			
-		1.5	SS-7	2-2-2 (4)	30.0-30.8 - grayis	sh orange, (10YR 7/4), w o fine grained, no HCl rea	/et, very		_
-	31.5			(4)	\no to low plasticit	y fines, silica sand			_
-					Organic Soil (OH	l) black, (5Y 2/1), wet, soft	high		_
-					\ plasticity, no to slo	ow dilatancy, no HCl rea	ction,	1	-
-					10-15% very fine	grained silica sand, whit ment at 30.9', medium qu	e -	1	-
-					graver-sized fragi	nent at 50.5, mediam gi	anica	1	-
-							-	1	-
-							-		-
35	35.0						-		-
7.5	35.0				Clayey Sand (SC			////	_
-		1.5	SS-8	2-3-1	35.0-36.5' - olive	black with grayish orang ₹ 7/4), wet, very loose, v	e mottling,		-
-	36.5			(4)	fine grained, no H	ICI reaction, 12% low to	medium		-
-	30.5				plasticity fines, sil	ica sand, some organic	fines	<i>Y././</i> 2	-
-							-		-
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PROJECT NUMBER:

338884.FL

B-06

SHEET 3 OF 9

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724172.6 N, 457791.6 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

					ORIENTATI	
WATER	LEVELS	: 4.4 ft bo	s on 4/26	5/U <i>/</i> S	START: 4/24/2007 END: 4/26/2007 LOGGER: B. Ellis	
≥ □ ⊕				STANDARD PENETRATION	SOIL DESCRIPTION COMMENTS	
ANI (†)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	SOIL NAME LISSS OPOUR SYMPOL COLOR	NO DATE
A BE		RECOVERY (ft)			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLI DEPTH OF CASI	
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6"	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLI DRILLING FLUID LOSS, TE	N
2.5	10.7			(N)	<u> </u>	
2.5	40.0			2-1-2	Clayey Sand (SC) 40.0-41.5' - Same as 35.0-36.0' except no HCl	_
I _		1.5	SS-9	(3)	reaction, 16% fines, silica sand, varies in irregular	
	41.5			. ,	beds throughout	
]	1
-					1	1
-					1 1	1
-						-
-					1 1	-
,	45.0				1 - 1	-
45 -2.5	45.0				Silt (ML)	\dashv
-			00.40	1-2-1	45.0-46.1' - black mottled with moderate yellowish	-
-		1.1	SS-10	(3)	brown (5Y 2/1 mottled with 10YR 5/4), wet, soft, nonplastic, no dilatancy, no HCl reaction, trace to 10% /	-
_	46.5				\very fine to fine grained, silica sand	_
_						_
_]]	
_]]	
					1 1	1
50	50.0				1	1
-7.5	00.0				Fat Clay (CH)	
-		1.5	SS-11	0-1-1	50.0-50.45' - Same as 45.0-46.1' except pale olive mottled with light olive gray and moderate yellowish	1
-	51.5			(2)	brown, (10Y 6/2 mottled with 5Y 5/2 and 10YR 5/4), \ \ \ \ \	1
-	31.3				wet, soft, high plasticity, no dilatancy, no HCl reaction	
-					Silty Sand (SM) 50.45-51.3' - moderate yellowish brown, (10YR 5/4),	-
-					wet, very loose, very fine to fine grained, no HCI	-
-					reaction, silica sand, 20-25% low plasticity fines Fat Clay (CH)	-
-						-
-					fat clay (CH) with silty sand (SM)	-
-]]	_
55	55.0				01(4)	_
-12.5				34-44-50/4.5	Silt (ML) 55.0-56.3' - moderate yellowish brown, (10YR 5/4),	_
		1.3	SS-12	(94/10.5")	moist, hard, low plasticity, rapid dilatancy, moderate	
	56.4				HCl reaction, 5-10% fine to medium sand grained, trace organics, all carbonate	
					\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	1
1 1					1 1	1
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-					09:28: Setting casing to 59' (1'	stick up 60'
-					- casing)	-
60					++	
					1 1	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-06	SHEET	4	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724172.6 N, 457791.6 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

						, auto hammer, AWJ rods			ORIENTATION : Vertical
WATER	LEVELS	: 4.4 π D	gs on 4/26		START : 4/24/2007	END: 4/26/2007 SOIL DESCRIPTION	LOGGE	K:B	COMMENTS
≳∂€ i	SAMPLE	INTERVA	\ (ft)	STANDARD PENETRATION TEST RESULTS		COLE DECOMM THOM		9	COMMENTE
DEPTH BELOW SURFACE AND ELEVATION (ft)	OAWII EE	RECOVI		TEST RESULTS	SOIL NAME MOISTURE (, USCS GROUP SYMBOL CONTENT, RELATIVE DE	., COLOR, ENSITY OR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTI SURF, ELEV/			#TYPE	6"-6"-6" (N)	CONSISTENC	Y, SOIL STRUCTURE, M	INERALOGY		
-17.5	60.8	0.2	SS-13	50/4 (50/4")	Silt (ML)	ne as 55.0-56.3' except	light olive		10:48 Slight chatter while drilling
_				(30/4)	brown, (5Y 5/6),	moderate to strong HC	I reaction	1	_
_								1	I
_								1	11:03 Bringing up SS-13
-								-	-
-								-	-
-								┨	-
-								1	-
65	65.0							1	-
-22.5	65.4	0.2	SS-14	50/4.5	Limestone Frag	ments	HCI roostics /	十	11:22 Bringing up SS-14
				(50/4.5")	∖friable	ky yellow, (5Y 6/4), mild	HCI reaction,]	11:41 Switching to core barrel
_					Begin Rock Cori	ing at 65.5 ft bgs eet for the rock core log		1	_
_					Occ the next she	cet for the rock core log		1	_
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-06

SHEET 5 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724172.6 N, 457791.6 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, NO tools, HW casing

ORIENTATION · Vertical

CORING	METHOD A	ND EC	QUIPM	IENT : CME 55 S/N 316625, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
WATER	LEVELS : 4.4	ft bgs	s on 4/	26/07 START: 4/24/2007 END: 4/2	26/20	07 LOGGER : B. Ellis	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-	65.5 R1-NQ 1 ft 66.5 100%	0	2	65.5-65.7' - Bedding plane, horizontal, bedding change 65.8' - Fracture, 60 deg, rough, undulating	TT T	Silt (ML) 65.5-65.7' - very fine grained, some organics	Water level at 0.0 below ground surface (at surface); tooling in hole
-			0	66.2' - Mechanical break -	F	Limestone 65.7-66.5' - yellowish gray, (5Y 7/2), very fine grained, no to moderate	13:30 Coring R1-NQ 13:45 Coring R2-NQ
-			4	67.5' - Mechanical break 67.9, 68.0, 68.2' - Bedding plane (3), <5 deg,		HCl reaction, weak (R2), voids up to 1/16" over 20% of surface, poorly	-
-	R2-NQ 5 ft	77	1	rough, undulating, open up to 1/8" 68.1' - Fracture, 85 deg, rough, undulating, open, no matching end		fossiliferous, infill of yellowish gray (5Y 8/1) over < 5%, infill has voids/fossils	_
70 <u></u>	84%		0	68.8' - Mechanical break 69.3' - Fracture, 60 deg, smooth, undulating 69.8' - Mechanical break		Limestone 66.5-67.9 and 68.5-69.8' - Same as 65.7-66.5' except no silt, light olive	_
-27. 5 -			0 NR		Ħ	gray (5Y 5/2) from 67.9-68.5' voids up to 1/16" over 30% of surface, fossiliferous (fossil casts up to 1"),	-
-	71.5		1		Ħ	dissolution features up to 1/8", bedding feature of grayish orange - (10YR 7/4) from 67.6-67.7' is fine	13:59 Coring R3-NQ
-			0	72.4' - Bedding plane, <5 deg, rough, undulating, with 0.4' of silt infill, very fine 72.2-72.6', has laminar organic layers within,	Ē	grained, none to trace voids, fossils infill with light olive gray material 69.8-70.7' - yellowish gray, (5Y 7/2),	SC-1 collected at 71.5- 72.2'
-	R3-NQ 5 ft	63	1	up to 0.05' width 73.0' - Mechanical break 73.6' - Bedding plane, <5 deg, rough,	Ħ	very fine grained, weak to medium strong (R2 to R3), trace voids up to 1/16", poorly fossiliferous, no	-
75_ -32.5	99%		1	undulating 73.9-74.0' - Mechanical break 74.7' - Bedding plane, <5 deg, smooth to		dissolution on surface No Recovery 70.7-71.5' Limestone 71.5-72.2' - Same as 65.7-66.5'	
-			0	rough, undulating 75.3, 75.8, 76.8' - Mechanical break (3)	Ħ	except discontinuous organic laminations over < 5% of surface up to 1/8"x1/4", infill occurs over 20% of]
-	76.5		NR) 3	76.55, 76.7, 76.8' - Bedding plane (3), <5 deg, rough to smooth, undulating, <5%	Ë	to 1/8 x1/4", Infill occurs over 20% of surface 72.2-72.6" - very fine grained, has laminar organic layers within, up to	14:20 Coring R4-NQ
-			4	organics on fracture surface 77.3' - Mechanical break 77.85, 77.75' - Fractures (2), 10 deg, rough, undulating, fracturing associated with	Ħ	1/2" width, dusky yellow (5Y 6/4) silt infill 72.6-74.9' - light olive gray to very	-
-	R4-NQ 5 ft 76%	31	>10	dissolution, open up to 1/2" 78.2' - Fracture, 85 deg, smooth, undulating, a fragment at 79.6' is missing		pale orange, (5Y 5/2 to 10YR 8/2), very fine grained, trace voids up to 1/16", 73.4-73.9' silt infill yellowish	-
80_ -37.5			1	78.25' - Bedding plane, smooth to rough, undulating, intersects 78.2' — 79.0' - Bedding plane, <5 deg, smooth to	E	gray to very pale orange mottled with very light gray (5Y 7/2 to 10YR 8/2 mottled with N8), 73.9-74.9',	_
-	81.5		NR	rough, undulating, change in lithology, open up to 1/4" - 79.05' - Fracture, 85 deg, rough, undulating,		- 73.9-74.9' has infill of very pale orange with 20% tiny voids, matrix has trace voids up to 1/16", poorly	-
-	01.0		1	open up to 1/8" 79.1-79.25' - Fracture zone, intersecting fractures		fossiliferous 74.8-74.9' - moderate olive brown, (5Y 4/4), bedding layer with organics	14:35 Begin R5-NQ
-			0	79.8' - Fractures, 65-70 deg, rough, undulating, intersecting fractures 80.2' - Mechanical break		- of olive gray (5Y 3/2) <1/16" thick -	-
-	R5-NQ 5 ft 92%	80	1	81.5-81.7' - Fracture zone 82.7' - Mechanical break 83.6' - Fracture, 10 deg, rough, undulating,	Ħ	-	SC-2 collected at 82.7- 83.7'
85_ -42.5	. 02,0		0	fracturing associated with dissolution, open up to 1/2" — 84.0' - Mechanical break		-	_
					⇈		
					<u> </u>		

APPENDIX 2BB-434 Rev. 7



PROJECT NUMBER:

338884.FL

B-06

SHEET 6 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724172.6 N, 457791.6 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

DISCORTINUTIES CHARACTERISTICS COLOR MINERALOGY, TEXTURE, PLANETY, DELIGIBLATION, REQUIRED Section Color	WATER	LEVELS: 4.4	ft bgs	s on 4/	26/07 START : 4/24/2007 END : 4	26/20	07 LOGGER : B. Ellis	
1	≥ □⊋	<u> </u>			DISCONTINUITIES	ا ا	LITHOLOGY	COMMENTS
1	DEPTH BELOV SURFACE AN ELEVATION (f	CORE RUN, LENGTH, AND RECOVERY (⁹	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
1	-			1 NR	86.95' - Bedding plane or mechanical break,		 organic laminations (discontinuous) through <5% of surface up to 1/2"x1/4" and infill occurs over 20% of surface, tiny voids up to 1/16" over 	15:10 Begin R6-NQ
91.0, 91.7, 95.8' - Mechanical break (3) 92.2' - Fracture, 60 deg, rough, undulating 92.4' - Mechanical break 92.7' - Fracture, 60 deg, rough, undulating 92.4' - Mechanical break 93.0' - Fracture, 60 deg, rough, undulating multiple missing pieces, intersecting fractures 93.0' - Fracture, 60 deg, rough, undulating multiple missing pieces, intersecting fractures 93.0' - Fracture, 60 deg, rough, undulating 93.8' - Bedding plane, <5 deg, sill triflid of 10		5 ft 100%		1	87.3' - Mechanical break 89.0' - Mechanical break 89.15' - Bedding plane or mechanical break, <5 deg, rough, undulating 89.7' - Mechanical break 90.4' - Bedding plane, <5 deg, rough,	- 1	casts and molds up to 1/2"x1", tiny voids decrease to 10% of surface at 75.7'. No Recovery 76.45-76.5' Limestone 76.5-81.5' - weak to extremely strong (R2 to R6), 76.5-76.7' and 77.5-79.95' same as in R3-NQ from 72.6-74.9 except from 77.5- 78.65 has tiny voids on 5-10% of surface, 2"x1" cavities over <5% of surface.	- - - - - -
96.65, 96.7' - Bedding plane (2), <5 deg, smooth, stepped, open up to 1/8" R8-NQ 5 ft 100% 95 1 1 98.9, 100.5' - Bedding plane or mechanical break (2), <5 deg, rough, undulating 101.5 101.5 R9-NQ 5 ft 1 1 1 101.6' - Bedding plane, <5 deg, smooth, undulating 102.5' - Fracture, 70 deg, smooth, undulating 103.35' - Bedding plane, 15 deg, smooth, undulating 103.5' - Bedding plane, 15 deg, smooth, undulating 103.5' - Bedding plane, 15 deg, smooth, undulating 104.0' - Mechanical break 103.0' - Mechanical break 103.35' - Bedding plane, 15 deg, smooth, undulating 104.0' - Mechanical break 105.91.7' - sit infill of yellowish gray (57 7/2), mottled with light of live gray (67 7/2), fractorial casts up to 1/6", formed frait of the properties of the	 95 52.5	R7-NQ 5 ft		3 1 1	92.2' - Fracture, 60 deg, rough, undulating 92.4' - Mechanical break 92.7' - Fracture, 60 deg, rough, undulating, multiple missing pieces, intersecting fractures 93.0' - Fracture, 80 deg, rough, undulating 93.8' - Bedding plane, <5 deg, silt infill of yellowish gray color (5Y 7/2), milimeters thick organic layers (discontinuous), thickness of infill is 93.5'-94.3'		except no cavities/fossil molds, moderate yellowish brown (10YR 5/4); 79.0-80.3' same as 76.7-77.0' except from 79.1-80.0' has up to 1/16" voids over 10% of surface, extremely strong at 78.9' No Recovery 80.3-81.5' Limestone 81.5-86.1' - Same as 65.7-66.5' except weak to medium strong (R2 to R3), voids over 30% of surface, fossils up to 1/2"x1/4" (casts), infill of light gray (N7) over 5%, infill is very	15:28 Drill R7-NQ
101.5 101.6' - Bedding plane, <5 deg, smooth, undulating 102.5' - Fracture, 70 deg, smooth, undulating 102.55' - Mechanical break 103.35' - Bedding plane, 15 deg, smooth, undulating 105 105 105 107 107 107 107 107 108 109 109 109 109 109 109 109 109 109 109		R8-NQ 5 ft		2 0 1	smooth, stepped, open up to 1/8" 98.05' - Mechanical break 98.9, 100.5' - Bedding plane or mechanical break (2), <5 deg, rough, undulating 99.0' - Mechanical break 99.9' - Mechanical break		trace cavities features up to 1/8", infill is approximately medium strong rock (R3), except 81.5'-81.8' is extremely weak to very weak rock (R0-R1) No Recovery 86.1-86.5' Limestone 86.5-91.5' - 86.5-90.0' dusky yellow, (5Y 6/4), 86.5-88.0' light gray (N7) to very pale orange (10YR 8/2), very fine grained, 30% tiny voids up to 1/16", fossiliferous, fossil casts up to 1/4", trace very fine grained organics, infill is up to 10% light gray (N7) material voids, no visible fossils	
		R9-NQ 5 ft		1 2 0	undulating 102.5' - Fracture, 70 deg, smooth, undulating 102.55' - Mechanical break 103.35' - Bedding plane, 15 deg, smooth, undulating	- 1	 1/4", and olive gray (5Y 3/2), thin wavy laminations, 90.0-91.5' yellowish gray (5Y 7/2), mottled with light olive gray (5Y 5/2), very fine grained, voids from 0-10% (decreasing with depth) up to 1/16", trace fossil casts up to 1/4", weak to medium strong (R2 to R3) 91.5-91.7' - silt infill of yellowish gray color (5Y 7/2), discontinuous thin 	16:10 Begin R9-NQ



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-06

SHEET 7 OF 9

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724172.6 N, 457791.6 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

				12141 : ONIC 33 3/14 3 10023, mad rotary, rvg tools, rrive to			ONENTATION: Vertical
WATER	LEVELS: 4.4	ft bg	s on 4	/26/07 START : 4/24/2007 END : 4/	26/20	D7 LOGGER : B. Ellis	
>	(9			DISCONTINUITIES	ڻ ق	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		SI.	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	CIZE AND DEDTIL OF CACING
불병은	RUN H, A	(%) Q	URI TOC	DEDTH TYPE OPICHTATION POHOLINECE	1	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
F F S	RE 1	0	ACT R F(DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	MBC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SCIE	CO	R Q	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
				104.9' - Bedding plane, <20 deg, rough,		91.7-93.5' - very fine grained, trace	
-	1		1	undulating, open up to 1/4"	╁	 voids to 1/16", trace fossils up to 	-
-	106.5			105.6' - Fracture, 70 deg, smooth, undulating, intersecting high angle fractures		_ 1/4", voids increasing with depth to 20% of surface	16:30 Begin R10-NQ
-			0	intersecting high angle hactures	₽	- 94.3-96.25' - yellowish gray, (5Y 7/2),	10.50 Begill K10-NQ
l .						fine to medium grained, strong HCI	
				407 Ol Machanical brook		reaction, very weak to weak (R1 to	
-	1		0	107.8' - Mechanical break	┰	 R2), voids to 1/4" over 30-40% of surface, voids to 1/2" at 94.55', 	1 1
-	R10-NQ			108.6' - Bedding plane, <20 deg, rough,	ш	fossiliferous	1
-	5 ft	85	2	undulating, open up to 1/8"	╁┼	- No Recovery 96.25-96.5'	1 -
-	96%			109.0' - Mechanical break		Limestone 56.5-101.5' - yellowish gray, (5Y 7/2),	-
110_			1	109.2' - Fracture, 75 deg, rough, undulating,	╨	— medium to fine grained, moderate to	
-67.5				open up to 1/8" 110.0' - Bedding plane, <5 deg, rough to		strong HCl reaction, very weak to	
-]			smooth, undulating, open up to 1/8"	\vdash	weak (R1 to R2), voids up to 1/16"	1
-	1115		0			 over 20-30% of surface, fossiliferous (casts/molds) 	1
-	111.5		NR.		╫	104.0-105.2' - yellowish gray, (5Y	16:45 Begin R11-NQ
-	-		1	111.7' - Bedding plane, <5 deg, smooth, planar, open up to 1/8"	厂	_ 8/1), fine to medium grained, strong	-
-					┢	HCl reaction, very weak to weak (R1 to R2)	1 -
l _			3	112.6, 112.7, 112.8' - Bedding plane (3), <5		_ 105.2-106.5' - yellowish gray, (5Y	_
				deg, rough to smooth, undulating, open up to 1/8"	Ш	8/1), fine to medium grained, strong	
-	R11-NQ			113.6' - Mechanical break	世	HCI reaction, very weak to weak (R1 to R2), trace tiny voids up to 1/16".	1 1
-	5 ft 80%	72	0	114.0' - Mechanical break	╁	poorly fossiliferous, slight increase in	1
	00%			444 CL Made asiant bands		fossil casts (approximately 10%)	1
115_ -72.5			0	114.6' - Mechanical break	₩	106.5-111.5' - yellowish gray, (5Y	-
-72.5					口	8/1), fine to medium grained, strong HCl reaction, very weak to weak (R1	-
l .]		NR		┢	to R2), fewer voids about 5% of rock	_
	116.5		'\'			No Recovery 111.3-111.5'	
-					Ш	 Limestone 111.5-115.5' - from 111.5-112.7' 	17:00 Begin R12-NQ
-	1		1	117.0' - Fracture, 50 deg and 60 deg, rough,	口	same as R10-NQ	1 1
-	-			undulating	╁	- At 112.7' color goes from yellowish	1 -
-	-		1	117.5' - Fracture, 50 deg and 60 deg, smooth, undulating		gray (5Y 7/2) to light olive gray (5Y 5/2) with depth, fine grained, voids	-
-				Sillootti, dilddiatilig	⊬	 begin to increase with depth to 15%, 	1 -
I -	R12-NQ 5 ft	78	1	118.7' - Bedding plane, smooth, undulating,		fossil casts and molds increase to]
	100%	. 0	اللل	open up to 1/8"	\vdash	20% up to 1/4"x1/8", has <5% infill dusky yellow (5Y 6/4), with voids in	
120				119.0' - Mechanical break 119.4' - Mechanical break		infill up to 30%-40% and size of infill	1
-77.5	1		2	120.0' - Bedding plane, <10 deg, rough,	1—	is up to 1/8"x1/8"	
-	1			undulating, open up to 1/4"	口	 No Recovery 115.5-116.5' Limestone 	1
-	1		1	120.3' - Fracture, 85 deg, rough, undulating 120.6' - Mechanical break	+	116.5-121.5' - Same as 106.5-111.5'	-
-	121.5					 except light olive gray (5Y 5/2) with 	07:24 Water level at 4.41
-]		4	121.6, 121.7' - Bedding plane (2), <5 deg,	\vdash	<5% very pale orange mottling, very	07:24 Water level at 4.4' below ground surface -
]		الل	smooth, undulating, open up to 1/8" 121.9' - Fracture, 75 deg, rough, undulating,		fine to fine grained, trace fossils up to 1/4", casts and molds, trace tiny	l
				open up to 1/8"	\vdash	voids up to 1/16"	07:31 Drilling R13-NQ
-	1		0	122.25' - Bedding plane, 20 deg, rough,		119.4-120.6' medium grained,	1
-	R13-NQ			undulating 123.0' - Mechanical break	屽	 extremely weak (R0) to weak (R2) rock, up to 30% fossil casts up to 	-
-	5 ft	79	1	123.6' - Fracture, 75 deg, rough, undulating,	世	1/4", trace dissolution cavities up to	-
-	100%			open up to 1/8"	+	_ 1/4", 10% voids up to 1/16"	-
125_]		1	124.0' - Mechanical break 124.8' - Mechanical break		_	SC-4 collected at 124.0-
-82.5				127.0 - IVICUIAIIICAI DIEAN	$oldsymbol{\sqcup}$		124.8'
1	1		ı		1		1

APPENDIX 2BB-436 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-06

SHEET 8 OF 9

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724172.6 N, 457791.6 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

WATER	LEVELS : 4.4			26/07 START : 4/24/2007 END : 4/		07 LOGGER : B. Ellis	
≥Q⊋	(%			DISCONTINUITIES	F0G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LC	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-	126.5		1	125.1' - Bedding plane, <5 deg, smooth, undulating, associated with lithology change 125.5' - Mechanical break		Limestone - 121.5-126.5' - Same as 111.5-115.5' except fine grained, very weak to	-
-			1	126.3' - Bedding plane, 80 deg, rough, undulating, open up to 1/4" - 126.6' - Bedding plane, <5 deg, rough to	E	weak (R1 to R2), various layers between dusky yellow (5Y 6/4) and yellowish gray (5Y 5/2) and light olive	07:42 Drilling R14-NQ
-			2	smooth, undulating, open up to 1/4" 127.8' - Bedding plane, <5 deg, smooth, stepped	Ħ	gray (5Y 5/2), fossils increasing from 125.4-126.5' up to 15%, casts and molds up to 1/2"x1/4" and trace	
-	R14-NQ 5 ft 100%	87	1	128.25' - Bedding plane or mechanical break, <5 deg, rough, undulating 128.8-129.0' - Mechanical break 129.3' - Bedding plane, <5 deg, rough to	Ė	organic features, <5% infill dusky yellow (5Y 6/4), with voids in infill up to 30-40% and size of infill is up to 1/8"x1/8"	
130_ -87.5			0	smooth, undulating, open up to 1/4" — 129.8' - Mechanical break	Ė	Limestone 126.5-131.5' - Same as 121.5-126.5' except fine grained, extremely weak	
-	131.5		1	130.9' - Bedding plane or mechanical break, <5 deg, rough, undulating		to weak (R0 to R2), fossiliferous layers have color change from light olive gray (5Y 5/2) to yellowish gray	- 07:55 Begin R15-NQ
-			4	131.65, 131.7, 131.95, 132.5' - Bedding plane (4), <5 deg, smooth to rough, undulating, open <1/8"	E	(5Y 7/2) 131.5-134.3' - Same as 126.5-131.5' except only one bedding feature is	
-	R15-NQ		1	- 133.3' - Fracture, 50 deg, rough, undulating, open up to 1/8"	H	highly fossiliferous from 133.1-133.25', rock is extremely weak (R0) to very weak (R1)	_
- 135	5 ft 56%	33	0	133.8-134.3' - Mechanical break, multiple fragments	Ħ	- No Recovery 134.3-136.5'	-
-92.5			NR		Ē	-	
	136.5				H	_]
-			>10	136.7-137.1' - Fracture zone, intersecting fractures 137.35' - Bedding plane, <5 deg, rough,		Limestone 136.5-137.1' - yellowish gray, (5Y 7/2), fine grained, extremely weak to	08:13 Begin R16-NQ
-	R16-NQ		0	undulating 138.3' - Mechanical break	Ħ	very weak (R0 to R1), fragments are very light gray (N7) to gray (N5), clasts are very weak (R1) to weak (R2), poorly fossiliferous	-
-	5 ft 50%	28	>10	138.75-139.0' - Fracture zone, intersecting fractures		(12), poorly idealine dustrians (5Y 5/2), fine grained, very weak to medium strong (R1 to R3), dusky	-
140 <u> </u>			NR	-	E	— yellow (5Y 6/4) infill, 15-20% fossil casts up to 1/2"x1/4", trace voids up to 1/16" up to 30% of surface	-
_	141.5				F	No Recovery 139.0-141.5']]
-			1	142.2, 143.0, 144.0, 145.7, 145.9' - Bedding	Ħ	Limestone 141.5-144.0' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very	08:38 Begin R17-NQ
-	R17-NQ		1	plane (5), <5 deg, smooth, undulating, open up to 1/8" - 143.4' - Mechanical break	E	fine grained, medium strong to strong (R3 to R4), very fine wavy bedding features ranging in color from yellowish gray (5Y 7/2), light olive	SC-5 collected at 142.2- 143.0' -
-	5 ft 98%	90	1		E	gray (5Y 5/2) and olive gray (5Y 4/1), <5% voids up to 1/16", trace fossils, casts, trace cavities up to 1/8"]
145 -102.5			2			·	_



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-06	SHEET	9	OF	9

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724172.6 N, 457791.6 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 4.4 ft bgs on 4/26/07 START: 4/24/2007 END: 4/26/2007 LOGGER: B. Ellis DISCONTINUITIES LITHOLOGY COMMENTS DEPTH BELOW SURFACE AND ELEVATION (ft) 90 CORE RUN, LENGTH, AND RECOVERY (%) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 145.5' - Mechanical break Limestone 1 144.0-146.4' - Same as 141.5-144.0' except dusky yellow, (5Y 6/4), fine to 146.5 NR medium grained, extremely weak 09:42 Begin R18-NQ 146.65, 146.8' - Bedding plane (2), <5 deg, (R0) at 146.0-146.4', zone at 144.5' and 145.3 are same as 136.5-137.1', 4 smooth, undulating, open up to 1/4" 146.7' - Fracture, 75 deg, smooth, undulating extremely weak material (R0), rock at 147.35' - Bedding plane, <5 deg, smooth, 141.5-144.0' is medium strong (R3) 0 undulating to strong rock (R4) SC-6 collected at 147.35-148.15' - Mechanical break No Recovery 146.4-146.5' R18-NQ 148.15' 5 ft 77 3 Limestone 148.9' - Bedding plane, <5 deg, smooth, 146.5-151.1' - Same as 141.5-144.0' 92% undulating, open up to 1/8" 149.4, 149.6, 149.9' - Bedding plane (3), <5 except interbedded with dusky yellow 150 (5Y 6/4) up to 1' thick, most beds are >10 deg, smooth, undulating, open up to 1/8" -107.5 thick with zones of thin wavy bedding 149.75' - Mechanical break 150.05-150.15' - Fracture zone, intersecting from 150.75-151.1' is same as 1 R10-NQ rock, 146.5-150.75' is fractures NR medium strong (R3) to strong rock 151.5 150.8' - Bedding plane (<5), smooth, undulating, open up to 1/4" 150.95' - Mechanical break No Recovery 151.1-151.5' Bottom of Boring at 151.5 ft bgs on 4/26/2007



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-07	SHEET	1	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724369.7 N, 457955.5 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER	/ATER LEVELS : 2.0 ft bgs on 5/4/07											
				STANDARD	SOIL DESCRIPTION	ر,	COMMENTS					
AND (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS] č						
무심		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND					
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLICLIOG	INSTRUMENTATION					
43.1	0.0			(14)	Poorly Graded Sand With Organics (SP)	╁	√					
-		1.0	SS-1	0-2-1	0.0-1.0' - dark gray grading to very light gray, (N3 to N8), moist, very loose, very fine to fine grained silica	1	1					
-	1.5			(3)	\bigcap sands, trace nonplastic fines, 10% organics and roots \bigcap	Ť	Using 2' x 2" split spoon for SPT					
-	1.0				decreasing with depth, last 2.4' is dark yellowish brown (10YR 6/6) with 5% nonplastic fines, trace	1	1					
-					concretions to 1/2"	1	1					
_												
-						1						
_						1						
_							-					
5 38.1	5.0				Poorly Graded Sand (SP)	١.	SS-2 taken 09:47					
- 30.1			00.0	3-3-2	Poorly Graded Sand (SP) 5.0-5.9' - very pale orange, (10YR 8/2), wet, loose,	┨.	Assumed water level at 2.0' due to moisture -					
-		0.9	SS-2	(5)	very fine to fine grained silica sands, trace nonplastic fines, trace sand-sized black particles	╪	content in SS-2 and water level measurements at B-9					
-	6.5				(┨	-					
-						┨	-					
-						1	1					
-						1	1					
-						1	1					
-						1	1					
10	10.0											
33.1				0.05	Poorly Graded Sand With Silt (SP-SM) 10.0-11.0' - white to very light gray, (N9 to N8), very		SS-3 taken 09:53 Similar to SS-2					
_		1.0	SS-3	3-3-5 (8)	fine to fine grained silica sands, 10% nonplastic fines,	£	1					
_	11.5				sand-sized black particles	1	_					
-						-	-					
-						1	-					
-						┨	-					
-						┨	-					
-						┨	-					
15	15.0					1	-					
28.1	13.0				Poorly Graded Sand With Silt (SP-SM)	H	SS-4 taken 09:57					
-		0.9	SS-4	3-3-4 (7)	15.0-15.9' - mottled white and pale yellowish brown, (10YR 6/2), wet, very fine to fine grained silica sands,		<u>i</u>]					
-	16.5			(1)	$\sqrt{7}$ % nonplastic fines, trace very fine sand-sized black $\sqrt{2}$	1	1					
					\particles \\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \]					
-]					
-						1						
-						-]					
-						1	-					
-						-	-					
20						╀	_					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-07	SHEET	2	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724369.7 N, 457955.5 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER	LEVELS	: 2.0 ft bo	s on 5/4/	07 5	START : 5/4/2007 END : 5/6/2007 LOGGE	R:	Р.	De Sa'rego, R. Bitely
				STANDARD	SOIL DESCRIPTION	╝,	_o	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS			SYMBOLIC LOG	
표 등 등		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	1		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
HPT.			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	1	чMВ	INSTRUMENTATION
23.1	22.2			(N)	Cille Cond (CM)	1	Ś	00.5 tales: 40.07
23.1	20.0			4-5-5	Silty Sand (SM) 20.0-21.1' - pale yellowish brown, (10YR 6/2), wet,	41		SS-5 taken 10:07
-		1.1	SS-5	(10)	loose, no HCl reaction, very fine to fine grained silica			_
-	21.5				sands, 20% nonplastic fines			_
_						1		_
_						1		_
l -						1		_
l -						1		_
l _								_
_								
25	25.0							
18.1				000	Silty Sand (SM) 25.0-26.5' - pale brown, (5YR 5/2), wet, very loose, no			SS-6 taken 10:13
l _]	1.5	SS-6	2-2-2 (4)	HCl reaction, very fine to fine grained silica sands,			_
l _	26.5			` ,	20-25% nonplastic fines	1		_
l _						1		
l _						1		
l _						1		
l _						1		
l _						1		
l _						1		
30	30.0							_
13.1				0.04	Poorly Graded Sand With Silt (SP-SM) 30.0-31.5' - yellowish gray, (5Y 7/2), wet, very loose,	H	ij.	SS-7 taken 10:20
l _		1.5	SS-7	2-2-1 (3)	no HCl reaction, very fine to fine grained silica sand,	1	놖	_
l _	31.5			` ,	6% nonplastic fines, trace very fine sand-sized black particles	j	ļi.	_
l _					partiolog			_
l _								_
l _						1		_
l _						1		
_								
_								
35	35.0					1		
8.1				1 1 1	Poorly Graded Sand With Silt (SP-SM) 35.0-36.5' - Same as 30.0-31.5' except yellowish gray,	F	H	SS-8 taken 10:25
_		1.5	SS-8	1-1-1 (2)	trace medium bluish gray mottling, (5Y 8/1 trace 5B		빏	
_	36.5			` ′	7/1)	Ţ	H	
_								
_								
_								
_								
_								
_								
40								



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-07	SHEET	3	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724369.7 N, 457955.5 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 2-7/8" tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 2.0 ft b	gs on 5/4/	/07 S	START : 5/4/2007 END : 5/6/2007 LOGGEF	} : P.	De Sa'rego, R. Bitely
				STANDARD	SOIL DESCRIPTION		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		SYMBOLIC LOG	
B 등 E		RECOVE	ERY (ft)	12011120210	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	SLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTH			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	MB	INSTRUMENTATION
				(N)		်	
3.1	40.0			2-2-3	Poorly Graded Sand With Silt (SP-SM) 40.0-41.5' - yellowish gray, (5Y 8/1), wet, loose, no		SS-9 taken 10:45
_		1.5	SS-9	(5)	HCl reaction, very fine to fine grained silica sand, 11%	H	
l _	41.5				nonplastic fines, trace pyrite fragments	莊	Driller's Remark: Switched to 2-7/8" tricone drag bit
l _					_		anag an
l _					_		_
_					_		
_					_		
_							
_							
45	45.0						
-1.9					Poorly Graded Sand With Silt (SP-SM) 45.0-46.5' - Same as 40.0-41.5'		SS-10 taken 10:50
		1.5	SS-10	2-2-3 (5)	43.0-46.5 - Same as 40.0-41.5		1
	46.5			(0)		陆	1
							1
					_	1	1
]
					_	1	1
					_		1
-					-	1	1
50	50.0				-	1	1
-6.9					Poorly Graded Sand With Silt (SP-SM)	11	SS-11 taken 10:57
-		1.5	SS-11	0-1-1 (2)	50.0-51.5' - moderate yellowish brown to pale yellowish brown, trace medium dark gray mottling,		1
	51.5			(=)	(10YR 5/4 to 10YR 6/2 with N4), wet, very loose, no — HCl reaction, very fine to fine grained silica sand, 6%		Weight of hammer over 4", then 2 blows
					nonplastic fines		recorded as 0-1-1 (2)
_						1	1
_					_	1	1
-					_	1	1
					_	1	1
					_	1	1
55	55.0				_	1	1
-11.9					Poorly Graded Sand With Silt (SP-SM)	帯	SS-12 taken 11:06
_		1.5	SS-12	0-1-1 (2)	55.0-56.5' - Same as 50.0-51.5' except medium dark gray to dark gray (N4 to N3) mottling		1
_	56.5			(2)	_		1 blow for first 12"
						Γ]
-					_	1	1
-					_	1	1
					_	1	1
					_		1
					_	1	1
60					<u> </u>	1	1

APPENDIX 2BB-441

Rev. 7



PROJECT NUMBER:	BORING NUMBER:			
338884.FL	B-07	SHEET	4 OF	8

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724369.7 N, 457955.5 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER	LEVELS	: 2.0 ft b	gs on 5/4/	07 5	START : 5/4/2007 END : 5/6/2007 LOGGE	R : P	De Sa'rego, R. Bitely
				STANDARD	SOIL DESCRIPTION		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		SYMBOLIC LOG	
표방한		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	l o	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
HPT.			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	MB	INSTRUMENTATION
-16.9	00.0			(N)	Poorly Graded Sand With Silt (SP-SM)	Ś	SS-13 taken 11:11
-10.9	60.0	l		0-1-2	60.0-61.4' - Same as 50.0-51.5' except dusky blue,	11	SS-13 taken 11.11
-		1.4	SS-13	(3)	(5PB 3/2), trace concretions		-
-	61.5					11:13	4
-						4	-
-						-	-
-						-	-
-						-	-
_						-	CC 14 has a jumbled appearance
-						-	SS-14 has a jumbled appearance
65 <u> </u>	65.0				Clay With Gravel (CL)		 SS-14 taken 13:10
-21.9				5-6-12	65.0-66.4' - mottled grayish blue green and medium	<i>\\\\\</i>	33-14 taken 13.10
-		1.5	SS-14	(18)	dark gray, (5BG 5/2 and N4), moist to wet, very stiff, high plasticity, no dilatancy, 20% fine to coarse gravel,	<i>\\\\\</i>	-
-	66.5				carbonate derived, rounded to subrounded; silty sand	*//	4
-					(SM) lens at 66.0', 3.0' thick, white (N9) to yellowish gray (5Y 8/1), fine to coarse sand-sized carbonate	1	-
-					material, gravel and silty sand have very strong HCI	1	-
-					reaction, clay has no HCl reaction	1	-
-						-	-
-						┨	-
-						-	-
70 <u> </u>	70.0				Silty Sand (SM)		 SS-15 taken 13:26
-20.9		l	00.45	2-2-3	70.0-71.4' - yellowish gray, (5Y 8/1), wet, very loose,	-	35-15 taken 13.26
-		1.4	SS-15	(5)	no HCl reaction, very fine to fine grained silica sands, 25% low plasticity fines, scattered irregular pockets of	4	-
-	71.5				\tau fat clay (CH), grayish blue green (5BG 5/2), high \[\square \]		4
-					plasticity, 15-20% is fat clay	-	-
-						-	-
-						-	-
-						-	-
-						-	-
-						-	-
75 <u> </u>	75.0				¬ Fat Clay (CH)		SS-16 taken 13:43
-01.9		, -	00.46	4-2-1	\setminus 75.0-75.2' - moderate yellowish brown, (10YR 5/4),		- 00-10 tanett 10.40
-		1.5	SS-16	(3)	wet, soft, high plasticity, no dilatancy, sandy seam Poorly Graded Sand With Silt (SP-SM)	11	-
-	76.5				\neg 75.2-76.5' - very pale orange heavily mottled with dark \neg		-
-					gray, (10YR 8/2 with N4), wet, very loose, very fine to fine grained silica sand, 10% nonplastic fines, trace	-	-
-					very fine sand-sized black particles	┨	-
-						-	-
-						-	-
-						-	-
-						-	-
80						╀	-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-07	SHEET	5	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724369.7 N, 457955.5 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLIN	G METH	OD AND	EQUIPM	ENT : CME 55 S/	N 316625, mud rotary, auto hammer, AWJ rods, 2-7/8" tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 2.0 ft b	gs on 5/4/	07	START: 5/4/2007 END: 5/6/2007 LOGGER: P. De Sa'rego, R. Bitely
I				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	AL (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY
표성인		RECOVI	ERY (ft)	120111200210	SOIL NAME, USCS GROUP SYMBOL, COLOR,
H Å Ä			#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR ONSISTENCY, SOIL STRUCTURE, MINERALOGY SOIL STRUCTURE, MINERALOG
			,,,,,	(N)	≿s
-36.9	80.0				Silty Sand (SM) SS-17 taken 14:27
-		1.5	SS-17	1-1-2 (3)	80.ó-81.5' - palé yellowish brown, (10YR 6/2), wet, -
-	81.5			(3)	very fine to fine grained silica sand, 25% nonplastic
-	01.0				fines, trace very fine sand-sized black particles
-					Driller's Remark: Light to medium chatter
-					observed while drilling to 85'
-					
-					
-					
-					
85 <u> </u>	85.0	00	00.10	F0/0	(1) (1) (1) (1) (1) (1) (1) (1) (1) (1)
-41.9	85.3	0.3	SS-18	50/3 (50/3")	Clayey Sand (SC) 85.0-85.4' - mixed silty sands, fat clays (SM, CH), fat
_				(55,0)	clay is mottled olive black (5Y 2/1) and gravish black
_					(N2), silty sand is dark yellowish brown (10YR 4/2) Driller's Remark: Switch to 2-7/8" tricone with black streaks, wet, very loose/soft, trace medium Priller's Remark: Switch to 2-7/8" tricone roller bit at 15:07
					to coarse sand-sized carbonate material with SS-18 may be slough
					moderate HCI reaction, no HCI reaction in silty sands
_					or fat clays
_					1 1
-					
-					<u> </u>
-					
90 <u> </u>	90.0				Silt (ML) SS-19 taken 15:36
-		١.,	00.40	4-19-26	↑ 90.0-90.4' - yellowish gray, (5Y 8/1), nonplastic, rapid /=
-		1.4	SS-19	(45)	\ dilatancy, moderate to strong HCl reaction, very thinly
_	91.5				(organics), all carbonate
_					Silty Sand With Gravel (SM)
_					\ \ \ 90.4-91.4' - yellowish gray, (5Y 8/1), wet, dense, strong HCl reaction, fine to coarse sand-sized, 20%
l _					fine to coarse gravel-sized, 30% nonplastic fines, all
_					carbonate
] [
I -]
95	95.0				11
-51.9					Sandy Clay With Silt (CL-ML) SS-20 taken 15:51
-		1.5	SS-20	0-7-47	95.0-96.5' - yellowish gray, (5Y 8/1), moist, hard, low - plasticity, rapid dilatancy, strong HCl reaction,
-	96.5			(54)	greenish black (5GY 2/1) mottling at 95.8', 10-15% Weight of hammer for first 6"
-	30.0				fine to medium sand-sized, trace organics in pockets
-					
-					
-					
-					
-]] .
_]] .
100					
I		<u> </u>			



PROJECT NUMBER:

338884.FL

B-07

SHEET 6 OF 8

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724369.7 N, 457955.5 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER	LEVELS	: 2.0 ft b	gs on 5/4/	/07 5	START : 5/4/2007 END : 5/6/2007 LOGGE	R : P.	De Sa'rego, R. Bitely
				STANDARD	SOIL DESCRIPTION	(J	COMMENTS
LOW N (#)	SAMPLE	INTERVA	AL (ft)	PENETRATION TEST RESULTS	COLL NAME TIGOGO CLECKE CALLED	Ĭ	DEDTIL OF GAOING SOULING DATE
H H H		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	OCIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	INSTRUMENTATION
-56.9	100.0	0.5	SS-21	38-50/2	Silty Sand (SM)	T	SS-21 taken 17:03
-	100.7	0.0	00 2	(88/8")	100.0-100.5' - yellowish gray to very light gray, (5Y 7/2 to N8), wet, very dense, strong HCl reaction, fine to	1	1
					coarse sand-sized, 25% low plasticity fines, 10% fine gravel-sized, all carbonate		11:50 100% circulation loss at 101.0' Switch to 2-3/8" tricone roller drill bit
_					g-over oldes, all contact	1	_
-						-	5/5/07 water level taken 08:38, 4.4' below ground surface
-						-	09:30 65.0' 4" HW casing installed Driller's Remark: Will use 2-7/8" tricone drag
-						1	bit to advance boring, AWJ rods
-						1	-
105	105.0					1	1
-61.9	100.0				Silty Sand (SM) 105.0-105.9' - yellowish gray, (5Y 7/2), wet, medium	T	Light chatter while drilling with drag bit
		0.9	SS-22	10-6-23 (29)	$\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ $]
_	106.5			, ,	35% low plasticity fines, 10% fine to coarse / gravel-sized, all carbonate		10:40 Driller's Remark: Reached 90.0-91.0' and lost complete circulation -
_					g-are-cases, am caracteriate	-	Installed 4" HW casing to 105.0' below
-						-	ground surface
-						-	-
-						┨	1
-						1	1
110	110.0					1	1
-66.9	110.0				Silty Sand With Limestone Fragments (SM)	111	SS-23 taken 14:55
-		1.5	SS-23	13-22-11 (33)	110.0-111.5' - very light gray to light gray, (N5 to N7), wet, dense, strong HCl reaction, fine to coarse	1	1
	111.5			(00)	sand-sized, 35% fine to coarse gravel-sized limestone fragments, 20% low plasticity fines, material is]
_					carbonate and highly fossiliferous		
_						4	_
-						-	-
-						-	-
-						-	-
115	115.0					┨	1
115 <u></u> -71.9	115.0				Silty Sand With Limestone Fragments (SM)		SS-24 taken 15:13
-		0.9	SS-24	7-2-29 (31)	115.0-115.85' - Same as 110-111.5'		Last SPT on 5/5/07
_	116.5			(31)			1
]
_						1]
_						1	
-						-	-
-						-	-
-						1	-
120						+	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-07	SHEET	7	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724369.7 N, 457955.5 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

	WATER LEVELS: 2.0 ft bgs on 5/4/07 START: 5/4/2007 END: 5/6/2007 LOGGER: P. De Sa'rego, R. Bitely										
WATER	LEVELS	: 2.0 ft bo	gs on 5/4/	07 8	START : 5/4/2007	END : 5/6/2007	LOGGE	R : P.	De Sa'rego, R. Bitely		
3000				STANDARD PENETRATION		SOIL DESCRIPTION		ğ.	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	COUL NAME	AE LICOS ODOLID CVANDO	. 00LOD	SYMBOLIC LOG	DEDTIL OF CACINIC DRILLING DATE		
B NE		RECOVE	ERY (ft)			ME, USCS GROUP SYMBO E CONTENT, RELATIVE D		l j	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND		
PT. EVA			#TYPE	6"-6"-6"		NCY, SOIL STRUCTURE, N		MB	INSTRUMENTATION		
				(N)				S			
-76.9	120.0					th Limestone Fragments		Ш	Start drilling on 5/6/07 at 8:05		
		1.5	SS-25	13-18-19	120.0-121.8 - strong HCl rea	yellowish gray, $(5\bar{Y} 8/1)$, action, fine to coarse sand	wei, dense, H-sized 42%	1	Water level at 6.4' below ground surface at beginning of day		
-	101 E			(37)	low plasticity fi	ines, 15-20% fine fragme	nts-sized	1			
-	121.5					ived, highly fossiliferous v	with molds and	1	-		
-					casts			-	-		
_								4	-		
_								4	_		
									_		
								1			
125	125.0							1	-		
-81.9	123.0			37-50/5	Silty Sand Wi	th Limestone Fragments	s (SM)	111	Driller's Remark: Continued circulation loss		
-	125.9	0.9	SS-26	(87/11")	125.0-125.9' -	Same as 120-121.8' exc	ept 25-30%	-	from 120-125' - gained a little back at 125.0' -		
-	125.9			,	gravel-sized m 1/4"-1/2" thick	naterial in wafer-like lense	es up to	+11.1	-		
_					\1/4 - 1/2 tillCK			4	_		
_								_	_		
								_			
								1	_		
-								1	-		
-								-	-		
-								-	-		
130_	130.0			50/5 F	City Const Wit	4b. 1 :	- (OM)	1	Dellada Danasida 100 1051 dellad faida band		
-86.9 _	130.5	0.4	SS-27	50/5.5 (50/5.5")	130 0-130 4' -	th Limestone Fragments Same as 125.0-125.9' ex	S(SM) (cent trace /][[Driller's Remark: 130-135' drilled fairly hard and consistent		
				(00/0.0)	organic fragme			_	and condition		
								1			
								1	_		
-								1	=		
-								-	-		
-								-	-		
_								4	_		
I _								_	_		
								_			
135	135.0										
-91.9	135.4	0.1	SS-28	50/4.5	\ Limestone Fra	agments		1	1		
-				(50/4.5")	\135.0-135.1' -	strong HCI reaction		1	-		
-								1	Chatter at 136-136.5'		
-								-	Driller's Remark: Harder -		
-	407.5							-	End soil sampling at 10:35 on 5/6/07		
-	137.5	0.0	SS-29	50/2	No Recovery	137 5-137 6'		₩	Switch to rock coring, see rock core log		
	137.6		33 23	(50/2")	Begin Rock Co	oring at 137.5 ft bgs	/	1			
					See the next s	sheet for the rock core log	I	_			
]											
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140								1	-		
140								+	-		
			1								



PROJECT NUMBER:

33884.FL

B-07

SHEET 8 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724369.7 N, 457955.5 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

WATER LEVELS 2.28 in Begon of Swidty START - \$4/2007 (END) - \$6/2007 (COMMENTS) (COMMENT	CORING	IVIL IT IOD AI	ND L	ZUIFIV	IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW c	asiriy		ORIENTATION : Vertical
DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, BLANARTY, ENTILLING MATERIAL AND SERVICE COLOR AND THE SERVICE STARINGS, AND TREM'S AND TREM'	WATER	LEVELS : 2.0	ft bg	s on 5	/4/07 START : 5/4/2007 END : 5/	<u>3/200</u>	7 LOGGER: P. De Sa'rego, R. Bite	ly
137.5 7 137.6 Fractures (3), horizontal smooth to rough, undulating, to stepped, heavy drill action marks, open 137.6 - 138.7 Fractures, portange of the possible black staining over 50% of surface, with 14/ relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.5 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.5 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 139.45 - Fracture, 5 deg, rough, undulating, 1/16' relief, open 139.45 - Fracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 41.6' relief, tight 139.6 - Fracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 41.6' relief, tight 139.6 - Fracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 41.1' - Fracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/					DISCONTINUITIES	(2	LITHOLOGY	COMMENTS
137.5 7 137.6 Fractures (3), horizontal smooth to rough, undulating, to stepped, heavy drill action marks, open 137.6 - 138.7 Fractures, portange of the possible black staining over 50% of surface, with 14/ relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.5 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.5 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 139.45 - Fracture, 5 deg, rough, undulating, 1/16' relief, open 139.45 - Fracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 41.6' relief, tight 139.6 - Fracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 41.6' relief, tight 139.6 - Fracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 41.1' - Fracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/	N S S S S S S S S S S S S S S S S S S S	9€		m	DESCRIPTION	1 8	DOOK TVET COLOT	
137.5 7 137.6 Fractures (3), horizontal smooth to rough, undulating, to stepped, heavy drill action marks, open 137.6 - 138.7 Fractures, portange of the possible black staining over 50% of surface, with 14/ relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.5 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.5 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 139.45 - Fracture, 5 deg, rough, undulating, 1/16' relief, open 139.45 - Fracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 41.6' relief, tight 139.6 - Fracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 41.6' relief, tight 139.6 - Fracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 41.1' - Fracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/	O A A	Z Z Z	_	꽃	DESCRIPTION	ਹੁ	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
137.5 7 137.6 Fractures (3), horizontal smooth to rough, undulating, to stepped, heavy drill action marks, open 137.6 - 138.7 Fractures, portange of the possible black staining over 50% of surface, with 14/ relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.5 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.5 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 139.45 - Fracture, 5 deg, rough, undulating, 1/16' relief, open 139.45 - Fracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 41.6' relief, tight 139.6 - Fracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 41.6' relief, tight 139.6 - Fracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 41.1' - Fracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/	ACI	SE	%)	120	DEPTH. TYPE. ORIENTATION. ROUGHNESS.	占		FLUID LOSS, CORING RATE AND
137.5 7 137.6 Fractures (3), horizontal smooth to rough, undulating, to stepped, heavy drill action marks, open 137.6 - 138.7 Fractures, portange of the possible black staining over 50% of surface, with 14/ relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.5 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.5 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 139.45 - Fracture, 5 deg, rough, undulating, 1/16' relief, open 139.45 - Fracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 41.6' relief, tight 139.6 - Fracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 41.6' relief, tight 139.6 - Fracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 41.1' - Fracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/	ER.	NG NG NG NG NG NG NG NG NG NG NG NG NG N	Ωα	AC.	PLANARITY, INFILLING MATERIAL AND	MB		SMOOTHNESS, CAVING ROD
137.5 7 137.6 Fractures (3), horizontal smooth to rough, undulating, to stepped, heavy drill action marks, open 137.6 - 138.7 Fractures, portange of the possible black staining over 50% of surface, with 14/ relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.3 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.4 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.5 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 138.5 - Bedding plane, 5 deg, rough, undulating, 1/16' relief, open 139.45 - Fracture, 5 deg, rough, undulating, 1/16' relief, open 139.45 - Fracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 41.6' relief, tight 139.6 - Fracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 41.6' relief, tight 139.6 - Fracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 41.1' - Fracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 141.8 - Tracture, 5 deg, rough, undulating, 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/16' relief, open 1/	SU	잉필뜂	R O	FE	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S√	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
R1-NQ 4 ft 3					127.6.127.9! Fractures (2) harizantal	T	Limestone	Driller starts with new bit:
R1-ND 4 ft 35 75% 95.9 possible black staining over 50% of surface, with 14/4" relief, pore sold smooth and planar with wear from drilling, black staining with relief open 138 - Bedding plane, 15 deg, rough, planar, tight 138 - Bedding plane, 15 deg, rough, planar, tight 138 - Bedding plane, port of the planar tight 138 - Bedding plane, port of the planar tight 139 - Fracture, 60 deg, rough, undulating, 139 - Fracture, 60 deg, rough, undulating, 146 ft relief, tight 143 - Bedding plane, bortzontal, rough, undulating, 1416 ft relief, tight 143.3 - Fracture, 80 deg, rough, undulating, 1416 ft relief, tight 143.3 - Fracture, 80 deg, rough, undulating, 1416 ft relief, tight 143.3 - Fracture, 80 deg, rough, undulating, 1416 ft relief, tight 143.3 - Fracture, 80 deg, rough, undulating, 1416 ft relief, tight 143.3 - Fracture, 80 deg, rough, undulating, 1416 ft relief, tight 143.5 - Fracture, 80 deg, rough, undulating, 1416 ft relief, tight 143.6 - Fracture, 80 deg, rough, undulating, 1416 ft relief, tight 143.6 - Fracture, 80 deg, rough, undulating, 1416 ft relief, tight 143.6 - Fracture, 80 deg, rough, undulating, 1416 ft relief, tight 143.6 - Fracture, 80 deg, rough, undulating, 1416 ft relief, tight 143.6 - Fracture, 80 deg, rough, undulating, 1416 ft relief, tight 143.6 - Fracture, 80 deg, rough, undulating, 1416 ft relief, tight 143.6 - Fracture, 80 deg, rough, undulating, 1416 ft relief, tight 143.6 - Fracture, 80 deg, rough, undulating, 1416 ft relief, tight 143.6 - Fracture, 80 deg, rough, undulating, 1416 ft relief, tight 143.6 - Fracture, 80 deg, rough, undulating, 143.7 - Bedding plane, 90 ft relief, 143.6 - Fracture, 80 deg, rough, undulating, 144.6 - F	-			7				
R1-NO 4 ft 10						ш	8/1), strong HCl reaction, medium	
PRI-NO 4 75% possible black staining over 50% of surface, with 144 "relick lower side smooth and planar with wear from drilling, black staining with embedded practices over 60% of surface 139 - Bedding plane, chorzontal, bottom surface is rough, undulating, 116" relief, 138, 35". Bedding plane, plorzontal, bottom surface is rough, undulating, 116" relief, 139. "Fracture, 60 deg, rough, undulating, 116" relief, 139. "Fracture, 60 deg, rough, undulating, 116" relief, 139. "Fracture, 60 deg, rough, undulating, 116" relief, 139. "Fracture, 60 deg, rough, undulating, 116" relief, 139. "Fracture, 60 deg, rough, undulating, 116" relief, 139. "Fracture, 60 deg, rough, undulating, 116" relief, 139. "Fracture, 60 deg, rough, undulating, 116" relief, 139. "Fracture, 60 deg, rough, undulating, 116" relief, 139. "Fracture, 80 deg, rough, undulating, 116" relief, 139. "Fr					137.9' - Fracture, horizontal, rough, stepped.	Н		
with 14" relief, lower side smooth and planar with wear from drilling, black staining with embedded particles over 60% of surface 138". Bedding plane, 5 deg, rough, undusting, 1716" relief, open 138". Bedding plane, 5 deg, rough, undusting, 1716" relief, open 138". Bedding plane, 5 deg, rough, undusting, 1716" relief, open 138". Bedding plane, 150 deg, rough, undusting, 1716" relief, open 138". Bedding plane, 150 deg, rough, undusting, 1716" relief, open 138". Bedding plane, 150 deg, rough, undusting, 1716" relief, open 138". Bedding plane, 150 deg, rough, undusting, 1716" relief, open 138". Bedding plane, 150 deg, rough, undusting, 1716" relief, tight 138". Bedding plane, 150 deg, rough, undusting, 1716" relief, tight 140.1" Mechanical break 141.6" Mechanical bre	-	R1-NO		3	possible black staining over 50% of surface,			
with wear from drilling, black staining with embedded particles over 60% of surface 138 - Bedding plane, 5 deg, rough, undulating, 116 relief, open 138, 35 - Bedding plane, 15 deg, rough, undulating, 116 relief, open 138, 35 - Bedding plane, 15 deg, rough, undulating, 138, 45 - Bedding plane, horizontal, rough, undulating, 138, 45 - Fracture, 60 deg, rough, undulating, 138, 45 - Fracture, 80 deg, r	-		35		with 1/4" relief, lower side smooth and planar	╙		detrital limestone
141.5 188 - Bedding plane, 45 deg, rough, undulating, 11/6" relief, open 138.35" - Bedding plane, 15 deg, rough, planar, tight 138.4" - Bedding plane, horizontal, bottom surface is rough, undulating, 11/6" relief, open 138.7" - Mechanical break 140.1" - Mechanical break 140.1" - Mechanical break 140.1" - Mechanical break 141.8" - Fracture, 5 deg, rough, undulating, 11/6" relief, tight 139.9" - Fracture, 5 deg, rough, undulating, 11/6" relief, tight 139.9" - Fracture, 5 deg, rough, undulating, 11/6" relief, tight 140.1" - Mechanical break 140.1" - Mechanical break 140.1" - Mechanical break 141.8" - Fracture, 5 deg, rough, undulating, 11/6" relief, tight 143.3" - Fracture, 5 deg, rough, undulating, 11/6" relief, tight 143.3" - Fracture, 5 deg, rough, undulating, 11/6" relief, tight 143.3" - Fracture, 80 deg, rough, undulating, 11/6" relief, tight 143.3" - Fracture, 80 deg, rough, undulating, 11/6" relief, tight 143.3" - Fracture, 80 deg, rough, undulating, 11/6" relief, tight 143.3" - Fracture, 80 deg, rough, undulating, 11/6" relief, tight 143.3" - Fracture, 80 deg, rough, undulating, 11/6" relief, tight 143.3" - Fracture, 80 deg, rough, undulating, 11/6" relief, tight 143.3" - Fracture, 80 deg, rough, undulating, 11/6" relief, tight 143.3" - Fracture, 80 deg, rough, undulating, 11/6" relief, tight 143.3" - Fracture, 80 deg, rough, undulating, 11/6" relief, tight 143.3" - Fracture, 80 deg, rough, undulating, 11/6" relief, tight 143.3" - Fracture, 80 deg, rough, undulating, 11/6" relief, 11				4	with wear from drilling, black staining with	Н		
NR 141.5 NR 141	-96.9			'		⇈	strongly cemented	
141.5 NR 138.3°- Bedding plane, 15 deg, rough, planar, light 138.4'- Bedding plane, horizontal bottom surface is rough, undulating, heavy wear on upper side from drilling, <1/16' relief, open 18.7'. Mechanical break 138.7'- Bedding plane, horizontal, rough, undulating, 176' relief, tight 139.6'- Fracture, 50 deg, rough, undulating, 1516' relief, tight 139.6'- Fracture, 5 deg, rough, undulating, 1516' relief, tight 139.6'- Fracture, 5 deg, rough, undulating, 1716' relief, tight 139.6'- Fracture, 5 deg, rough, undulating, 1716' relief, tight 139.6'- Fracture, 5 deg, rough, undulating, 1716' relief, tight 139.6'- Fracture, 5 deg, rough, undulating, 1716' relief, tight 139.6'- Fracture, 5 deg, rough, undulating, 1716' relief, tight 139.6'- Fracture, 5 deg, rough, undulating, 1716' relief, tight 139.6'- Fracture, 5 deg, rough, undulating, 1716' relief, tight 138.5'- Mechanical break 141.5'- Mechanical break 141.5'- Mechanical break 141.6'- Mechanical break 141	-					仜		R1: 8 minutes
planar, light 138.4 - Bedding plane, horizontal, bottom surface is rough, undulating, heavy wear on upper side from drilling - 4/118* relief, open 138.7 - Mechanical break 139.9 - Fracture, 60 deg, rough, undulating, 3/16* relief, tight 139.3 - Bedding plane, horizontal, rough, undulating, rock weak from drilling in upper surface, open 139.45 - Fracture, 50 deg, rough, undulating, 1/16* relief, tight 139.6 - Fracture, 50 deg, rough, undulating, 1/16* relief, tight 139.6 - Fracture, 50 deg, rough, undulating, 1/16* relief, tight 139.6 - Fracture, 80 deg, rough, undulating, 1/16* relief, tight 143.8 - Fracture, 80 deg, rough, undulating, 1/16* relief, tight 143.8 - Fracture, 80 deg, rough, undulating, 1/16* relief, tight 143.8 - Fracture, 80 deg, rough, undulating, 1/16* relief, tight 143.8 - Fracture, 80 deg, rough, undulating, 1/16* relief, tight 143.8 - Fracture, 80 deg, rough, undulating, 1/16* relief, tight 143.8 - Fracture, 80 deg, rough, undulating, 1/16* relief, tight 143.8 - Fracture, 80 deg, rough, undulating, 1/16* relief, tight 143.8 - Fracture, 80 deg, rough, undulating, 1/16* relief, tight 143.8 - Fracture, 80 deg, rough, undulating, 1/16* relief, tight 143.8 - Fracture, 80 deg, rough, undulating, 1/16* relief, tight 143.8 - Fracture, 80 deg, rough, undulating, 1/16* relief, tight 143.8 - Fracture, 80 deg, rough, undulating, 1/16* relief, tight 143.8 - Fracture, 80 deg, rough, undulating, 1/16* relief, tight 143.8 - Fracture, 80 deg, rough, undulating, 1/16* relief, tight 143.8 - Fracture, 80 deg, rough, undulating, 1/16* relief, tight 143.8 - Fracture, 80 deg, rough, undulating, 1/16* relief, tight 143.8 - Fracture, 80 deg, rough, undulating, 1/16* relief, tight 143.8 - Fracture, 80 deg, rough, undulating, 1/16* relief, tight 143.8 - Fracture, 80 deg, rough, undulating, 1/16* relief, tight 143.8 - Fracture, 80 deg, rough, undulating, 1/16* relief, tight 143.8 - Fracture, 80 deg, rough, undulating, 1/16* relief, tight 143.8 - Fracture, 80 deg, rough, 144.8 - Fracture, 80 deg, rough, undulating, 145.	-			NR	138 35' - Redding plane 15 deg rough	┢		-
138 A'- Sedding plane, horizontal, bottom surface is rough, undulating, heavy wear on upper side from drilling, <1/16' relief, open 138 T'- Mechanical break 138.9' - Fracture, 60 deg, rough, undulating, 3/16' relief, tight 139.3' - Bedding plane, horizontal, rough, undulating, 1/16' relief, tight 148.5' - Tracture, 50 deg, rough, undulating, 1/16' relief, tight 148.5' - Tracture, 50 deg, rough, undulating, 1/16' relief, tight 143.3' - Fracture, 50 deg, rough, undulating, 1/16' relief, tight 143.3' - Fracture, 50 deg, rough, undulating, 1/16' relief, tight 143.3' - Fracture, 50 deg, rough, undulating, 1/16' relief, tight 143.3' - Fracture, 50 deg, rough, undulating, 1/16' relief, tight 143.8' - Fracture, 50 deg, rough, undulating, 1/16' relief, tight 143.8' - Fracture, 50 deg, rough, undulating, 1/16' relief, tight 143.8' - Fracture, 50 deg, rough, undulating, 1/16' relief, tight 143.8' - Fracture, 50 deg, rough, undulating, 1/16' relief, tight 143.8' - Fracture, 70 deg, rough, undulating, 1/16' relief, tight 143.8' - Fracture, 70 deg, rough, undulating, 1/16' relief, tight 143.8' - Fracture, 70 deg, rough, undulating, 1/16' relief, tight 143.8' - Fracture, 70 deg, rough, undulating, 1/16' relief, tight 143.8' - Fracture, 70 deg, rough, undulating, 1/16' relief, tight 143.8' - Fracture, 70 deg, rough, undulating, 1/16' relief, tight 143.8' - Fracture, 1/16' reli		141.5				屵	becomes more massive, highly	
surface is rough, undulating, heavy wear on upper side from drilling, 1-1/16" relief, open 138.7". Mechanical break 138.9". Fracture, 60 deg, rough, undulating, 3/16" relief, tight 139.3". Bedding plane, borizontal, rough, undulating, 17/16" relief, tight 140.1". Mechanical break 141.6". Mechanical break 141.6". Mechanical break 141.6". Mechanical break 143.5". Fracture, 80 deg, rough, undulating, 17/16" relief, tight 140.1". Mechanical break, 0-90 deg, rough, undulating, 17/16" relief, tight 143.3". Fracture, 80 deg, rough, undulating, 17/16" relief, tight 143.5". Fracture, 70 deg, rough, undulating, 17/16" relief, tight 143.5". Fracture, 80 deg, rough, undulating, 17/16" relief, tight 143.5". Fracture, 80 deg, rough, undulating, 17/16" relief, tight 143.5". Fracture, 80 deg, rough, undulating, 17/16" relief, tight 143.5". Fracture, 80 deg, rough, undulating, 17/16" relief, tight 143.5". Fracture, 80 deg, rough, undulating, 17/16" relief, tight 143.5". Fracture, 80 deg, rough, undulating, 17/16" relief, tight 143.5". Fracture, 80 deg, rough, undulating, 17/16" relief, tight 143.5". Fracture, 80 deg, rough, undulating, 17/16" relief, tight 143.5". Fracture, 80 deg, rough, undulating, 17/16" relief, tight 143.5". Fracture, 80 deg, rough, undulating, 17/16" relief, tight 143.5". Fracture, 80 deg, rough, undulating, 17/16" relief, tight 143.5". Fracture, 80 deg, rough, undulating, 17/16" relief, tight 143.5". Fracture, 80 deg, rough, undulating, 17/16" relief, tight 143.5". Fracture, 80 deg, rough, undulating, 17/16" relief, tight 143.5". Fracture, 80 deg, rough, undulating, 17/16" relief, tight 143.5". Fracture, 80 deg, rough, undulating, 17/16" relief, tight 143.5". Fracture, 80 deg, rough, undulating, 17/16" relief, tight 143.5". Fracture, 80 deg, rough, undulating, 17/16" relief, tight 143.5". Fracture, 80 deg, rough, undulating, 17/16" relief, tight 143.5". Fracture, 80 deg, rough, undulating, 17/16" relief, tight 143.5". Fracture, 80 deg, rough, undulating, 17/16" relief, tight 143.5". Fracture, 80 deg, roug	1 7					Ш		_
145 - 100% 126	-			3	surface is rough, undulating, heavy wear on	 		
R2-NQ 5 ft 198.9 - Fracture, 60 deg, rough, undulating, 31/6' relief, tight 199.3 - Bedding plane, horizontal, rough, undulating, rock weak from drilling in upper surface, open 139.45 - Fracture, 60 deg, rough, undulating, 1/16' relief, tight 139.6 - Fracture, 60 deg, rough, undulating, 1/16' relief, tight 139.6 - Fracture, 60 deg, rough, undulating, 1/16' relief, tight 140.1 - Mechanical break 141.6 - Mechanical break 0.90 deg, rough, undulating, 1/16' relief, tight 143.3 - Fracture, 70 deg, rough, undulating, 1/16' relief, tight 143.3 - Fracture, 70 deg, rough, undulating, 1/16' relief, tight 143.3 - Fracture, 70 deg, rough, undulating, 1/16' relief, tight 143.3 - Fracture, 70 deg, rough, undulating, 1/16' relief, tight 143.3 - Fracture, 70 deg, rough, undulating, 1/16' relief, tight 143.3 - Fracture, 70 deg, rough, undulating, 1/16' relief, tight 143.8 - Mechanical break 144.1 - Hadding plane, 0-5 deg, rough, undulating, open 144.6 - Had.5 - Fracture, vertical, undulating 145.9 - Mechanical break 146.6 - Bedding plane, horizontal, rough, undulating, open 18', organics covering 50-70% surface 146.8 - Bedding plane, horizontal, rough, undulating, open 18', organics covering 50-70% surface 147.3 - Bedding plane, horizontal, rough, undulating, tight 149.4 - Fracture, horizontal, rough, undulating, tight 149.4 - Fracture, horizontal, rough, undulating, tight 149.4 - Fracture, horizontal, rough, undulating, fossil fragment at surface of the plane of the	-					₽		
R2-NO 5 ft 100% 76 1 100% 76 1 100% 76 1 1039.3 - Bedding plane, horizontal, rough, undulating, rote weak from drilling in upper surface, open 199.45 - Fracture, 5 deg, rough, undulating, 110° relief, tight 140.1 - Mechanical break 141.6 - Mechanical break, 0-90 deg, rough, undulating, 1110° relief, tight 143.3 - Fracture, 80 deg, rough, undulating, 1110° relief, tight 143.3 - Fracture, 80 deg, rough, undulating, 1110° relief, tight 143.6 - Fracture, 80 deg, rough, undulating, 1110° relief, tight 143.6 - Mechanical break 144.1 - 144.4 - Bedding plane, 0-5 deg, rough, undulating, open 188° organics covering 50°-70% surface 146.5 - Bedding plane, horizontal, rough, undulating, open 188° organics covering 50°-70% surface 146.8 - Bedding plane, horizontal, rough, undulating, open 188°, organics covering 50°-70% surface 146.8 - Bedding plane, horizontal, rough, undulating, open 188°, organics covering 50°-70% surface 146.8 - Bedding plane, horizontal, rough, undulating, open 188°, organics covering 50°-70% surface 146.8 - Bedding plane, horizontal, rough, undulating, open 188°, organics covering 50°-70% surface 146.8 - Bedding plane, horizontal, rough, undulating, open 188°, organics covering 50°-70% surface 146.8 - Bedding plane, horizontal, rough, undulating, open 188°, organics covering 50°-70% surface 146.8 - Bedding plane, horizontal, rough, undulating, open 188°, organics covering 50°-70% surface 146.8 - Bedding plane, horizontal, rough, undulating, open 188°, organics covering 50°-70% surface 146.8 - Bedding plane, horizontal, rough, undulating, open 188°, organics covering 50°-70% surface 146.8 - Bedding plane, horizontal, rough, undulating, open 188°, organics covering 50°-70% surface 146.8 - Bedding plane, horizontal, rough, undulating, open 188°, organics covering 50°-70% surface 146.8 - Bedding plane, horizontal, rough, undulating, open 188°, organics covering 50°-70% surface 146.8 - Bedding plane, horizontal, rough, undulating, open 188°, organics covering 50°-70% surface 146.8 - Bedding plane, horizont								140.1
R2-NO 5 ft 100% 144.5 - Fracture, 50 deg, rough, undulating, 1/16' relief, light 143.5 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.5 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.5 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.5 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.5 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.5 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.5 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.5 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.5 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.5 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.5 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.5 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.5 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.5 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fractur	1 1					L .		_
undulating, rock weak from drilling in upper surface, open 139.45 - Fracture, 5 deg, rough, undulating, 1/16 'relief, light 139.6 - Fracture, 60 deg, rough, undulating, 1/16 'relief, light 141.6 - Mechanical break 141.6 - Mechanical break, 0-90 deg, rough, undulating, 4/16' relief, open 141.8, 142.1 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.3 - Fracture, 80 deg, rough, undulating, 1/16' relief, sight 143.3 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.3 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.5 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.5 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.5 - Fracture, 80 deg, rough, undulating, up to 1/16' relief, light 143.5 - Fracture, 80 deg, rough, undulating, up to 1/16' relief, light 143.5 - Fracture, 80 deg, rough, undulating, up to 1/16' relief, light 143.5 - Fracture, 80 deg, rough, undulating, up to 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, up to 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough, undulating, 1/16' relief, light 143.6 - Fracture, 80 deg, rough	-	₽2-NI∩				₽		-
surface, open 139.45 - Fracture, 6 deg, rough, undulating, 1/16' relief, tight 139.6' - Fracture, 6 deg, rough, undulating, 1/16' relief, tight 139.6' - Fracture, 6 deg, rough, undulating, 1/16' relief, tight 140.1' - Mechanical break, 0-90 deg, rough, undulating, 1/16' relief, tight 143.3' - Fracture, 6 deg, rough, undulating, 1/16' relief, tight 140.1' - Mechanical break, 0-90 deg, rough, undulating, 1/16' relief, tight 143.3' - Fracture, 70 deg, rough, undulating, 1/16' relief, tight 143.8' - Fracture, 70 deg, rough, undulating, open 144.1-144.4' - Bedding plane, 0-5 deg, rough, undulating, 145.9' - Mechanical break 146.6' - Bedding plane, 0-5 deg, rough, undulating, open 1/8'', organics covering 50-70% surface 147.3' - Bedding plane, horizontal, rough, undulating, open 1/8'', organics covering 50-70% surface 147.3' - Bedding plane or mechanical break, horizontal, rough, undulating, dight 149.4' - Fracture, 30 deg, rough, undulating, tight 149.4' - Fracture, ordeg, rough, undulating, open 1/8'', organics covering 50-70% surface 147.3' - Bedding plane or mechanical break, horizontal, rough, undulating, dight 149.4' - Fracture, 30 deg, rough, undulating, tight 149.4' - Fracture, 70 deg, rough, undulating, open 1/8'', organics covering 50-70% surface 147.3' - Bedding plane, 0-5 deg, rough, undulating, open 1/8'', organics covering 50-70% surface 147.3' - Bedding plane, 0-5 deg, rough, undulating, open 1/8'', organics covering 50-70% surface 149.4' - Stroure, 70 deg, rough, undulating, open 1/8'', organics covering 50-70% surface 149.4' - Stroure, 70 deg, rough, undulating, open 1/8'', organics covering 50-70% surface 149.4' - Stroure, 70 deg, rough, undulating, open 1/8'', organics covering 50-70% surface 149.5' - Fracture, 70 deg, rough, undulating, open 1/8'', organics covering 50-70% surface 149.4' - Stroure, 70 deg, rough, undulating, 0pen 1/8'', organics covering 50-70% surface 149.4' - Fracture, 70 deg, rough, undulating, 0pen 1/8'', organics covering 50-70% surface 149.4' - Fracture, 70 deg, rough, undul	-		76	1		\vdash	to weak (R1 to R2), very few voids of	_
145 - 101.9				'				
101.9 4 1/16 relief, ignt 139.6' - Fracture, 60 deg, rough, undulating, 1/16' relief, ignt 140.1' - Mechanical break, 0-90 deg, rough, undulating, 1/16' relief, ignt 141.8, 142.1' - Fractures, 70 deg, rough, undulating, 1/16' relief, tignt 143.5' - Fracture, 80 deg, rough, undulating, 1/16' relief, eacretions of indescent pyrite covering 30% of surface, tight 143.8' - Fracture, 70 deg, rough, undulating, 1/16' relief, gloth 143.8' - Fracture, 70 deg, rough, undulating, 1/16' relief, accretions of indescent pyrite covering 30% of surface, tight 143.8' - Fracture, 70 deg, rough, undulating, 145.5' - Fracture, 70 deg, rough, undulating, 145.5' - Fracture, 70 deg, rough, undulating, 145.5' - Mechanical break 144.1-144.4' - Bedding plane, 0-5 deg, rough, undulating, open 146.5-146.8', voids 146.6' - Bedding plane, horizontal, rough, undulating, open 1/8'', organics covering 50-70% surface 147.3' - Bedding plane, horizontal, rough, undulating, open 1/8'', organics covering 50-70% surface 147.3' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/8'', organics covering 50-70% surface 147.3' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/8'', organics covering 50-70% surface 147.3' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/8'', organics covering 50-70% surface 147.3' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/8'', organics covering 50-70% surface 147.3' - Bedding plane, 149.4' - Fracture, 30 deg, rough, undulating, 19th 149.4' - Fracture, 30 deg, rough, undulating, 19th 149.4' - Fracture, 30 deg, rough, undulating, 19th 149.4' - Fracture, 30 deg, rough, undulating, 19th 149.4' - Fracture, 30 deg, rough, undulating, 19th 149.4' - Fracture, 30 deg, rough, undulating, 19th 149.4' - Fracture, 30 deg, rough, undulating, 19th 149.4' - Fracture, 30 deg, rough, undulating, 19th 149.4' - Fracture, 30 deg, rough, undulating, 19th 149.4' - Fracture, 30 deg, rough, undulating, 19th 149.4' - Fracture, 30 deg, rough, u	145					╙		_
139.5 - Fracture, by deg, rough, undulating, 1/16" relief, tight 140.1' - Mechanical break 141.6 - Mechanical break 0-90 deg, rough, undulating, 4/1/6" relief, open 141.8, 142.1' - Fractures, 70 deg, rough, undulating, 1/1/6" relief, tight 143.3' - Fracture, 80 deg, rough, undulating, 1/1/6" relief, tight 143.3' - Fracture, 70 deg, rough, undulating, 1/1/6" relief, tight 143.6' - Fracture, 70 deg, rough, undulating, 1/1/6" relief, tight 143.8' - Fracture, 70 deg, rough, undulating, 1/1/6" relief, tight 143.8' - Fracture, 70 deg, rough, undulating, 1/1/6" relief, tight 143.8' - Fracture, 70 deg, rough, undulating, 1/1/6" relief, tight 143.8' - Fracture, 70 deg, rough, undulating, 1/1/6" relief, tight 143.8' - Fracture, vertical, undulating 145.9' - Mechanical break 144.1-144.4' - Bedding plane, horizontal, rough, undulating, open 1/8", organics covering 50-70% surface 147.3' - Bedding plane, horizontal, rough, undulating, open 1/8", organics covering 50-70% surface 147.3' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/8", organics covering 50-70% surface 147.3' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/8", organics covering 50-70% surface 147.3' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/8", organics covering 50-70% surface 147.3' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/8", organics covering 50-70% surface 147.3' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/8", organics covering 50-70% surface 147.3' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/8", organics covering 50-70% surface 147.3' - Bedding plane, horizontal, rough, undulating, open 1/8", organics covering 50-70% surface 147.3' - Bedding plane, horizontal, rough, undulating, open 1/8", organics covering 50-70% surface 147.3' - Bedding plane, horizontal, rough, undulating, open 1/8", organics covering 50-70% surface 147.3' - Fracture, organics covering 50-70% surface 147.				4		╁╌		
146.5								
141.6.5 141.6's - Mechanical break, 0-90 deg, rough, undulating, <1/16' relief, open 141.4's - Hechanical break, 0-90 deg, rough, undulating, 1/16' relief, open 141.4's - Fractures, 70 deg, rough, undulating, 1/16' relief, tight 143.8's - Fracture, 80 deg, rough, undulating, 1/16' relief, accretions of iridescent pyrite covering 30% of surface, tight 143.8's - Fracture, 70 deg, rough, undulating, open 1/8' 143.8's - Mechanical break 144.1-144.4' - Bedding plane, 0-5 deg, rough, undulating, open 1/8' 145.9' - Mechanical break 146.8' - Bedding plane, horizontal, rough, undulating, open 1/8'', organics covering 50-70% surface 146.8' - Bedding plane, horizontal, rough, undulating, open 1/8'', organics covering 50-70% surface 146.8' - Bedding plane, horizontal, rough, undulating, open 1/8'', organics covering 50-70% surface 146.8' - Bedding plane, horizontal, rough, undulating, open 1/8'', organics covering 50-70% surface 146.8' - Bedding plane, horizontal, rough, undulating, open 1/8'', organics covering 50-70% surface 146.8' - Bedding plane, horizontal, rough, undulating, open 1/8'', organics covering 50-70% surface 146.8' - Bedding plane, horizontal, rough, undulating, open 1/8'', organics covering 50-70% surface 146.8' - Bedding plane, horizontal, rough, undulating, open 1/8'', organics covering 50-70% surface 146.8' - Bedding plane, horizontal, rough, undulating, open 1/8'', organics covering 50-70% surface 146.8' - Bedding plane, horizontal, rough, undulating, open 1/8'', organics covering 146.8' - Bedding plane, horizontal, rough, undulating, open 1/8'', organics covering 146.8' - Bedding plane, horizontal, rough, undulating, open 1/8'', organics covering 146.8' - Bedding plane, horizontal, rough, undulating, open 1/8'', organics covering 146.8' - Bedding plane, horizontal, rough, undulating, open 1/8'', organics covering 146.8' - Bedding plane, 0-5 deg, rough, undulating, open 1/8'', organics covering 146.8'', organics covering 146.8'', organics covering 14						ш		R2: 17 minutes
undulating, .1/16" relief, open 141.8, 142.1' - Fractures, 70 deg, rough, undulating, 1/16" relief, tight 143.3' - Fracture, 80 deg, rough, undulating, 116" relief, accretions of indescent pyrite covering 30% of surface, tight 143.6' - Fracture, 70 deg, rough, undulating, 5 ft 76% 150 -106.9 151.5 15	1 7	146 5		0		Ъ⊤		_
14.18, 142.11 - Fractures, 70 deg, rough, undulating, 1/16" relief, tight 143.3' - Fracture, 80 deg, rough, undulating, 1/16" relief, accretions of indescent pyrite covering 30% of surface, tight 143.6' - Fracture, 70 deg, rough, undulating, up to 1/16" relief, tight 143.6' - Fracture, 70 deg, rough, undulating, up to 1/16" relief, tight 143.8' - Mechanical break 144.1-144.4' - Bedding plane, 0-5 deg, rough, undulating, open 144.6-145.5' - Fracture, vertical, undulating 145.9' - Mechanical break 146.6' - Bedding plane, horizontal, rough, undulating, open 1/8", organics covering 50-70% surface 146.8' - Bedding plane, horizontal, rough, undulating, open 1/8", organics covering 50-70% surface 147.3' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/8", organics covering 50-70% surface 147.3' - Bedding plane or mechanical break, horizontal, rough, undulating, tight 149.4' - Fracture, borizontal, rough, undulating, tight 149.4' - Fracture, borizontal, rough, undulating, tight 149.4' - Fracture, horizontal, rough, undulating, tight 149.4' - Fracture, borizontal, rough, undulating, tight 149.4' - Fracture, evertical, undulating, tight 149.4' - Fracture, evertica	-	140.5					144.4-146.5' - moderate HCl	-
undulating, 1/16" relief, tight 143.3' - Fracture, 80 deg, rough, undulating, 1/16" relief, accretions of iridescent pyrite covering 30% of surface, tight 143.85' - Mechanical break 144.1-144.4' - Bedding plane, 0-5 deg, rough, undulating, open 146.6' - Bedding plane, 0-5 deg, rough, undulating, open 1/8", organics covering 50-70% surface 146.8' - Bedding plane, horizontal, rough, undulating, open 1/8", organics covering 50-70% surface 147.3' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/8", organics covering 50-70% surface 147.3' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/8", organics covering 149.4' - Fracture, 30 deg, rough, undulating, tight 149.4' - Fracture, horizontal, rough, undulating, fossil fragment at surface of	-			4		\perp		_
R3-NQ Fig. 1 1 1 1/43.6 - Fracture, 70 deg, rough, undulating, 143.6 - Fracture, 70 deg, rough, undulating, 144.6 - Fracture, vertical, undulating, 145.3 - Fracture, 146.6 - Fracture, 14				'		\vdash		
R3-NQ 5 ft 76% 143.85' - Fracture, 70 deg, rough, undulating, up to 1/16" relief, tight 143.85' - Mechanical break 144.1-144.4' - Bedding plane, 0-5 deg, rough, undulating, open 146.6' - Bedding plane, horizontal, rough, undulating, open 1/8" ope	1 -					1		
R3-NQ 5 ft 76% 11 143.6' - Fracture, 70 deg, rough, undulating, up to 1/16" relief, tight 143.85' - Mechanical break 144.1-144.4' - Bedding plane, 0-5 deg, rough, undulating, open 144.6-145.5' - Fracture, vertical, undulating 145.9' - Mechanical break 146.6' - Bedding plane, horizontal, rough, undulating, open 5/8" 151.5 1	-			1		\Box		-
150	-					┢		_
150			-00		143.6 - Fracture, 70 deg, rough, undulating,	Н		
150— 106.9 144.1-144.4' - Bedding plane, 0-5 deg, rough, undulating, open 144.6-145.5' - Fracture, vertical, undulating 145.9' - Mechanical break 146.6' - Bedding plane, horizontal, rough, undulating, open 5/8" 146.7' - Bedding plane, horizontal, rough, undulating, open 1/8", organics covering 50-70% surface 147.3' - Bedding plane, horizontal, rough, undulating, open 1/8", organics covering 50-70% surface 147.3' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/8" 149.4' - Fracture, 30 deg, rough, undulating, tight 149.4' - Fracture, horizontal, rough, undulating, fight 149.7' - Bedding plane, 20 deg, rough, undulating, fossil fragment at surface of			60	1		ш		
1 undulating, open 144.6-145.5' - Fracture, vertical, undulating 145.9' - Mechanical break 146.6' - Bedding plane, horizontal, rough, undulating, open 1/8", organics covering 50-70% surface 146.8' - Bedding plane horizontal, rough, undulating, open 1/8", organics covering 50-70% surface 147.3' - Bedding plane or mechanical break, horizontal, rough, undulating, topin 1/8" 149.4' - Fracture, 30 deg, rough, undulating, tight 149.7' - Bedding plane, 20 deg, rough, undulating, fossil fragment at surface of	-	7070				╁		-
144.9." - 180.3 17acture, ventical, distribution of the state of				1		╨		
151.5 NR 146.6' - Bedding plane, horizontal, rough, undulating, open 5/8" 146.7' - Bedding plane, horizontal, rough, undulating, open 1/8", organics covering 50-70% surface 146.8' - Bedding plane, horizontal, rough, undulating, open 1/8", organics covering 50-70% surface 147.3' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/8" Society of the appearance of being fine to medium grain textured rock No Recovery 150.3-151.5' Bottom of Boring at 151.5 ft bgs on 5/6/2007 Society of the appearance of being fine to medium grain textured rock No Recovery 150.3-151.5' Bottom of Boring at 151.5 ft bgs on 5/6/2007 Society of the appearance of being fine to medium grain textured rock No Recovery 150.3-151.5' Bottom of Boring at 151.5 ft bgs on 5/6/2007 Society of the appearance of being fine to medium grain textured rock No Recovery 150.3-151.5' Bottom of Boring at 151.5 ft bgs on 5/6/2007 Society of the appearance of being fine to medium grain textured rock No Recovery 150.3-151.5' Bottom of Boring at 151.5 ft bgs on 5/6/2007 Society of the appearance of being fine to medium grain textured rock No Recovery 150.3-151.5' Bottom of Boring at 151.5 ft bgs on 5/6/2007 Society of the appearance of being fine to medium grain textured rock No Recovery 150.3-151.5' Bottom of Boring at 151.5 ft bgs on 5/6/2007 Society of the appearance of being fine to medium grain textured rock No Recovery 150.3-151.5' Bottom of Boring at 151.5 ft bgs on 5/6/2007 Society of the appearance of being fine to medium grain textured rock No Recovery 150.3-151.5' Bottom of Boring at 151.5 ft bgs on 5/6/2007 Society of the appearance of being fine to medium grain textured rock No Recovery 150.3-151.5' Bottom of Boring at 151.5 ft bgs on 5/6/2007 Society of the appearance of being fine to medium grain textured rock No Recovery 150.3-151.5' Society of the appearance of being fine to medium grain textured rock No Recovery 150.3-151.5' Society of the appearance o	-106.9			\vdash		口	, · · · · · · · · · · · · · · · · · · ·	
151.5 149.4-150.3', particles in rock matrix (medium dark gray particle, fossil mold fragments, fossils) give the appearance of being fine to medium grain textured rock No Recovery 150.3-151.5' 149.4-150.3', particles in rock matrix (medium dark gray particle, fossil mold fragments, fossils) give the appearance of being fine to medium grain textured rock No Recovery 150.3-151.5' 149.4-150.3', particles in rock matrix (medium dark gray particle, fossil mold fragments, fossils) give the appearance of being fine to medium grain textured rock No Recovery 150.3-151.5' 150.4-150.3', particles in rock matrix (medium dark gray particle, fossil mold fragments, fossils) give the appearance of being fine to medium grain textured rock No Recovery 150.3-151.5' 150.4-150.3', particles in rock matrix (medium dark gray particle, fossil mold fragments, fossils) give the appearance of being fine to medium grain textured rock No Recovery 150.3-151.5' 150.4-150.3', particles in rock matrix (medium dark gray particle, fossil mold fragments, fossils) give the appearance of being fine to medium grain textured rock No Recovery 150.3-151.5' 150.4-150.3', particles in rock matrix (medium dark gray particle, fossil mold fragments, fossils) give the appearance of being fine to medium grain textured rock No Recovery 150.3-151.5' 150.4-150.3', particles in rock matrix (medium dark gray particle, fossil mold fragments, fossils pive the appearance of being fine to medium grain textured rock No Recovery 150.3-151.5' 150.4-150.3', particles in rock matrix (medium dark gray particle, fossil mold fragments, fossils pive the appearance of being fine to medium grain textured rock No Recovery 150.3-151.5' 150.4-150.3', particles in rock matrix (medium dark gray particle, fossil mold fragments, fossils pive the appearance of being fine to medium grain textured rock No Recovery 150.3-151.5' 150.4-150.3', particles in rock matrix (medium dark gray particle, fossils mold fragments, fossils pive the appearance of being fine to medi	1 1			,,_		 		R3: 8 minutes
151.5 146.7' - Bedding plane, horizontal, rough, undulating, open 1/8", organics covering 50-70% surface 146.8' - Bedding plane, horizontal, rough, undulating, open 1/8", organics covering 50-70% surface 147.3' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/8" 147.8' - Fracture, 30 deg, rough, undulating, tight 149.4' - Fracture, horizontal, rough, undulating, fossil fragment at surface of 149.7' - Bedding plane, 20 deg, rough, undulating, fossil fragment at surface of 149.7' - Bedding plane, 20 deg, rough, undulating, fossil fragment at surface of 150-70% surface 150-70	-			INK		╁		-
undulating, open 1/8", organics covering 50-70% surface 146.8' - Bedding plane, horizontal, rough, undulating, open 1/8", organics covering 50-70% surface 147.3' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/8" 147.8' - Fracture, 30 deg, rough, undulating, tight 149.4' - Fracture, horizontal, rough, undulating, fossil fragments, fossils) give the appearance of being fine to medium grain textured rock No Recovery 150.3-151.5' Bottom of Boring at 151.5 ft bgs on 5/6/2007 Assume core loss from bottom of run. Finish drilling at 13:00. Abandoned on 5/7/07 with 61 bags of Bonsal or Quikrete brand Portland Type I/II or Type I cement (47-lb bags) grouted to surface	-	151.5				\vdash	(medium dark gray particle, fossil –	Agguma gara laga fram
50-70% surface 146.8' - Bedding plane, horizontal, rough, undulating, open 1/8", organics covering 50-70% surface 147.3' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/8" 147.8' - Fracture, 30 deg, rough, undulating, tight 149.4' - Fracture, horizontal, rough, undulating, tight 149.7' - Bedding plane, 20 deg, rough, undulating, fossil fragment at surface of being fine to medium grain textured rock No Recovery 150.3-151.5' Bottom of Boring at 151.5 ft bgs on 5/6/2007 Bottom of Boring at 151.5 ft bgs on 5/6/2007 Abandoned on 5/7/07 with 61 bags of Bonsal or Quikrete brand Portland Type I/II or Type I cement (47-lb bags) grouted to surface						1	mold fragments, fossils) give the	
Abandoned on 5/7/07 with 61 bags of Bonsal or Quikrete brand Portland Type I/I or Type I cement (47-lb bags) grouted to surface 149.4' - Fracture, horizontal, rough, undulating, tight 149.4' - Fracture, horizontal, rough, undulating, fossil fragment at surface of	1]				50-70% surface	1		
undulating, open 1/8", organics covering 50-70% surface 147.3' - Bedding plane or mechanical break, horizontal, rough, undulating, tight 149.4' - Fracture, horizontal, rough, undulating, tight 149.7' - Bedding plane, 20 deg, rough, undulating, ossil fragment at surface of	1 -				146.8' - Bedding plane, horizontal, rough,	1		
147.3' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/8" 147.8' - Fracture, 30 deg, rough, undulating, tight 149.4' - Fracture, horizontal, rough, undulating, tight 149.7' - Bedding plane, 20 deg, rough, undulating, fossil fragment at surface of	-				undulating, open 1/8", organics covering	1		61 bags of Bonsal or -
horizontal, rough, undulating, open 1/8" 147.8' - Fracture, 30 deg, rough, undulating, tight 149.4' - Fracture, horizontal, rough, undulating, tight 149.7' - Bedding plane, 20 deg, rough, undulating, fossil fragment at surface of						1		
147.8' - Fracture, 30 deg, rough, undulating, tight 149.4' - Fracture, horizontal, rough, undulating, tight 149.7' - Bedding plane, 20 deg, rough, undulating, fossil fragment at surface of	1 7					1	5/5/2007	
tight 149.4' - Fracture, horizontal, rough, undulating, tight 149.7' - Bedding plane, 20 deg, rough, undulating, fossil fragment at surface of	-					1	†	
149.4' - Fracture, horizontal, rough, undulating, tight 149.7' - Bedding plane, 20 deg, rough, undulating, fossil fragment at surface of	-					1	-	suriace _
undulating, tight 149.7' - Bedding plane, 20 deg, rough, undulating, fossil fragment at surface of]	L	
undulating, fossil fragment at surface of	1 7					1		
	-					1	<u> </u>	-
preak, open up to 3/8"	-					1	-	_
					preak, open up to 3/8	1	L	
	1 7					1		1
	-				•	1	<u> </u>	-
				\vdash		₩	-	
						1		
						<u> </u>		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-07A	SHEET	1	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724358.9 N, 457965.5 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" drag bit

DITILLIN	G WILTIN	JD AND	LQUIF IVII	_INT . CIVIL 330 3	714 100073, mud rotary	r, cathead, NW rods, 3-7/8"			ORIENTATION: Vertical
WATER	LEVELS	: 4.5 ft bo	gs on 6/16	5/07	START : 6/15/2007	END : 6/17/2007	LOGGER	: N.	Jarzyniecki
200				STANDARD		SOIL DESCRIPTION		စ္က	COMMENTS
ANE R (#	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COU NAME	LICOC ODOLID CVMDOL	001.00	ЭГС	DEDTIL OF CACING DRILLING DATE
불병		RECOVE	ERY (ft)		MOISTURE C	USCS GROUP SYMBOL, ONTENT, RELATIVE DEN	COLOR, ISITY OR	O Li	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	CONSISTENCY	Y, SOIL STRUCTURE, MIN	ERALOGY	SYMBOLIC LOG	INSTRUMENTATION
43.2	2.2			(N)	De entre Ouerde d'O			S	
43.2	0.0			2-2-3	0.0-1.2' - medium	and With Organics (SP) and dark gray grading to ve) rv light grav. –		<u>-</u>
_		1.2	SS-1	(5)	(N4 to N8), moist	, loose, fine grained, no	HCI		_
_	1.5				reaction, trace no	onplastic fines, 20% orga with depth, silica sand	nics and		_
_					\rightarrow \text{violet decircusing}	mar dopan, omod dand	/ _		_
							_	1	_
-							-	1	_
-							_	1	-
5_	5.0						_		-
38.2	5.0				Poorly Graded S	and (SP)			
-		1.0	SS-2	7-7-6	5.0-6.0' - white to	yellowish gray, (N9 to 5	Y 8/1), wet, -		-
-		1.0	002	(13)	nonplastic fines.	ine grained, no HCl react silica sand	lion, trace		-
-	6.5								-
-							_		-
-							_		-
_							-		-
-							_		-
_							_		_
_							_		_
10	10.0								
33.2				7.0.0	Poorly Graded S				_
		1.0	SS-3	7-9-8 (17)	Silty Sand (SM)				_
	11.5			. ,	10.1-11.0' - streat	ked light gray to medium , medium dense, very fin	gray, (N7 to		_
					grained, no HCl r	, medium dense, very lin eaction, 15% low to med	lium plastic		
					fines, silica sand				
							_	1	_
1 7							_		_
							_		-
							_		-
15	15.0						-		-
28.2	13.0				Poorly Graded S	and With Silt (SP-SM)		ŢŢ	
-		0.9	SS-4	5-8-11	15.0-15.9' - vellov	wish gray, (5Y 8/1), wet, to fine grained, no HCl re	medium -		-
-	10.5	3.3	'	(19)	nonplastic fines,	silica sand	aciicii, 10%		-
-	16.5				1				-
-							-		-
-							-		-
-							-		-
-							-		-
-							-		-
-							_		-
20								Ш	
			l					Ш	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-07A	SHEET	2	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724358.9 N, 457965.5 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" drag bit

						ary, carneau, NVV 10us, 3-7			Onientation : vertical
WATER	LEVELS	: 4.5 ft bo	us on 6/1		START : 6/15/2007	END : 6/17/2007	LOGGER	: N.	Jarzyniecki COMMENTS
≥□⊋				STANDARD PENETRATION		SOIL DESCRIPTION		၁၉	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		TEST RESULTS	SOIL NAMI	IE LISCS GROUP SYMBO	COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
ACE ATIC		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR				DRILLING FLUID LOSS, TESTS, AND
EV.			#TYPE	6"-6"-6"	CONSISTEN	ICY, SOIL STRUCTURE, M	INERALOGY	YME	INSTRUMENTATION
23.2	20.0			(N)	Poorly Graded	d Sand With Silt (SP-SM	<u> </u>	S)	1.65' recovery noted on log
	20.0			6-6-7	20.2-21.5' - yell	llowish gray, (5Y 8/1), we	t, medium -	liķi	- 1.03 recovery noted on log
_		1.5	SS-5	(13)		e to fine grained, no HCI	reaction, _	H	_
_	21.5				5-10% nonpias	stic fines, silica sand		1,1	_
_							_		_
_							_		
							_		_
-							_	1	_
-							_		1
25	25.0						-		-
18.2	25.0				Poorly Graded	d Sand With Silt (SP-SM		1,4	2.0' recovery noted on log
-		1.5	SS-6	7-3-2	25.0-26.5' - Sai	me as 20.0-21.5'	-	撻	-
-		1.5	33-0	(5)			-		-
-	26.5							4,4	-
_							-		-
_							-		_
_							_		_
_							_		
							_		
30	30.0						_	1	1
13.2	00.0				Silty Sand (SM	Л)		П	1.7' recovery noted on log
-		1.5	SS-7	1-2-2	30.0-31.5' - yell	llowish gray, (5Y 7/2), we Il reaction, 15-20% nonp	t, loose, fine -		1
-	31.5			(4)	silica sand	or reaction, 13-20 % nonp	asiic iiries,		-
-	31.5							441	-
-							-		-
-							_		-
-							-		-
_							_		_
_							_		_
_							_		
35	35.0								
8.2					Poorly Graded	Sand With Silt (SP-SM	t very lesse		1.75' recovery noted on log
]		1.5	SS-8	2-1-2 (3)	very fine to fine	llowish gray, (5Y 7/2), we e grained, no HCl reactio	ı, very 100se,		
]	36.5			(5)	nonplastic fines	s, silica sand	_		1
-							_		
-							-		1
-				ĺ			-		
-							-		
-							-		-
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40								\vdash	
				ĺ					



PROJECT NUMBER:

33884.FL

BORING NUMBER:

B-07A

SHEET 3 OF 9

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724358.9 N, 457965.5 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" drag bit

DRILLIN	G METH	OD AND	EQUIPMI	<u>ENT : CME 550 S</u>	/N 186073, mud rotary, cathead, NW rods, 3-7/8	' drag bit		ORIENTATION : Vertical
WATER	LEVELS	: 4.5 ft b	gs on 6/16	6/07	START : 6/15/2007 END : 6/17/2007	LOGGER	: N.	Jarzyniecki
				STANDARD	SOIL DESCRIPTION		ניז	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	AL (ft)	PENETRATION TEST RESULTS			SYMBOLIC LOG	
H H		RECOVE	ERY (ft)	TEST NESOLIS	SOIL NAME, USCS GROUP SYMBOL,		2	DEPTH OF CASING, DRILLING RATE,
TH YAT			#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DEN CONSISTENCY, SOIL STRUCTURE, MIN		ABC	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			#1175	(N)			SYI	
3.2	40.0				Silty Sand (SM)		П	Driller's Remark: Weight of hammer causes
_		1.5	SS-9	1-1-2	40.0-41.5' - Same as 35.0-36.5' except pagray, (5Y 8/1), 20% nonplastic fines, blac	ale yellowish -	Ш	2' rod drop from 37-55' 2.0' recovery noted on log
-				(3)	staining from 40.5-40.6'	k (Organic)		2.0 Tecovery floted off log
-	41.5						111	•
_						-		
_						_		
_								
-								
_						1		
1 <u> </u>	45.0					+		
45 <u> </u>	45.0		-		Silty Sand (SM)		111	1.8' recovery noted on log
_		1	00.10	1-1-2	45.0-46.5' - Same as 40.0-41.5' except 25			,
-		1.5	SS-10	(3)	nonplastic fines, trace black (possibly org staining from 45.25-45.35'	anic) _	Π	
_	46.5				3tailing 110111 45.25-45.55			
_								
_								
· <u> </u>								
_						-		
-						-		
_						-		
_						-		
50 <u></u> -6.8	50.0				Silty Sand (SM)		TIL	1.75' recovery noted on log
-0.0				0-1-1	50.0-51.5' - Same as 45.0-46.5' except lir	nestone -		1.75 recovery noted on log
_		1.5	SS-11	(2)	fragments in top 1" of sample, rock fragm	ents are	Ш	
_	51.5			, ,	fossiliferous, no HCL reaction, trace coan sand-sized concretions	se		
					Salid-Sized Colicietions			
_						1		
_						=		
-						-		
-						4		
-						-		
-						4		
55	55.0						1.11	_
-11.8				0.4.5	Silty Sand (SM) 55.0-56.3' - moderate yellowish brown, (1	0VR 5/4\		
_		1.3	SS-12	0-1-5 (6)	wet, loose, very fine to fine grained, no H	Cl reaction,		
_	56.5			(5)	40% low plasticity fines, trace moderate of	ray (N5) to		
_	33.0				dark reddish brown (10YR 3/4) concretion nodules in upper 4" of sample, black (org	ns or pyrite / -		
-					staining over bottom 6" of sample	······/ / 		Driller's Remark: "Drastic" change of
-								material at 57.5', harder and different in color
-						4		("gray to green") Driller switch to tri-cone roller bit (from drag
_						_		bit) at 57.5'
_						_		Driller removes large (6" spherical) piece of
								silty clay with trace rock fragments from drill bit from 57-60'
60						7		Dit itolii 37-00



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-07A

SHEET 4 OF 9

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724358.9 N, 457965.5 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" drag bit

DHILLIN	3 IVIL II I	JD AND	EQUIFIVI	EINT : CIVIE 550 S	71N 100073, Illuu Tolary	y, cathead, NW rods, 3-7/8"	urag bil		ORIENTATION: Vertical
WATER	LEVELS	: 4.5 ft bo	gs on 6/16	5/07	START : 6/15/2007	END: 6/17/2007	LOGGER	: N.	Jarzyniecki
]				STANDARD		SOIL DESCRIPTION		g	COMMENTS
O D S	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				l lo	
BH		RECOVE	RY (ft)			, USCS GROUP SYMBOL, C CONTENT, RELATIVE DENS		CIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"		Y, SOIL STRUCTURE, MINE		SYMBOLIC LOG	INSTRUMENTATION
SU				(N)				SY	
-16.8	60.0 60.6	0.6	SS-13	25-50/1 (75/7")	Elastic Silt (MH)) light gray, (N8), mottled w	iith _	Ш	
				(13/1)	yellowish gray (5	by 8/1), wet, hard, high plas	sticity, slow		
						% fine sand (both silica an e nodules in top 1.5" of sa			HW casing advanced to 61'
1 7						action in carbonate materi			
					sample is non-re	eactive			_
-							_	l	-
-							_		-
_							_		-
-							-		-
	CE O						-		-
65 <u> </u>	65.0 65.4	0.4	SS-14	50/5	Clayey Sand (SC	C)		///	1.0' recovery noted on log
-	55.7			(50/5")	☐ 65.0-65.4' - light	gray to yellowish gray, (N			, - g
-						medium to coarse grained arbonate materials, subar			-
-					grains (carbonate	e material with trace pyrite	e), 5-10% -		-
-					\fine grained silica fines	a sand, 25% medium to hi	gh plasticity _		-
-					Įioo				-
_							_		-
-							_		-
_							_		-
_							_		_
70	70.0								
-26.8				10 17 10		orly Graded Sand With C d Fat Clay (SP-SC, CH)	lay To _		_
		1.2	SS-15	16-17-12 (29)	71.0-71.2' - 60%	sand: yellowish gray (5Y t	8/1), wet,		_
	71.5			` ,		fine silica sand, 5-10% me onate grains in upper half (///	_
					variable fine (10-	-30%) content, medium pla	asticity, mild		
						carbonate grains, 40% of s			_
					plasticity, at 70.0	ish gray (5G 6/1), moist, h)-70.5' clay in 3/4" irregula	r beds, at	1	_
						ccurs in 1-3/16" to 2" lense	es	1	-
					interbedded in sa	allu			-
							-		-
75	75.0						-		-
-31.8	, 5.0					Sand With Silt (SP-SM)		1,1	6/16/07: Water level at 4.5'
-		1.5	SS-16	4-2-4		wish gray, (5Y 7/2), wet, lo ed, no HCl reaction, 5% no		誾	8:15: HW casing to 70'
-	76.5			(6)	fines, trace black	k mottling at 75.2-75.3', sili	ca sand	捌	8:30: At 75.0' switch to 2-7/8" rock bit
-	70.0						_		8:57 Driller's Remark: Casing slid approx. 2-
-							_		1/2' down borehole, added 5" HW casing (to -
-							-		75')
-							-		-
-							_		-
-							=		-
-							-		-
80								\vdash	
					l				



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	B-07A	SHEET	5	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724358.9 N, 457965.5 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" drag bit

,						y, cathead, NW rods, 3-7/8" di			ORIENTATION : Vertical
WATER	LEVELS	: 4.5 ft bo	gs on 6/16	6/07	START : 6/15/2007	END : 6/17/2007	LOGGEF	? : N.	Jarzyniecki
200				STANDARD		SOIL DESCRIPTION		g	COMMENTS
N (#	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COIL NAME	LICCO CROUD CVMROL CO	O LC	DEDTIL OF CACING DRILLING DATE	
H H H H H		RECOVE	ERY (ft)		MOISTURE C	USCS GROUP SYMBOL, CO CONTENT, RELATIVE DENSI	TY OR	O Li	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	CONSISTENCY	Y, SOIL STRUCTURE, MINER	RALOGY	SYMBOLIC LOG	INSTRUMENTATION
-36.8	80.0			(N)	Silty Sand (SM)			S	
-30.6	80.0		00 17	1-0-50/5	80.0-80.9' - yello	wish gray, (5Y 7/2), wet, ve	ry loose, -		-
_		1.4	SS-17	(50/11")	very fine to fine g	grained, no HCl reaction, 20)-25% /=		-
_	81.4				nonplastic fines, Organic Lens (O		/	ш	_
_					80.9-81.1' - brow	nish black, (5YR 2/1), shin	y _		_
_						earance, may be compress	sed leaves		_
_					81.1-81.4' - medi	ium gray, (N5), moist, hard,	medium _		_
_					\plasticity, slow to mottled	rapid dilatancy, strong HC	I reaction,		_
					inotaca				_
							_		_
85	85.Q							<u> </u>	_
-41.8		0.1	SS-18	50/1.5 (50/1.5")	Silt With Sand (I	ML) zy yellow, (5Y 6/4), moist, ha	ard	Ι'''	0.3' recovery noted on log
				(30/1.3)	\nonplastic, rapid	dilatancy, strong HCl react	ion,		_
					\15-20% fine to m	nedium sand, all carbonate			
							·		
							-		Driller's Remark: Clay lens at 87.5-88.0'
							-	1	_
							-		Driller's Remark: Very soft at 88.5'
							-		_
90	90.0						-	1	-
-46.8	- 00.0				Silt (ML)			Ш	1.6' recovery noted on log
-		1.5	SS-19	6-9-29 (38)	90.0-91.5' - light	olive gray, (5Y 5/2), wet, hat to rapid dilatancy, strong H	ard, - Cl	1	-
-	91.5			(30)	reaction, 10-15%	fine to medium sand-sized	particles	1	_
-	• • • • • • • • • • • • • • • • • • • •				(carbonate), carb	onate silt		ľ	-
							-	1	_
							-	1	-
-							-	1	-
-							-	1	-
-							-	1	-
95	95.0						-	1	-
-51.8	95.5	0.3	SS-20	50/5.5		Limestone Fragments (SM			Driller's Remark: Losing circulation at 95.0'
-	99.9			(50/5.5")	95.0-95.3' - yello	wish gray, (5Y 8/1), wet, ve ion, fine sand-sized carbon	ry dense,	1	-
-					particles, 25% no	on to low plasticity fines, lim	estone	l	-
-					fragments to 1/2" sand/50% limeste	" in "wafer" like pieces, 50%	silty -	1	-
-					Sanu/50% IIIIIesti	UNE		1	-
-							-	1	-
-							-	1	-
-							-	1	-
-							-	1	-
-							-	1	-
100								\vdash	
$\overline{}$		l						1	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-07A	SHEET	6 OF	. 9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724358.9 N, 457965.5 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" drag bit

DRILLIN	DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" drag bit ORIENTATION: Vertical												
WATER	WATER LEVELS : 4.5 ft bgs on 6/16/07												
				STANDARD	SOIL DESCRIPTION	ار ا	COMMENTS						
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		SYMBOLICLOG							
HE HE		RECOVE	RY (ft)	120111200210	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND						
PTH RFA EVA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	MBC	INSTRUMENTATION						
SU				(N)		Š							
-56.8	100.0			00.00.45	Silty Sand (SM) 100.0-101.5' - yellowish gray, (5Y 7/2), light gray		1.6' recovery noted on log						
		1.5	SS-21	22-33-45 (78)	mottling, wet, very dense, medium to coarse grained,								
	101.5			(1.5)	strong HCl reaction, 25% low plasticity fines increasing to 35-40%, all carbonate								
					increasing to 35-40%, all carbonate	T]						
						1							
-						1	1						
						1	1						
_						1	1						
-						1	1						
105	105.0					1	-						
-61.8	103.0			37-50/5	Poorly Graded Sand With Silt (SP-SM)	1	1.35' recovery noted on log						
-	105.9	0.9	SS-22	(87/11")	105.0-105.1' - pale yellowish brown, (10YR 6/2), wet, very dense, strong HCl reaction in carbonates, 5-10%	1	1						
-					\nonplastic fines, fine silica sand, medium carbonate	7	†						
-					sand, trace black medium sand-sized minerals	1	-						
-					Silty Sand (SM) 105.1-105.9' - Same as 100.0-101.5' except very	┨	-						
-					strong HCl reaction, 40% low-plasticity fines	1	-						
-						-	-						
-						-	-						
-						-	-						
-						-	-						
110 <u> </u>	110.0				Poorly Graded Sand With Silt (SP-SM)	1	Driller's Remark: Likely to have no recovery						
-00.0		1.3	SS-23	30-50-50/3	110.0-110.95' - Same as 105.0-105.1' except	- 1計	if coring begins at 105.0'						
-	111.3	1.0	00 20	(100/9")	yellowish gray to pale yellowish brown, (5Y 7/2 to 10YR 6/2), predominately fine to medium silica sand,	-	2.0' recovery noted on log						
_	71110				5% white medium carbonate sand, 5-10% nonplastic	Ŧ	1 -						
_					\ fines increasing with depth; strong HCl reaction in \ \ fines and carbonate grains \	4	-						
-					Limestone Fragments	4	-						
-					110.95-111.25' - yellowish gray, (5Y 7/2), fine to	4	4540						
_					coarse grained, very strong HCl reaction, highly fossiliferous	1	15:12: Instruct driller to take one more spoon 115.0'-120.0' and if limestone present, begin -						
-						1	coring with NQ						
_						1							
115_	115.0					 							
-71.8				25-31-32	Silty Sand With Limestone Fragments (SM) 115.0-116.2' - yellowish gray, (5Y 8/1), wet, very		Driller extends casing (HW) to 110.0'						
		1.2	SS-24	(63)	dense, 15% coarse sand to fine gravel-size limestone]						
	116.5			. ,	fragments, 30% low plasticity fines, all carbonate	╁╨	՝						
						1							
]	06/17/07: Water level at 8.0'						
]						1	1						
]	8:45: Driller clear hole with tri-cone roller bit						
120						1	1						
						Τ							



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-07A	SHEET	7	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724358.9 N, 457965.5 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" drag bit

						ary, cameau, ivvv rous, 5-7/				ONIENTATION : Vertical
WATER	LEVELS	: 4.5 ft bo	gs on 6/16	6/07	START : 6/15/2007	END: 6/17/2007	LOG	GER	: N.	Jarzyniecki
1.				STANDARD		SOIL DESCRIPTION			g	COMMENTS
SSE SSE	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS					ŏ	
HH. NO.		RECOVE		1201 HEOULIS	SOIL NAM	E, USCS GROUP SYMBOL	, COLOR,		ļ.	DEPTH OF CASING, DRILLING RATE,
THE		1120012		0" 0" 0"	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY		1BO	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION		
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTEN	or, soil structure, M	INLHALOGY		SYMBOLIC LOG	ING I NOIVILINTATION
-76.8	120.0	0.2	SS-25	50/3.5	Silty Sand Wit	h Limestone Fragments	(SM)		111	Resume drilling 6/16/07 at 8:57
-	120.0		-	(50/3.5")	\120.0-120.2' - 3	Same as 115.0-116.2'	(0)	/-		Driller setting rod for SPT at 120.0'
l -								_ 1		_
I -										
-								-		-
-								-		-
-								-		-
_								_		0 0 00 1
_										Split spoon SS-26 driven from 125.0-125.15'
1	124.5									
125		0.2	SS-26	50/2	Limestone Fra	gments			Ш	Driller's Remark: 5% return of mud from 125-
-81.8				(50/2")	├ 125.0-125.15' -	yellowish gray, (5Y 8/1),	strong HCI	7		130' —
-					\reaction, friable	e oring at 125.0 ft bgs		-/ ┤		Switched to NQ WL to begin rock core at 125.0'
1 -					See the next sl	heet for the rock core log		_]
-										_
_										
_								_		1
-								-		
-								-		-
-								4		
I -										_
130										
-86.8										
-								-		1
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-91.8										
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140										



PROJECT NUMBER: BORING NUMBER: 338884.FL

B-07A

SHEET 8 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724358.9 N, 457965.5 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing

WATER	LEVELS: 4.5	ft bgs	s on 6/	/16/07 START: 6/15/2007 END: 6/	17/20	07 LOGGER : N. Jarzyniecki	
≥ □₽	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
ELO ON (#	AN RY (9	•	ZES JT	DESCRIPTION	0 C	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) O	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
	COL	A Q	FR/ PEF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-81.8	125.0		6	125.0, 125.1' - Bedding plane (2), horizontal, smooth, planar, fractures, open	H	Limestone - 125.0-129.4' - yellowish gray, (5Y	Start rock coring at 125' with NQ WL casing -
-				125.35, 125.5' - Fractures (2), horizontal,	F	7/2), fine to medium grained, strong	- Will True VVE odolling
-			>10	rough, planar, open, some rock fragments (3) 125.85, 125.9' - Fractures (2), horizontal,	尸	HCl reaction, very weak (R1), 10% voids up to 1/16", 5% casts/cavities	-
-	R1-NQ			rough, undulating, open 126.0-127.9' - Fracture zone, smooth to	\blacksquare	up to 3/4"x3/8", poorly fossiliferous, slightly harder (R1-R2) from	-
-	5 ft	13	>10	rough, planar, bedding plane fractures, thin	厂	- 127.9'-129.9'	-
-	88%			(1/2") beds, open to tight	口	-	-
-			3	128.6, 128.9, 129.0' - Fractures (3),	世	-	-
-			2	horizontal, rough, undulating, open	世	-	R1: 3 minutes
130	130.0		NR	129.1, 129.2' - Fractures (2), horizontal, rough, undulating to stepped, open	世	No Recovery 129.4-130.0'	1
-86.8			3	130.1' - Fracture, horizontal, rough,		Limestone - 130.0-130.1' - Same as 125.0-129.4']
l _				undulating, open 130.4' - Fracture, horizontal, rough,	上	130.1-131.55' - yellowish gray	
-			>10	undulating, open, associated with large infilled cavity		mottled with light gray, (5Y 7/2 and N7), moderate HCl reaction, weak to	
-	DO NO			130.9, 131.0, 131.45' - Fractures (3),	H	medium strong (R2 to R3), mottling associated with large cavities over	-
-	R2-NQ 5 ft	19	>10	horizontal, rough, undulating, open, sandy organic soil infilling at 131.45'	F	 40% of surface, carbonate, fine to 	-
-	75%			131.26-131.4' - Fracture zone, sandy black (possibly organic) soil infilling	F	medium grained, 5-10% voids up to 1/8", 25% cavities (up to	-
-			4	131.6-131.85' - Fracture zone	Ħ	- 2-3/8"x1-9/16" at 130.4-130.55', 130.75-130.8'), cavities infilled with	-
-			NR	131.9, 132.1, 132.2' - Bedding plane (3), <10 . deg, rough, undulating	厈	carbonate material (pale yellowish	R2: 6 minutes
135	135.0		INIX	132.0-132.05' - Clay seam, (CH), reacts with HCl	Ħ	brown, medium grained, weak (R2), 25% voids, mild HCl reaction, poorly	1
-91.8			>10	132.3-132.45' - Fracture zone 132.45-133.0' - Fracture, vertical, smooth,]#	fossiliferous) 131.55-132.45' - very pale orange,	Difficult to distinguish voids due to average worn
_			-10	undulating, open, 70% light gray staining	片	(10YR 8/2), fine grained, moderate HCl reaction, very weak (R1), thinly	appearance of unit from
_			>10	133.0-133.1' - Fractures (3), horizontal, vertical, and 30 deg, rough, undulating, open	H	bedded (1/4"-1/2"), trace voids to	drilling action
-	R3-NQ			135.0-136.4', 136.6-136.8' - Bedding plane, horizontal, smooth, planar, fractures every	H	3/16", no visible casts, 25% extremely weak (R0), irregular gray	-
-	5 ft	18	7	1/2" over interval, open	片	L lenses 132.45-133.75' - yellowish gray,	-
-	88%			137.05, 137.15, 137.2, 137.6, 137.8, 138.05, 138.15, 138.25, 138.35, 138.5' - Fractures	片	mottled light gray, and very pale	
-			6	(10), horizontal, smooth to rough, planar		orange, (5Y 7/2, N7, and 10YR 8/2), fine grained, strong HCl reaction,	
-			0	138.95' - Fracture, horizontal, rough, undulating, pale yellowish brown (10YR 6/2)		medium strong (R3), 5-10% voids up to 1/16" increasing with depth, trace	R3: 4 minutes
140_	140.0		NR	clay infill up to 1/4" thick, open]#	cavities up to 9/16"x3/8"]
-96. 8			0		片	No Recovery 133.75-135.0' Limestone]
-			$oxed{L}$		H	135.0-138.95' - yellowish gray, (5Y 7/2), medium grained, strong HCl	
-			1		\vdash	reaction, very weak to weak (R1 to R2), trace voids to 1/6", trace	-
-	R4-NQ			141.7' - Mechanical break 141.9' - Fracture, horizontal, smooth, planar,	\vdash	 casts/cavities to 1/4", poorly 	-
-	5 ft	48	>10	open	F	fossiliferous (with small 3/16" shell fragments)	-
-	83%			142.05-142.1' - Carbonate silt seam (possible infill of fracture with cuttings from drilling)	仠	}	-
-			3	142.15, 142.2, 142.3, 142.4, 142.5, 142.65, 142.7, 142.8, 142.9, 143.05' - Fractures (10),	厂	-	
-			0	horizontal, smooth to rough, undulating, open	厂	<u> </u>	R4: 5 minutes
145	145.0		NR	143.3' - Fracture, horizontal, smooth, undulating, open	ightharpoons		<u> </u>



PROJECT NUMBER:	BORING NUMBER:
338884.FL	B-07A

ROCK CORE LOG

SHEET 9 OF 9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724358.9 N, 457965.5 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: G. Davis; Cathead Operator: A. Turner

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 4.5	ft bg	s on 6/	16/07 START: 6/15/2007 END: 6	6/17/20	07 LOGGER : N. Jarzyniecki	
>00	(9)			DISCONTINUITIES	O	LITHOLOGY	COMMENTS
ELOV E ANI	JN, AND RY (%	(RES	DESCRIPTION		ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-101.8	022		8	143.55' - Fracture, horizontal, smooth, planar to undulating, open	-	138.95-139.4' - yellowish gray to light gray, (5Y 7/2 to 5Y 5/2), fine to	-
-			2	145.1, 145.2, 145.35' - Fractures (3), horizontal, smooth, undulating, open 145.15-145.35' - Fracture, vertical, smooth,	片	medium grained, mild HCl reaction, weak to medium strong (R2 to R3), 10% voids to 1/16" in size, trace	-
-	R5-NQ 5 ft	42	>10	undulating, open 145.85' - Fracture, horizontal, smooth to rough, undulating	#	voids to 3/8" in size, no visible cavities/casts No Recovery 139.4-140.0'	R5: 5 minutes
-	77%	42	1	146.35' - Fracture, <10 deg, rough, undulating, open 146.95, 147.0, 147.2, 147.4' - Fractures (4),		Limestone 140.0-142.05' - Same as	6/17/07 15:30: 15' HW
_				horizontal, rough, undulating, open 147.0-147.4' - Fracture, vertical, rough,		138.45-139.4' except trace cavities up to 9/16"x3/8", and 20% voids up to 1/16" from 141.3-141.7'	casing removed to ensure - no lock up in boring - 6/18/07 8:02 Driller's
150 -106.8	150.0		NR	undulating, open 147.5, 147.55, 147.65' - Fractures (3), ↑ horizontal, smooth, planar to undulating,		142.05-144.15' - yellowish gray, (5Y 7/2 to 5Y 8/1), fine to medium grained, strong HCl reaction, very	Remark: Bottom of hole tagged to 138.5' over newer cave-in after casing
-				open 147.65-147.8' - Fracture zone 147.95, 148.7' - Fractures (2), horizontal,	-	weak (R1), 10% voids up to 1/16", trace casts/cavities up to 5/16"x3/16" at 143.5-144.4', irregular gray	removal -
-				rough, undulating, open	-	laminatons and thread-like mottling in 1/16" to 3/16" thick bands at 142.0-142.4']
-						Limestone 145.0-145.85' - yellowish gray, (5Y	-
-					-	7/2), fine to medium grained, strong HCl reaction, very weak (R1), trace voids to 1/8", trace casts/shell	-
-				_	1	fragments up to 3/8"x3/16" 145.85-147.05' - pale yellowish brown to dusky yellow, (10Y 2/2 to 5Y	_
-					-	6/4), medium grained, moderate HCl reaction, very weak to weak (R1 to	-
-]	R2), 15-20% voids to 1/16", moderately fossiliferous 147.05-147.65' - yellowish gray, (5Y	-
-					-	- 7/2), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3)	-
-					-	- 147.65-148.35' - Same as 145.0-145.85' No Recovery 148.5-150.0'	-
-					-	Bottom of Boring at 150.0 ft bgs on 6/17/2007	-
-				-	-	-	
-					-	_	
-					-		_
-					-	-	-
-					-	-	
					1	-	



PROJECT NUMBER:

338884.FL

B-08

SHEET 1 OF 9

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.9 N, 457874.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLIN	G METH	OD AND	EQUIPM	ENT : CME 55 S/I	N 316625, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 4.0 ft b	gs on 5/2	0/07	START : 5/20/2007 END : 5/22/2007 LOGGER : M. Faurote, N. Jarzyniecki
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPI F	INTERVA	L (ft)	PENETRATION	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
SEL ON		RECOVE		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, \Box DEPTH OF CASING, DRILLING RATE,
E E E		RECOVE	<u> </u>		MOISTURE CONTENT, RELATIVE DENSITY OR ON DRILLING FLUID LOSS, TESTS, AND
989			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
42.4	0.0			(14)	Poorly Graded Sand With Organics (SP)
	0.0			1-1-1	0.0-0.9' - dark gray, (N2), dry to moist, very loose,
l -		0.9	SS-1	(2)	│ angular to sub angular, fine silica sand, 25-30% │ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │
_	1.5				organics, 10-15% roots and rootlets that are 1"-1.5" / long and up to 3/16"x3/16" with organics
					08:10 Driller's Remark: 50 lb bags of
-					- Halliburton Quik gel bentonite mud mixture
-					
-					
-					
l -					
					Water level assumed at approximately 4.0'
5	5.0				below ground surface
37.4	- 5.0				Silty Sand (SM)
-		1.0	SS-2	4-3-4	5.0-6.0' - yellowish gray, (5YR 7/2), wet, loose, fine
-		1.0	33-2	(7)	subangular, silica sands, 12% nonplastic fines,
-	6.5				\with rootlets (<1/8" x 1/8") -
l _					
-					1
-					1
-					
-					
-					
10	10.0				
32.4					Silt (ML)
-		1.0	SS-3	20-34-50/5 (84/11")	10.0-11.0' - moderate yellow, (5YR 7/6), wet, hard, -
-	11.4			(04/11)	\ 5-10% fine to medium sand-sized carbonate particles, /
-					friable, trace black fine sand-sized, trace white /- Driller's Remark: 100% circulation loss after
_					carbonate grains, an carbonate
_					09:30: Install 10' 6" casing, additional 5' of 6"
l _					casing installed
					11:00: 15' 6" casing installed to 14.0' below ground surface (1 foot stick up height),
-					ground surface (1 foot stick up neight), drilling and doing SPTs with a NW casing
Ι -					sized stabilizer installed on AWJ rods just
45 -	45.0				above drill bit
15 <u> </u>	15.0				Silty Sand With Limestone Fragments (SM) 13:53: Switched to 5 1/2" tricone bit, 100%
		, _		31-24-17	15.0-16.25' - gravish vellow. (5Y 8/4), wet, dense, fine I Circulation loss after pulling out spoon, add
-		1.2	SS-4	(41)	to coarse grained, moderate HCl reaction, sand-sized 1/2 bag bentonite
l _	16.5				carbonate material, 25% nonplastic fines, 1/8"-1/4" fossiliferous limestone casts (<1/16") limestone,
					\ 20-25% gravel-sized fragments, limestone also
-					contains cast voids partially infilled with brilliant green /
l -					(5G 6/6) material, all carbonate
-					
- ا					
-					
_]
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-08

SHEET 2 OF 9

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.9 N, 457874.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLIN	G METH	OD AND	<u>EQUIPM</u>	<u>ENT : CME 55 S/I</u>	/N 316625, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit OR	RIENTATION : Vertical
WATER	LEVELS	: 4.0 ft bo	gs on 5/20	0/07	START : 5/20/2007 END : 5/22/2007 LOGGER : M. Faurote, N. Jarzyniecki	
				STANDARD	SOIL DESCRIPTION COMM	MENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPL F	INTERVA	L (ft)	PENETRATION	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING DRILLING FLUID L INSTRUMI	
OH A		RECOVE		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,	
FEE		RECOVE			MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID L	OSS, TESTS, AND
P.S.E.			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	ENTATION
22.4	20.8	0.1	SS-5	50/3		loss, Driller's Remark:
-				(50/3")		ng section, adding 1/2 -
-	05.0				Driller's Remark: Drill - 24.0'	bit slippage from 23.0'-
25 <u> </u>	25.0			40.50/4.5	Limestone Fragments 14:47: Add 1/2 bag be	entonite to mud vat
	25.0	0.6	SS-6	13-50/4.5 (63/10.5")	\25.0-25.2' - Same as 15.0-16.25'	-
- - - -	25.9			(63/10.5)	Silt With Limestone Fragments (ML) 25.2-25.6' - grayish yellow, (5Y 8/4), wet, hard, rapid dilatancy, nonplastic, 10-15% medium to coarse sand-sized, 25% fine to coarse gravel-sized limestone fragments, 5-10% molds 3/8"	- - - - -
-						-
30 <u> </u>	30.0	1.3	SS-7	20-11-13 (24)	Silty Sand With Limestone Fragments (SM) 30.0-31.3' - moderate yellow, (5Y 7/6), wet, medium dense, fine to coarse grained, moderate HCl reaction, 22% nonplastic fines, 30-35% fine to coarse gravel-sized limestone fragments, highly fossiliferous	c: No circulation, add 4"
- - - - - 35	35.0				(casts/molds, shells), white-grayish yellow (5Y 8/1) and moderate yellow (5Y 7/6), all carbonate	- - - - -
7.4	35.3	0.3	SS-8	50/4	Limestone Fragments	
7.4 - - - - - - - 40	00.0	0.3	33-6	50/4 (50/4")	St. 0-35.3' - moderate yellowish brown, (10YR 5/4), fine to coarse grained, mild HCl reaction, fine gravel-sized angular fragments, 10-15% nonplastic fines	- - - - - - -
-						



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-08	SHEET	3	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.9 N, 457874.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER	LEVELS	: 4.0 ft bo	gs on 5/20	0/07	START: 5/20/2007 END: 5/22/2007 LOGGER: M. Faurote, N. Jarzyniecki
					SOIL DESCRIPTION COMMENTS
A ND Z	SAMPLE	INTERVA	L (ft)	STANDARD PENETRATION TEST RESULTS	O O O
H B L		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY BOTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
2.4	40.0	0.2	SS-9	50/5	Limestone Fragments Driller's Remark: Install 4" HW casing to 40'
-	1			(50/5")	40.0-40.15' - light olive gray, (5Y 5/2), wet, moderate HCl reaction, medium to coarse sand-sized,
					moderately fossiliferous (casts/molds), trace very fine /-
					Begin Rock Coring at 41.0 ft bgs See the next sheet for the rock core log
Ι.					See the next sheet for the rock core log
-	_				
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45 -2.6	-				
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PROJECT NUMBER:

33884.FL

B-08

SHEET 4 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.9 N, 457874.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

CORING	NETHOD A	ND E	JUIPIV	IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW c	asiriy		ORIENTATION : Vertical
WATER	LEVELS: 4.0) ft bg:	s on 5/	20/07 START: 5/20/2007 END: 5/2	22/20	D7 LOGGER : M. Faurote, N. Jarzyr	niecki
	_			DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		_o	DESCRIPTION	SYMBOLIC LOG		
O A A	2 4 X		FRACTURES PER FOOT	DESCRIPTION	일	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
AACH	N.E.S.	Q D (%)		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	¤	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
T 발류성	S. S. S. S. S. S. S. S. S. S. S. S. S. S	g	RAC FIRI	PLANARITY, INFILLING MATERIAL AND	Į₩.	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
	SES	22	표표	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	1 1,
	41.0				ш	No Recovery 41.0-43.7'	
I -				-	Н	-	Start R1-NQ at 09:00 on
-				-		_	5/21/07, water level 6" SW -
l -			NR		ш	_	casing at 4.9' below ground
					Н		surface, 4" HW casing to
-	R1-NQ			-	ш	_	41.0', will advance 4" HW - casing after pulling out R1-
l -	5 ft	33		43.3-43.9' - Fracture zone, 1"-2" fragments	ш	-	NQ
l -	54%		>10	-	Н	_ Limestone	Driller's Remark: First 1.5' -
l _			0			43.7-46.0' - moderate olive brown, - (5Y 4/4), wet, moderate HCl reaction,	of run very fast drilling-
45					Н	very weak (R1), highly fossiliferous	slippage; will assume core
-2.6				_	ш	(casts/molds), 15-20% voids on	loss occurs at top of run 4" HW casing installed to
-			2	450 450 5 18	口	surface up to 1/16", 5-7% cavities	47.0' below ground surface
I -	46.0		Ш	45.6, 45.8' - Bedding plane or mechanical break (2), horizontal, rough, undulating, tight	₽₩	infilled with medium gray (N5) up to	R1: 4 minutes
				broak (2), honzontal, rough, undulating, tight	Ш	3/8", trace black sand-sized coarse grained and short 3/4" discontinuous	
I -					\mathbb{H}	laminations (<1/16" thick)	1
-			NR	-	Н	No Recovery 46.0-48.3'	1
-				-	ш	-	1 -
l _				_	Н	_	_
	R2-NQ				Н	Lineartone	1
-	5 ft 46%	24	1	-	Ш	 Limestone 48.3-51.0' - Same as 43.7-46.0' 	1 1
-	4070			48.95' - Bedding plane or mechanical break,	Н		1
-			5	horizontal, rough, undulating, open 1/2"	ш	=	1 -
50				49.1, 49.4' - Bedding plane or mechanical	Щ		
-7.6				break (2), 25 deg, rough, undulating, tight 49.5, 49.6' - Bedding plane or mechanical	Н		R2: 2 minutes
-	E1 0		2	break (2), horizontal, rough, undulating, open		7	1 1
-	51.0			1/16"	₩	51.0-55.3' - medium olive brown, (5Y	1
l -			2	49.9, 50.1' - Bedding plane or mechanical	H	- 4/4), moderate HCl reaction, weak to	1 -
_				break (2), horizontal, rough, undulating, open	Д	medium strong (R2 to R3), poorly to	l
				1/8" for 49.9', tight for 50.1' 50.4, 50.5' - Bedding plane or mechanical	Н	moderately fossiliferous (casts),	
-			1	break (2), horizontal, rough, undulating, open	ш	- 15-20% spheroidal voids mostly	1 -1
-	D2 NO			1/16"	Н	<1/16", trace coarse sized black grains, carbonate fines/silts from	1 -
l _	R3-NQ 5 ft	72	2	51.4' - Bedding plane or mechanical break,	Н	- 54.6-54.85', fossil casts from]
	86%		-	horizontal, rough, undulating, tight	Ш	1/8"-1/2"	
I -				51.75' - Fracture, 50 deg, rough, undulating,	\mathbb{H}		1
			2	tight 52.8' - Bedding plane or mechanical break,	╁┼┤	-	1
55 -12.6			0	horizontal, rough, undulating, tight —	Ш	<u> </u>	R3: 5 minutes
12.0			\vdash	53.1' - Bedding plane or mechanical break,	Н	- No Recovery 55.3-56.0'	No. 5 minutes
	56.0		NR	horizontal, rough, undulating, open 1",very			
I -				weak rock, friable 53.3' - Mechanical break or bedding plane,	μ	Limestone	1
-			0	horizontal, rough, undulating, tight	H	- 56.0-60.3' - moderate olive brown,	-
-			\vdash	54.6-54.85' - Fracture zone, extremely weak,	Ħ	(5Y 4/4), moderate HCl reaction,	-
			0	carbonate silt	Щ	medium strong rock (R3) from – 56.0-56.85', 56.8-58.5' black fine	
_			'	56.85-58.5' - Fracture, extremely to very	Н	carbonate laminations, medium	1
1 -	R4-NQ		\vdash	weak rock		strong rock (R3), grading to very] 1
-	5 ft	45	1	-	ш	weak rock (R1) 58.5-60.3',	-
-	86%		\sqcup	58.75' - Fracture, 50 deg, rough, undulating,	Н	56.0-58.5', 5-10% voids/casts <1/16",]
1				tight		58.5-60.3', 30-35% voids <1/16", - 3-7% medium sized black grains in	
60			2	-	Ш	rock matrix (carbonaceous)	1
-17.6			0	60.0, 60.2' - Mechanical break or bedding	\Box		R4: 3 minutes
			$\overline{}$	plane (2), horizontal, rough, undulating, tight	口	- No Recovery 60.3-61.0'	SC-1 collected at 58.75-
	61.0		NR	, (,, = = = , =========================	Ш		60.0'
			_		_		•



PROJECT NUMBER:

338884.FL

B-08

SHEET 5 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.9 N, 457874.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

CORING	I WILL IT IOD AI	ND L	JUIFIV	MENT: CME 55 S/N 316625, mud rotary, NQ tools, HW (asing		ORIENTATION : Vertical
WATER	LEVELS: 4.0	ft bg	s on 5		/22/20		
≥ 0€	(%:			DISCONTINUITIES	8	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	~	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
FAC	E RI STH OVE	Q D (%)	E S	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOL	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
OEP' SURI	COR	Q Q	-RA(PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	011				9,	Limestone	
-			0	61.2, 61.7, 63.1, 64.2, 65.4' - Fractures (5), horizontal, rough, undulating, tight	+	 61.0-66.0' - light olive brown, (5Y 	-
-				Honzoniai, rough, andulating, agric	+	5/6), moderate to strong HCl reaction, weak (R2), 63.0-64.0'	-
-			1		╀┷	medium strong rock (R3), 20-25%	-
-	R5-NQ			62.75' - Bedding plane or mechanical break,	lacksquare	voids/casts decreasing to 10-15% below 64.0', moderately fossiliferous	-
-	5 ft	90	0	horizontal, rough, undulating, open 1/4" 63.5' - Mechanical break	╁┸	 (casts, few molds), trace black fine to 	-
-	100%			03.3 - Mechanical break		medium grain sized, 3-7% medium to coarse sized, medium dark gray (N4)	-
-			1		+	intraclasts from 65.5-66.0',	-
65 <u> </u>				64.8' - Fracture, 50 deg, rough, undulating, –		subrounded bedding interval from 64.0-66.0', short discontinuous (3/8")	DE Eminutes
			1	tight	#	 black laminations and fine grain 	R5: 5 minutes
-	66.0			65.75' - Bedding plane or mechanical break,	╨	black grained, 20% staining in olive gray (5Y 3/2)	-
-			3	horizontal, rough, undulating, tight	\bot	_ 66.0-71.0' - light olive brown, (5Y	_
-				66.55' - Fracture, 35 deg, rough, undulating, open 5/8"	上	5/6), moderate HCl reaction, similar to 61.0-66.0', medium strong rock	_
_			0	66.8, 66.95' - Bedding plane or mechanical	_	(R3), 66.0-66.8' weak rock (R2),]
_			Ľ	break (2), horizontal, rough, undulating, tight 67.9, 68.3, 68.55, 68.7, 68.75' - Mechanical	厈	68.7-69.7' extremely weak rock (R0), 10-15% voids <1/16", 5-10% medium	_
_	R6-NQ 5 ft	88	0	break (5)	片	_ dark gray (N4), medium to coarse	_
_	100%	00			╨	grained intraclasts, discontinuous, 68.7-69.7' short horizontal black	_
_			2		$oldsymbol{\perp}$	_ laminations, trace olive gray (5Y 4/1)	_
70				69.6' - Bedding plane, 20 deg, rough,	口	staining	
-27.6			0	undulating, tight, very weak rock (R1) 69.9' - Fracture, 60 deg, rough, undulating,	上	_	R6: 7 minutes
_	71.0		Ŭ	tight	┟┼	_	
_			0		厈	Limestone - 71.0-75.7' - light olive brown to	
_			L		井	moderate olive brown, (5Y 5/6 to 5Y	
			0	72.0' - Fracture, 35 deg, rough, undulating, tight	世	4/4), moderate to strong HCl reaction, poorly fossiliferous (casts),	SC-2 collected at 71.0- 72.0' -
				72.6' - Bedding plane, horizontal, rough,	╨	medium strong rock, R3, from	72.0
	R7-NQ	77		undulating, tight	厂	71.0-72.5', very weak rock, R1, to extremely weak rock, R0, from	
]	5 ft 94%	77	0		上	72.5-74.2', medium strong, R3, from]
]			0	73.95, 75.1' - Fractures (2), horizontal, rough, undulating, tight	+	74.2 to 75.7', 10-15% voids <1/16" - over 71.0-72.5', 35-40% voids <1/16"]
75			ا	andalating, tight	H	over 74.2-75.7', poorly fossiliferous]
-32.6			1			(casts), bottom 2" has gritty feel, medium dark gray (N4) intraclast as	R7: 7 minutes
	76.0		NR		世	seen in 66.0-71.0' interval	1
]					\vdash	No Recovery 75.7-76.0' No Recovery 76.0-78.0'	1
					\blacksquare	- 110 Necovery 10.0-10.0	1
]			NR			-	1
					1-	-	1
	R8-NQ			78.0-78.4' - Fracture zone		-	1
-	5 ft 60%	28	>10	78.5' - Fracture or mechanical break,	1	-	1
-	33,3			horizontal, rough, undulating, open 1/16" 78.8' - Fracture, 15-20 deg, rough,	╁	-	1
80			>10	undulating, open 1/6"	厂	-	-
-37.6				78.95' - Fracture or mechanical break, – horizontal, open 1-1/4"	世		R8: 10 minutes
-	81.0		0	nonzoniai, open i na		-	-
	01.0						



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-08

SHEET 6 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.9 N, 457874.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

				(20/07 CTART: 5/20/0007 FNR: 5/4		07 LOCOED M Fourste N Jerry	ioald
	LEVELS : 4.0) It bg	S OH 5	<u>/20/07 START : 5/20/2007 END : 5/.</u> DISCONTINUITIES	<u> </u>	07 LOGGER : M. Faurote, N. Jarzyn LITHOLOGY	COMMENTS
§8€	₫%		(n	DESCRIPTION	8		GONINIENTO
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%	FRACTURES PER FOOT		SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
TH A	RE F VGTF SOV	(%) Q i	ACTI 7 FC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	MBO	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	SEN	A Q	FR/ PEF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
				79.15' - Fracture, horizontal, rough,	\perp	Limestone	
-			3	undulating, open 1/8" 79.25' - Fracture, horizontal, rough,	T	- 78.0-81.0' - light olive brown, (5Y 5/6), strong to moderate HCl	1
-				undulating, tight	╁	reaction, medium strong to strong	
-			2	79.65-79.95' - Fracture zone 81.3' - Bedding plane, horizontal, rough,	F	- (R3 to R4), 78.0-78.5' dissolution cavity zone, 10-25% voids mostly	1
-	R9-NQ			undulating, open 1/2"	Ė	<1/16", poorly fossiliferous (casts	
-	5 ft 88%	74	1	81.45' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1/8"	Ш	- <3/16") trace cavities 3/16"x1/8", trace black fragment 3/4"x1/8",	-
-	0070			81.9' - Bedding plane, horizontal, rough,	╨	bedding discontinuity up to 5/8" at	
85			1	planar 82.2' - Bedding plane or mechanical break,	厂	- 80.7' Limestone	-
-42.6			0	horizontal, rough, undulating, tight	世	81.0-85.4' - light olive brown to dusky	R9: 8 minutes
-	86.0		NR	82.9' - Fracture, 20 deg, rough, undulating, tight	╁	 yellow, (5Y 5/6 to 5Y 6/4), moderate to strong HCl reaction, poorly to 	-
1 -	00.0			83.45' - Fracture, 60-70 deg, rough,	F	moderately fossiliferous (casts),	
-			1	undulating, tight 84.4' - Fracture, 60 deg	Ė	 81.0-81.8' strong rock (R4), trace voids <1/16", trace medium dark gray 	-
-				86.7' - Bedding plane, horizontal, rough,	t	(N4) staining, 81.5-85.4' weak rock	-
-			0	undulating, tight	╨	L (R2), 30% voids/casts <1/16", trace cavities, 10-15% medium gray (N5)	-
-	R10-NQ] !		88.0' - Bedding plane, 5-10 deg, rough,	口	staining at 84.5'	-
-	5 ft 88%	74	>10	undulating, open 1/8" 88.2-88.5' - Fracture zone	仜	No Recovery 85.4-86.0' Limestone	-
-	0070			88.5' - Fracture, 15-20 deg, rough to	╁	86.0-90.4' - light olive brown to dusky	-
90			2	undulating, black staining over 15% of surface	╁	yellow, (5Y 5/6 to 5Y 6/4), moderate to strong HCl reaction, weak (R2),	SC-3 collected at 88.5-
-47.6			0	89.4' - Bedding plane, 5-10 deg, rough,	Ħ	moderate to strongly fossiliferous (molds, casts), 3-7% medium coarse	89.4' R10: 9 minutes
-	91.0		NR	stepped, 1/8" black layer organics 89.7' - Bedding plane, 30 deg, rough,	Ħ	grain-sized black laminations <1/16"	-
-	01.0			undulating, tight	世	thick, casts/molds up to 5/8", voids/casts <1/16" over 25-30% of	-
-			1		╁	surface, 3-7% medium to coarse	_
-				91.85' - Bedding plane, 0-5 deg, smooth, undulating, tight, <1/16" fine infill	\vdash	 sized, medium dark gray (N4) subrounded sand-sized in rock 	
-			1	and alating, agric, while initial	ш	matrix, 89.9' black intraclast also at	
-	R11-NQ			92.95' - Fracture, 40 deg, rough, undulating,	世	- 1/8" No Recovery 90.4-91.0'	
-	5 ft 92%	60	3	tight, fracture surface parallels friable zone 1" - thick	╁	Limestone	SC-4 collected at 92.95-
-				93.65, 93.7' - Fractures (2), 45 deg, rough,	F	- 91.0-92.5' - Same as 86.0-90.4' 91.0-95.6' - light olive brown (5Y 5/6)	93.65'
95			4	undulating, tight 93.8' - Fracture, 50 deg, rough, undulating,		grading to white (N9) at 92.5', light	_
-52.6			2	open 1/16" 94.0' - Fracture, 55 deg, rough, undulating,	Ħ	olive gray (5Y 6/1) mottling, strong HCl reaction	R11: 16 minutes
1 -	96.0		NR	tight	\vdash	92.5-95.0' - yellowish gray (5Y 8/1), medium strong rock (R3), cavities	1
1 -				94.2' - Fracture, horizontal, rough, undulating, open 5/8", friable zone	\mathbb{H}	fine grained infill at 92.9', very weak]
1 -			0	94.6' - Fracture, 60 deg, rough, undulating,	$oxed{\Box}$	zones at 93.7' with a chalk-like feel, 5-10% voids to <1/16" over surface]
-				tight 94.7' - Fracture, horizontal, rough, undulating,	Ш	95.0-95.25' - very weak (R1), 20-25%]
1 -			2	open 1/8"	上	voids to <1/16" over surface 95.25-95.6' - very weak (R1), with]
1 -	R12-NQ	l 1 69	0	95.1' - Bedding plane, horizontal, very weak rock (white) below	\vdash	25% (<1/16") black laminations]
1 -	5 ft 76%	09	L	95.4' - Bedding plane, horizontal, 1/2" thick	F	No Recovery 95.6-96.0']
1 -			2	organic layer 97.8-97.9' - Fracture zone	片]
100			<u> </u>	97.9' - Bedding plane, horizontal, rough,	片]
-57.6			NR	undulating — 99.0' - Fracture, 10-20 deg, rough,	\vdash		R12: 4 minutes
	101.0			undulating, open 1/2"			
					1		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-08

SHEET 7 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.9 N, 457874.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

CORING	I WE I HOD AI	ND EC	JUIPIV	MENT: CIME 55 S/N 316625, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
WATER	LEVELS: 4.0	ft bgs	s on 5	/20/07 START : 5/20/2007 END : 5/	22/200	D7 LOGGER : M. Faurote, N. Jarzyr	niecki
> -	<u> </u>			DISCONTINUITIES	(J	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
B H E	ZUN H, A	(%	STO		일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YFA YFA	RE FIGE	Q D (%)	P. F.	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	/BC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SCE	COF	S. O.	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
				99.4' - Bedding plane or mechanical break,	Н	Limestone	
-			1	horizontal, rough, undulating, open 1"	\vdash	- 96.0-99.8' - yellowish gray, (5Y 8/1),	-
-				101.55, 102.0' - Fractures (2), 70 deg, rough,	Н	strong HCl reaction, very weak (R1), grading to weak rock (R2), highly	-
l _			4	undulating, tight 102.2' - Bedding plane, horizontal, rough,	Д	- fossiliferous (casts, molds), 1/2"	_
			-	undulating, tight	Н	fossils decreases with depth, trace	
	R13-NQ		_	102.7' - Fracture, 70 deg, rough, undulating,		brownish black (5YR 2/6) infill,	1
-	5 ft	65	2	tight 102.95' - Fracture, 40 deg, rough, undulating,	Н	 diverse fossil types over upper 2.0' and lower 0.5', 10-15% medium gray 	1 1
-	90%			tight	ш	(N5) fine to medium sized	1 -
-			1	103.1' - Fracture, 60 deg, rough, undulating,	Н	No Recovery 99.8-101.0'	-
105				dark gray stains over 80%, tight		Limestone	
-62.6			0	103.5' - Fracture, 30 deg, rough, undulating, tight	Ш	101.0-105.5' - Same as 96.0-99.8' - except yellowish gray, (5Y 7/2),	R13: 5 minutes
	106.0		NR	104.7' - Fault, 40 deg, rough, undulating,	Ш	strong HCl reaction, 20-25% medium	1
-	. 30.0			tight, 50% dark gray staining	1-1	dark gray (N4), fine medium sized	1
-			0			uprains No Recovery 105.5-106.0'	-
-					ш	Limestone	-
I -			0		Ш	106.0-111.0' - Same as 96.0-99.8'	1 -
I _					H	except yellowish gray, (5Y 8/1), with	_
	R14-NQ		١		Н	gradational change to smaller (mostly microforams) fossils starting	
	5 ft 100%	98	2	108.4' - Fracture, 60 deg, rough, undulating, black staining over 100% surface, tight	Ш	at 107.5'	1
-				108.75' - Fracture, 30 deg, black staining	Ш	_	1 1
			1	over 100% of surface	П	_	-
110 <u> </u>				109.3' - Fracture, 70 deg, rough, undulating,	Н		R14: 5 minutes
-07.0			3	trace dark gray (N3) staining, tight 110.25' - Fracture, 70 deg, rough, undulating,	ш	_	K14. 5 minutes
I _	111.0			dark gray stains over 100% over surface,	Н	_	_
			1	tight 70 h	H	Limestone	
			1	110.5' - Fracture, 70 deg, rough, undulating, tight, dark gray stains over 100% of surface	Н	 111.0-115.9' - yellowish gray, (5Y 8/1), fine to medium grained, strong 	1 7
-				110.75' - Fracture, 70 deg, rough, undulating,	Ш	HCl reaction, very weak (R1),	1 1
-			2	dark gray stains over 100% of surface, tight	Н	 gritty/powder-like feel, highly 	SC-5 collected at 112.5-
-	D45 NO			111.1 - Bedding plane or mechanical break,	П	fossiliferous (microforams, shells, casts, molds), grain size increases	113.3'
_	R15-NQ 5 ft	80	1	horizontal, rough, planar, tight, open 1/16" 112.0' - Fracture or mechanical break, 40	Н	- with depth, 15-20% fine sized,	_
	98%			deg, rough, undulating, tight	Ш	medium dark gray (N4) grains in	
			_ \	112.5' - Fracture, 60 deg, rough, undulating,	H	matrix]
115			0	open 1/16" 113.3' - Fracture or mechanical break,	Ш	_] 1
-72.6				horizontal, rough, undulating, tight	₩		R15: 5 minutes
-			2	115.2' - Fracture, 75-80 deg, rough,	Ш	_	-
-	116.0		NR/	undulating, open 1/16" 115.8' - Bedding plane or mechanical break,	H	No Recovery 115.9-116.0'	-
-			0	horizontal, rough, undulating, open 1/16"	口	Limestone] -
_					Н	116.0-118.5' - yellowish gray, (5Y 8/1), medium grained, strong HCl]
			4	117.2' - Fracture, 70 deg, rough, undulating,	Ш	_ reaction, highly fossiliferous	
]			1	tight, large casts	1 + 1	(microforams, casts, molds), 15-25%] 1
-	R16-NQ			•	Ħ	moderate dark gray (N4) intraclasts,	1
-	5 ft	100	0		₽₩	_ 160.4' bedding contact, fossil casts >3/4" (corals)	-
-	100%				Ш	- 118.5-121.0' - vellowish grav. (5Y	-
_			2	119.25' - Bedding plane or mechanical break,	₽	7/2), 5/8" through coring cavities] -
120				horizontal, rough, undulating, tight, fracture	口	infilled at 118.7', fossil casts >1/2" — fragments (yellowish gray, medium	
-77.6			0	through bioturbated zone 119.6' - Bedding plane or mechanical break,	Н	dark gray, light olive brown) medium	R16: 6 minutes
]	121.0		ا	horizontal, rough, planar, tight	Ш	sized grains	1
					\Box		
					⊥ l		<u> </u>



PROJECT NUMBER:

338884.FL

B-08

SHEET 8 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.9 N, 457874.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

				IENT . CIVIE 35 3/N 3 10025, Midd Totally, NQ tools, HW C			ORIENTATION: Vertical
WATER	LEVELS : 4.0	ft bg	s on 5/		22/200		
> 0 0	(6)			DISCONTINUITIES	ا _ن	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		တ္သ	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
BH	H, A ER,	(%	FRACTURES PER FOOT		임	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H H A	GTF	(%) 🛭	FS	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
P R H	ENS	S O	RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ΔОШ	074	ľĽ.	шп		S		
					Н	No Recovery 121.0-123.3'	07:40: Water level on 5/22/07 at 4.9' below –
				_	ш		ground surface in 6" SW
-			NR	-	Ш	_	casing
-				-	₽₩	_	-
l _				_			_
	R17-NQ			400 0 400 71 5 4	\vdash		
-	5 ft	37	>10	123.3-123.7' - Fracture zone, subangular to - subrounded 3/4"-1 5/8" limestone fragments,	Н	 Limestone 123.3-123.85' - yellowish gray, (5Y 	1
-	54%			very weak (friable texture) rock (R1)	Ш	8/1), highly fossiliferous (fragments,	-
_			1 1	123.85, 124.0' - Bedding plane (2),	Н	- shells, molds, casts), friable	_
125			'	horizontal, rough, planar, open 1/16"	Н	123.85-126.0' - strong HCI reaction,	
-82.6					Ш	very weak (R1), highly fossiliferous	R17: 5 minutes
-			2	125.3' - Bedding plane, horizontal, rough,	\vdash	- (casts, shells), 1/2"x1/2" shells,	Add 7.0' of 4" HW casing, -
-	126.0			undulating, open 1/16" 125.4' - Bedding plane, rough, undulating,	ᡛ╣	10-15% voids <1/16", very fine to medium grain rock texture, 7-10%	now set at 53.0' below ground surface
			2	tight, fracture through/across bedding plane -	Ш	yellowish gray (5Y 7/2) mottling	ground surface
			-	126.05, 126.15, 127.45, 127.55, 127.65,	Н	126.0-128.0' - Same as	
-				129.75' - Bedding plane or mechanical break	т	123.85-126.0'	1
-			4	(6), horizontal, rough, planar, open <1/16"	ш	-	1
-				127.9-128.0' - Fracture zone, horizontal,	Н		_
	R18-NQ	56	2	rough, undulating	ш	Limestone	
	5 ft 78%	50		128.4, 129.55, 129.55' - Bedding plane or	Ш	 128.0-129.9' - medium grained, strong HCl reaction, very weak (R1), 	
-				mechanical break (3), horizontal, rough,	Н	friable, 20-25% medium grained	1
-			3	undulating, tight		 sized, medium dark gray (N4) grains, 	-
130_					Н	rounded to subrounded, grain size	
-87.6			NR		Н	coarsens with depth, 128.0-128.4' - very fine grain with >1/2" casts,	R18: 5 minutes
1 7	131.0		INIX	·	П	crystalline carbonate material in rock	1
-	131.0			-	₩	matrix as cavity infilling and matrix	All material is carbonate;
-			3	131.1' - Bedding plane, horizontal, rough, undulating, open 1/8"	ш	– grains	larger (1/2"x1/8") shells -
I _				131.25, 131.30' - Bedding plane (2),	Н	No Recovery 129.9-131.0'	appear to be bedded at
				horizontal, rough, undulating, open 1/4"	Н	Limestone 131.0-133.4' - yellowish gray, (5Y	approximate 20°-30° dip
			1	132.55' - Fracture or mechanical break,	ш	8/1), very weak (R1), 30-40%	over 132.0-133.4' interval – SC-6 collected at 131.3-
-	R19-NQ			horizontal, rough, undulating, tight	Н	voids/casts <1/16", trace cavities	132.55'
-	5 ft	47	3	133.3' - Bedding plane or mechanical break, -	Н	_ 3/16"x1/16", friable, highly	-
	76%			horizontal, rough, undulating, tight	Щ	fossiliferous (casts, molds, shells),]
			5	133.5, 133.6, 133.7' - Bedding plane (3),	Н	very fine grain sized limestone, all carbonate	
135				horizontal, rough, planar, open <1/16" - 134.05' - Bedding plane, horizontal, rough,	口	133.4-134.8' - yellowish gray, (5Y	1
-92.6				undulating, tight	╁┼┤	8/1), very fine to medium grained,	R19: 6 minutes
			NR	134.1' - Bedding plane, horizontal, rough,	╆┩	_ (grain size coarsening with depth),	-
	136.0			undulating, open 1/8"	口	thin bedded, medium-sized rounded]
			[134.2, 134.4, 134.5' - Bedding plane (3), horizontal, rough, undulating, open 1/8"	$\vdash\vdash\vdash$	particles of different colors bedded from 133.5-134.8, carbonate	
1 7			2	136.1, 137.1' - Bedding plane or mechanical	ш	materials	1
-				break (2), 5-10 deg, rough, undulating, tight	H	No Recovery 134.8-136.0'	CO 7 collected = 1400 0
-			3	136.3' - Bedding plane or mechanical break,	╀┤	=	SC-7 collected at 136.3- 137.1'
				horizontal, rough, planar, tight	Ш	_] 107.1
	R20-NQ			137.85, 137.95 - Bedding plane or mechanical break (2), horizontal, rough,	$\vdash\vdash$]
1 -	5 ft	58	2	undulating, tight	++	_	1
-	80%		\vdash	138.1' - Fracture, 70 deg	ш	_	-
			>10	138.9' - Fracture, 15-20 deg	\vdash	_]
140			'	139.3' - Bedding plane, 5 deg, rough,	Ш		
-97.6				undulating 139.3-140.0' - Fracture, angular stained black	Ш	_	R20: 8 minutes
-			NR	along fracture surfaces	++	-	
	141.0			gacta. o caacco	H		



PROJECT NUMBER:

338884.FL

B-08

SHEET 9 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.9 N, 457874.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

				IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW o	asiriy	1		ORIENTATION: Vertical
WATER	LEVELS: 4.0) ft bgs	s on 5	/20/07 START : 5/20/2007 END : 5/	22/20	07	LOGGER : M. Faurote, N. Jarzyr	ilecki
> 0 0	(9)			DISCONTINUITIES	O	L	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S.	DESCRIPTION	SYMBOLIC LOG		ROCK TYPE, COLOR,	OLZE AND DEDTH OF GAGING
ᆱ끯은	RUN H, 4 ÆR	Q D (%)	N N	DEDTIL TYPE OPIENTATION POLICINESS	1 ∺	ı	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H A A	ZOV.	0	Z F	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	₩ W	ı	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SUF	COI	S S	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	ı	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
					╁	╆	Limestone	
-			3	141.2' - Bedding plane or mechanical break,	F	₽	136.0-139.3' - yellowish gray, (5Y	-
-				15-20 deg, rough, undulating, open fractured through cavity	╨	╁	8/1), very fine grained, strong HCI	_
			2	141.6, 141.9, 142.25' - Mechanical break or	ш	L	reaction, very weak (R1), very fine grain rock with medium grained beds	
1 7				fracture (3), horizontal, rough, undulating,	Н	Ł	at 136.0', 138.0-138.3', very weak	1
1 1	R21-NQ			tight, fractured through irregularly shaped		t	(R1), highly fossiliferous	1
-	5 ft	60	3	dissolution cavities, 15% brown or black staining on fracture surface	╨	╁	(microforams, shells, casts, molds),	1
-	92%			142.8' - Bedding plane, 10 deg, rough,	╁┼	╁	5-7% medium sized, medium dark gray (N4) medium sized grain,	-
			1	undulating, black stains over 10% of surface,		L	subrounded, 5-10% voids <1/16",	
145			·	open 1/16"	Н	1	10% mottling in yellowish gray (5Y	
-102.6			3	143.1' - Bedding plane, 15-20 deg, brownish — black stains over 85% of surface, tight	ш	Г	7/2) powder-like texture	R21: 10 minutes
-	4400		NR	143.25' - Bedding plane, horizontal, rough,	╁	ł	Limestone 139.3-140.0' - yellowish gray, (5Y	1 1
-	146.0		INIX	undulating, open 1/8"	亡	1	8/1), very fine grained, medium	1
-			1	143.9' - Bedding plane, horizontal, rough,	\vdash	╀	strong to strong (R3 to R4), 3-5%	-
				stepped 144.25' - Fracture, 25 deg, rough, undulating,	Ш	1	voids <1/16", poorly fossiliferous]
			_	tight		1	(casts, molds), interval has broken fragments of core with irregular]
1			2	145.05' - Bedding plane, horizontal, rough,	₽	ſ	shaped infilled cavities (bioturbated	1
1 -	R22-NQ			undulating, tight 145.35' - Bedding plane, horizontal, rough,	ш	1	zones), infilling with grayish yellow	1 1
-	5 ft	77	1	undulating, open 1/16"	+	╁	(5Y 8/4), hard, brittle minerals with] -
-	92%			145.5' - Fracture, 80 deg, rough, undulating,		1	30-40% voids <1/16" No Recovery 140.0-141.0'	1 4
			2	tight	╨	Ł	Limestone	
150			_	146.1' - Bedding plane or mechanical break, horizontal, rough, undulating, open 1"		1	141.0-145.05' - very fine grained,	
-107.6			1	147.35, 147.75' - Bedding plane or	┰	╀	strong HCl reaction, medium strong	R22: 9 minutes
-	454.0		NR	mechanical break (2), horizontal, rough,		t	to strong (R3 to R4), 5-15% voids <1/16", 15-20% horizontally aligned,	1
-	151.0		INIX	undulating	₩	Н	irregularly shaped to elongated	+
-				148.2, 148.5' - Mechanical break (2), tight 148.9' - Bedding plane, horizontal, rough,	1	Ы	cavities 3/16" x 1/16", few bedding	1
				undulating, tight		L	contacts with brownish black (5YR 2/1) laminations on surface, trace	Abandonment: approximately 250 gallons -
				149.15' - Fracture, vertical, rough, undulating,	1	П	dissolution cavities 3/4", poorly	of grout mix (28-47 lb bags
1 7				tight	1		fossiliferous (casts/molds), dense	of Bonsal brand Portland
-				149.8' - Fracture, 40-50 deg, rough, undulating, tight	1	H	heft	Type 1 cement), 7 dry 47 lb
-				150.3' - Fracture or mechanical break,	1	H	145.05-145.6' - light olive brown, (5Y 5/6), strong HCl reaction, weak (R2),	bags added to top of grouting surface (35-47 lb
-				horizontal, rough, undulating, tight, fractured	1	H	3-5% moderate dark gray (N4)	bags of grout mix used)
				through partially infilled cavity			rounded grains, fine to medium	
]					1		grained, trace voids <1/8"	1
				_	1	П	No Recovery 145.6-146.0' Limestone	
-					1	H	146.0-148.9' - yellowish gray grading	1
-					-	$ \cdot $	to light olive brown, (5Y 8/1 grading]
					1		to 5Y 5/6), medium grained, strong]
					L		HCl reaction, very weak (R1), with gritty feel, bedded medium sized	
]							carbonate grains (yellowish gray,	1
-				•	1		light olive brown, moderate yellow),	1 1
-					1	\vdash	particle sizes decreasing with depth,	1
-					-	F	angular to subrounded, medium light gray (N6) coarse sand to fine	-
					1	L	gravel-sized grains over top 0.7']
					1		interval	
					1	r] 1
-				_	1	\vdash		⊢
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-08	SHEET	10	OF	10	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724091.9 N, 457874.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

DISCORTINUITES DESCRIPTION DEPTH, TYPE, CHENTATION, ROJOHNESS DESCRIPTION DEPTH, TYPE, CHENTATION, ROJOHNESS THICKNESS, SURFACE STAINING, AND TIGHTNESS AND TIGHTNESS DESCRIPTION DEPTH, TYPE, CHENTATION, ROJOHNESS THICKNESS, SURFACE STAINING, AND TIGHTNESS AND TIGHTNESS DEPTH, TYPE, CHENTATION, ROJOHNESS THICKNESS, SURFACE STAINING, AND TIGHTNESS AND TIGHTNESS DEPTH, TYPE, CHENTATION, ROJOHNESS THICKNESS, SURFACE STAINING, AND TIGHTNESS AND TIGHTNESS DEPTH, TYPE, CHENTATION, ROJOHNESS THICKNESS, SURFACE STAINING, AND TIGHTNESS AND TIGHTNESS DISCORTING COUNTY MICHAEL COUNTY THICKNESS, SURFACE STAINING, AND TIGHTNESS AND TIGHTNESS DISCORTING COUNTY THICKNESS, SURFACE STAINING, AND TIGHTNESS AND TIGHTNESS THICKNESS, SURFACE STAINING, AND TIGHT	WATER LEVELS: 4.0 ft bgs on 5/20/07		s on 5/	20/07 START : 5/20/2007	END : 5/2	2/200	D7 LOGGER: M. Faurote, N. Jarzyr	niecki	
148.9-151.6' - fine to very fine grained, strong HCI reaction, medium strong to strong (R3 to R4), fine to very fine grain texture (decreasing with depth), 3-7% voids <1/16", poorly fossiliferous (casts), dense heft, moderate olive brown (5Y - 4/4) grading to yellowish gray (5Y 7/2) at 149.5' No Recovery 150.6-151.0' Bottom of Boring at 151.0 ft bgs on	>00	(9			DISCONTINUITIES		O	LITHOLOGY	COMMENTS
148.9-151.6' - fine to very fine grained, strong HCI reaction, medium strong to strong (R3 to R4), fine to very fine grain texture (decreasing with depth), 3-7% voids <1/16", poorly fossiliferous (casts), dense heft, moderate olive brown (5Y - 4/4) grading to yellowish gray (5Y 7/2) at 149.5' No Recovery 150.6-151.0' Bottom of Boring at 151.0 ft bgs on	PTH BELOVIREACE ANI	DRE RUN, NGTH, AND COVERY (%	3 D (%)	ACTURES R FOOT	DEPTH, TYPE, ORIENTATION, ROUG PLANARITY, INFILLING MATERIAL	. AND	MBOLIC LO	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
		CO LEP REF	RG	FR. PEI	THICKNESS, SURFACE STAINING, AND T	TIGHTNESS	SAI SAI	CHARACTERISTICS 148.9-151.6' - fine to very fine grained, strong HCl reaction, medium strong to strong (R3 to R4), fine to very fine grain texture (decreasing with depth), 3-7% voids <1/16", poorly fossiliferous (casts), dense heft, moderate olive brown (5Y 4/4) grading to yellowish gray (5Y 7/2) at 149.5' No Recovery 150.6-151.0' Bottom of Boring at 151.0 ft bgs on	DKOPS, IEST RESULTS, ETC.



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-09	SHEET	1	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724303.2 N, 458022.2 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLIN	G METH	<u>OD AND</u>	EQUIPM	ENT : CME 55 S/	N 316625, mud rotary, auto hammer,	AWJ rods, 2-7/8"	tri-cone bit		ORIENTATION : Vertical
WATER	LEVELS	: 4.0 ft b	gs on 5/3.	/07 5	TART : 5/1/2007 END : 5	/3/2007	LOGGER	: R.	Bitely, K. Coke, A. Erickson, W. Elliott
				STANDARD	SOIL DESCR	IPTION		(D	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	AL (ft)	PENETRATION				SYMBOLIC LOG	
ON A PE	RECOVERY (ft)		TEST RESULTS	SOIL NAME, USCS GROU			임	DEPTH OF CASING, DRILLING RATE,	
A F E E		INLCOVI			MOISTURE CONTENT, RE CONSISTENCY, SOIL STRU			ВÔ	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
E.E.E.E			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRU	CTURE, WIINERAL	.UG1	SY№	INSTRUMENTATION
42.9	0.0			(11)	Poorly Graded Sand With Or	ganics (SP)			
-	0.0	,,	00.4	1-1-2	0.0-1.1' - dark gray to very ligh	nt gray, (N3 to N8	3), –		
_		1.1	SS-1	(3)	moist, very loose, fine grained		nplastic _		
_	1.5				fines that are primarily organic decreasing with depth, silica s	s, trace roots,	/_		
_					(doctodottig that dopat, office of				
_	1						_	1	
_	1						-		Wet at 3.0' below ground surface (SS-1 dry
_	-						-		but SS-2 wet)
-							-		
-							_		
5	5.0				01 0 1 (00)			,,,,	_
37.9				242	Clayey Sand (SC) 5.0-6.0' - dark yellowish brown	(10YR 6/6) bro	wnish –		
		1.0	SS-2	3-1-2 (3)	black mottling, moist to wet, v	ery loose, fine gra	ained		
_	6.5			(5)	sand, 14% medium plastic fine	es, 5% concretion	ns up to \int	Γ΄	
_	0.0				1/2" in size, silica sand		/ -		
_	1						-		
_	-						-		
_							_		
_	ļ						_		
_	[_		
10	10.0						_	1	
32.9	10.0				Silt (ML)			Ш	_
_	1	0.9	SS-3	5-4-6	10.0-10.9' - grayish yellow, (5'		- CI	Ш	
-		0.5		(10)	nonplastic, rapid dilatancy, mi reaction, trace fine grained sa			'''	
_	11.5				carbonate derived	,	-		
_									
_							_		
_]								
_	1						_		
-							_		
-	,						-		
15 27.9	15.0		-		Silt (ML)				Driller's Remark: Some loss circulation after
_1.0				11-2-2	15.0-15.9' - Same as 10.0-10.	9' except trace	_		pulling split spoon
_		0.9	SS-4	(4)	 brown-black mottling, soft, tra 	ce fine white grain		Ш	· - · ·
_	16.5				\sand, fine to coarse grained s	and, carbonate d	erived / _		
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-09	SHEET	2	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724303.2 N, 458022.2 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 2-7/8" tri-cone bit ORIENTATION : Vertical												
WATER	WATER LEVELS : 4.0 ft bgs on 5/3/07											
		STANDARD			SOIL DESCRIPTION	ניז	COMMENTS					
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE INTERVAL (ft)			PENETRATION TEST RESULTS		SYMBOLIC LOG						
표원인		RECOVE	ERY (ft)	TEOT RECOETS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	13	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND					
PTH EVA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	MBG	INSTRUMENTATION					
SU				(N)		ς						
22.9	20.0	0.1	SS-5	50/3 (50/3") /	Well Graded Gravel (GW) 20.0-20.1' - dusky yellowish brown, (10YR 2/2), fine to	1	Driller's Remark: 4" HW casing advanced to 23.0'					
-					coarse grained gravel-sized concretions, dark	1						
-					yellowish orange staining, fine grained sands, also a single limestone fragment, silica sand	1	Driller's Remark: Circulation loss					
l -						1						
l -						1	Last SPT of 5/1/07					
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l _						⅃						
25	25.0					\perp						
17.9				05.05.10	Silty Sand With Limestone Fragments (SM) 25.0-26.2' - grayish yellow, (5Y 8/4), wet, very dense,		SS-6 is first run of 5/2/07, 08:03 water level = +0.8'					
1		1.2	SS-6	25-37-42 (79)	moderate HCl reaction, fine to coarse grained		10.0					
	26.5			(. 5)	sand-sized, 41% nonplastic fines, 15% fine grained gravel-sized limestone fragments, trace white	7111	1					
-					\carbonate streaks, trace black with green very fine	1						
-					grained sand, all carbonate derived	1						
-						1	1					
-						1	1					
-						1	1					
-						1	1					
30	30.0					1	1					
12.9	30.0				Silty Sand (SM)	111	_					
-		1.3	SS-7	27-31-29	30.0-31.3' - Same as 25.0-26.2' except 30-35% nonplastic fines and 10-15% fine sized limestone	1	-					
-	31.5			(60)	fragments	-	_					
-	31.3					1	-					
-						┨	-					
-						┨	-					
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						1	-					
35 7.9	35.0				Silty Sand With Limestone Fragments (SM)	1111	_					
-		1.5	SS-8	29-40-19	35.0-36.5' - Same as 25.0-26.2' except 20% sized	-	1					
-		1.5	J 33-8	(59)	limestone fragments	-[-					
-	36.5					411	-					
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-09	SHEET	3	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724303.2 N, 458022.2 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

						TND : 5/2/2007) . D	Ditable K. Cake A. Friekeen W. Fliett
WATER	LEVELS	. 4.∪ II D <u>(</u>	gs on 5/3/		START : 5/1/2007	END: 5/3/2007 SOIL DESCRIPTION	LUGGER	T . K.	Bitely, K. Coke, A. Erickson, W. Elliott COMMENTS
중무 <i>운</i>	CAMPIE	INITED / A	I /#\	STANDARD PENETRATION		JOIL DEJONIF HON		8	CONTINIENTS
ELC ON (SAMPLE INTERVAL (ft) RECOVERY (ft)		TEST NESOLIS		SOIL NAME, USCS GROUP SYMBOL, COLOR,		2	DEPTH OF CASING, DRILLING RATE,	
H B		RECOVE			MOISTURE	E CONTENT, RELATIVE DI	ENSITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTEN	NCY, SOIL STRUCTURE, M	INERALOGY	SYMBOLIC LOG	INSTRUMENTATION
2.9	40.0			(14)	Sandy Silt (MI	L)		Ш	
-		1.5	SS-9	20-40-46	40.0-41.5' - gra	ayish yellow, (5Y 8/4), mo	ist to wet,	$\ \ $	-
-		1.5	33-9	(86)	nard, nonplast	tic, rapid dilatancy, moder fine to medium grained s	ate HCI and all	$\ \ $	
-	41.5				carbonate	mio to modium gramou o		ш	-
-							-	-	-
_							-		
_							-	1	_
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45	45.0								
-2.1					Sandy Silt (MI	L)]
-		1.5	SS-10	16-22-36 (58)	45.0-46.5° - Sa	ame as 40.0-41.5'	-	1	1
-	46.5			(56)			-	1	1
-	40.0							T '''	1 1
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50 -7.1	50.0 50.3	0.0	SS-11	50/4	No Recovery	50 0-50 3'		⊢	-
-	00.0	0.0	00 11	(50/4")	No recovery	00.0-00.0		T	1 -
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55	55.0						-		1
-12.1	55.4	0.1	SS-12	50/5 (50/5")	Limestone Fra	agments	Γ	Г	1
				(50/5")	\ 55.0-55.1' - gra	ayish yellow, (5Y 8/4), mo to coarse grained sand ar	oderate HCl	1	1
-					limestone frag	ments		1	1
-								1	1
-							-	1	-
-							-	1	-
-							-	1	-
-							-	1	-
-							-	1	Driller's Remark: Last 2.0' were harder
-							-	1	drilling, light chatter
60							_	\vdash	



PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	B-09	SHEET	4	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724303.2 N, 458022.2 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

						ary, auto nammer, Avvo rous,			ORIENTATION: Vertical
WATER	LEVELS	: 4.0 ft b	gs on 5/3/	07 8	START : 5/1/2007	END : 5/3/2007	LOGGER	₹ : R.	Bitely, K. Coke, A. Erickson, W. Elliott
>00				STANDARD		SOIL DESCRIPTION		ပ္ခ	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				SYMBOLIC LOG	
BEI GE		RECOVE	ERY (ft)		SOIL NAM	ME, USCS GROUP SYMBOL E CONTENT, RELATIVE DE	, COLOR,	 	DEPTH OF CASING, DRILLING RATE,
F A A			#TYPE	6"-6"-6"	CONSISTEN	NCY, SOIL STRUCTURE, MII	NERALOGY	MBC	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			#ITPE	(N)	00.10.012.	101, 0012 011 101 101 12, 1111		SYI	
-17.1	60.8	0.1	SS-13	50/4	\ \ \ Limestone Fra	agments	Γ		Last SPT sample, switching to NQ coring
-				(50/4")	\ 60.0-60.1' - gra	ayish yellow, (5Y 8/4), mild	l to moderate / -	1	Driller's Remark: 4" HW casing advanced to
-					HCI reaction			-	60.0'
I -					Begin Rock Co	oring at 61.0 ft bgs sheet for the rock core log	-	1	
1					Oce the next s	sileet for the rock core log			
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PROJECT NUMBER:

338884.FL

B-09

SHEET 5 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724303.2 N, 458022.2 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND FOUIPMENT: CME 55 S/N 316625, mud rotary, NO tools, HW casing

CORING	METHOD A	ND E	QUIPN	MENT: CME 55 S/N 316625, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
WATER	LEVELS: 4.0	ft bg	s on 5	/3/07 START : 5/1/2007 END : 5/3	3/2007	LOGGER : R. Bitely, K. Coke, A.	Erickson, W. Elliott
\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \				DISCONTINUITIES	(J	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	61.0 R1-NQ 5 ft 66% 66.0 R2-NQ 5 ft 100%	8	4 6 3 1 NR 2 2 2	61.25, 61.55' - Bedding plane or mechanical break (2), horizontal, rough, undulating, open 1/16", shell casts on fracture surface 61.7' - Fracture, 50 deg, rough, undulating, tight 61.95' - Fracture, 80 deg, rough, undulating, black staining in microfractures on surface 62.1, 62.25' - Bedding plane or mechanical break (2), horizontal, rough, undulating, 1/8" open 62.5' - Fracture, 50 to 60 deg, rough, undulating, tight 62.6' - Mechanical break or fracture, horizontal, rough, undulating, tight 62.7' - Fracture, 50 to 60 deg, rough, undulating, tight 62.9' - Fracture, horizontal, rough, undulating, tight 63.1' - Fracture or mechanical break, horizontal, rough, undulating, open to 3/4" 63.5, 63.75' - Fractures or mechanical break (2), horizontal, rough, undulating, dark grayish staining, open 1/16" 64.0' - Fracture or mechanical break, 30 deg,		Limestone 61.0-64.4' - grayish yellow, (5Y 8/4), mild to strong HCl reaction, very weak (R1) (top most) to medium strong (R3) (lower 2/3 sample), voids (<1/16") over 25-30% of surface, moderately fossiliferous (casts, molds), medium gray (N5) staining over lower 2/3 sample, fossils up to 3/8" in size No Recovery 64.4-66.0' Limestone 66.0-71.0' - grayish yellow, (5Y 8/4), strong HCl reaction, voids (<1/16") over 25-30% of surface, moderate to highly fossiliferous (casts, molds), extremely weak (R0) from 66.0-66.3', rest of sample medium strong rock (R3), grayish stains on rock surface	NQ coring assembly, 60.0' 4" HW casing installed, tape measured total depth to 61.0' 14:00 Start coring, using 10.0' sections of NQ barrel R1: 3 minutes SC-1 collected at 68.75- 69.65'
-70 -27.1 -	71.0		0	rough, undulating, dark grayish staining on surface, tight 66.1, 66.3' - Mechanical break or fractures (2), horizontal, rough, undulating, open up to 1/2" 67.15' - Fracture, 50 deg, rough, planar, dark		- - -	R2: 11 minutes
	R3-NQ 5 ft 84% 76.0	75	2 0 0 1 NR	staining over 80% of surface, tight 67.95' - Fracture, 10 to 20 deg, smooth, stepped, tight 68.5' - Mechanical break, 10 to 20 deg, rough, undulating, mechanical break to get into box, tight 68.75, 68.85' - Mechanical break or bedding plane (2), 10 to 20 deg, rough, undulating, open 1/16" 69.65' - Mechanical break or bedding plane, horizontal, rough, undulating 71.1' - Bedding plane or mechanical break, horizontal, rough, undulating, open up to 1/4" 71.65' - Bedding plane, horizontal, rough, undulating, open to 1/2" contact between 2		71.0-75.2' - stained medium gray, (N5), strong HCl reaction, very weak to weak (R1 to R2) 71.0-71.65' - voids (<5/8") over 5-10% of surface, hard medium dark gray (N4) mineralization and olive gray (5Y 4/1) soft plastic very fine grained infilling 71.65-75.2' - yellowish gray, (5Y 8/1), chalk-like texture, highly fossiliferous (shell fragments, casts, molds), most fossils <1/16" in size up to 3/8" casts 73.0-73.8' - moderate yellowish brown staining, (10YR 5/4), horizontally oriented medium dark gray (N4) 3/8" long fossils	Driller's Remark: Slight (20%) loss of circulation over first foot of run R3: 7 minutes
- - - - - 80 -37.1	R4-NQ 5 ft 62% 81.0	43	2 NR 1 3	colors, infilled voids and soft plastic fines on surface above 74.85' - Mechanical break or bedding plane, horizontal, rough, undulating, tight 76.2' - Mechanical break or fracture, horizontal, rough, planar, open 1/16" 76.4' - Fracture or mechanical break, 30 deg, rough, undulating 76.65' - Fracture, horizontal, rough, undulating 78.5' - Fracture, horizontal, rough, undulating 79.0. 79.25' - Fractures (2), horizontal, rough, undulating, top and base of crumbled rock fragments, tight		gray (N4) 3/8" long fossils 74.3-75.2' - moderate yellowish brown (10yr 5/4) staining, horizontally oriented medium dark gray (N4) 3/8" long fossils No Recovery 75.2-76.0' Limestone 76.0-76.65' - yellowish gray, (5Y 8/1), very fine grained, strong HCI reaction, very weak (R1), voids (<1/16") over 5-10% of surface No Recovery 76.65-78.55'	Driller's Remark: Loss of core interval from 76.65-78.5' Driller's Remark: Loss of circulation at approximately 78' (100%) SC-2 collected at 79.8-81.0' R4: 25 minutes
					П		
							I



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-09	SHEET	6	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724303.2 N, 458022.2 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

				IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW c			ORIENTATION : Vertical
WATER	LEVELS: 4.0	ft bgs	s on 5		3/200		
≥ ∩ ⊕				DISCONTINUITIES	ا ي	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
불병	P.E.R.	Q D (%)	JUR OO	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	1 ട്ര	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
PTF/ EVA	NGT COO	Q	ACT R F	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
SS	잉필분	A.	FE	THICKNESS, SURFACE STAINING, AND TIGHTNESS	λs	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
			,	79.8' - Bedding plane or mechanical break,	\Box	Limestone	
-			1	horizontal, rough, planar, open <1/16" 81.5' - Mechanical break, 50 to 60 deg,	Н	 78.55-81.0' - medium yellow, (5Y 7/6), very fine grained, strong HCl 	1 1
-				rough, undulating, tight	П	reaction, weak to strong (R2 to R4),	1 1
-			2	81.8' - Bedding plane or mechanical break, -	Н	- voids (<1/16") over 25-30% of	1 -
-	55.110			horizontal, rough, undulating, tight 82.8, 82.9, 83.05' - Bedding plane or	Ш	 surface, trace unfilled cavities, irregularly shaped, poorly 	1 -
I _	R5-NQ 5 ft	86	3	mechanical break (3), 30 deg, rough,	Н	- fossiliferous (casts)	_
	100%	00	Ů	undulating, tight, fossil casts (up to 1 1/2"	Я	81.0-85.4' - yellowish gray, (5Y 8/1),	l
				size) and molds (of tubular fossils) on	Н	white mottled, strong HCl reaction,	1
85			0	surfaces - 83.3' - Bedding plane or mechanical break,	Ш	 very weak to weak (R1 to R2), highly fossiliferous (molds, casts) 1" long 	1 1
-42.1				horizontal, rough, undulating, open up to 1"	Ш	tubular molds 1/16" diameter, voids	R5: 14 minutes
-			1	83.5' - Mechanical break, mechanical break	H	 (<1/16") over 30-35% of surface, 23.3.84.0" year, fine grained 	-
-	86.0			to get into box 83.7' - Bedding plane or mechanical break,		83.3-84.0' very fine grained "chalk-like" textured layer, below	-
-			2	horizontal, rough, undulating, slight darker	Ш	84.0' highly mottled in bioturbated	-
				discoloration/staining	Ш	pockets - 85.4-86.0' - olive gray, (5Y 4/1),]
			1	84.2' - Mechanical break, 10 deg, rough, undulating, tight	Н	laminations 1/4" thick of a very fine	
1 7			'	85.4' - Bedding plane, 0 to 5 deg, rough,	Ш	grained soft fine material	1 1
-	R6-NQ			undulating, soft fine material infill 1/16" thick	Ш	86.0-91.0' - yellowish gray, (5Y 8/1),	1 1
-	5 ft 100%	86	0	86.2, 86.7' - Bedding plane or mechanical break (2), horizontal, rough, undulating, open	ш	 very fine grained, strong to moderate HCl reaction, weak (R2) 	1 1
-	100%			1/8"	╂┼┤	86.0-86.4' - light olive brown (5Y 5/6)	-
-			1	87.2' - Mechanical break or bedding plane,		_ bioturbated pockets with voids	1 -
90				horizontal, smooth, planar 87.4' - Fracture, vertical, rough, undulating, —	Н	(<1/16") 	l
-47.1 _			2	black stains over 10-15% of surface	ш	_ "chalk-like" textured limestone bed	R6: 21 minutes
	91.0		_	89.25' - Bedding plane, 70 deg, 3/4" thick soft	Н	86.7-90.0' - very fine grained weak	
				fine infill (olive gray 5Y 3/2) 90.0' - Fracture, 70 deg, rough, undulating,	Ħ	 (R2) rock, voids or casts (<1/16") over 10-15% of surface, grades to 	Driller's Remark: Depth to
1 7			3	light gray staining over 100% of surface, tight	Н	highly fossiliferous medium grained	water 4.0' below ground - surface
-				90.45' - Fracture, 30 deg, rough, undulating,	Ш	textured limestone, 20-25% white	
-			0	tight 91.1, 91.5' - Mechanical break or bedding	Ш	fossil allochems in rock matrix with 30-35% medium gray grains	1 1
-	R7-NQ			plane (2), horizontal, rough, undulating, open -	Ħ	- 89.5' - organic clay lens, light olive	-
_	5 ft	82	0	1/16"	Н	brown (5Y 5/6)	1 -
	98%			91.9' - Mechanical break or bedding plane, horizontal, rough, undulating, open up to 1/2",	口	90.0-91.0' - 30-40% yellowish gray - (5Y 7/2) grains in matrix, organic]
			1	fossils on surface of break	Ш	(black) laminations with 3/8" sized	Last run on 5/2/07
95				92.6, 93.65' - Mechanical break (2), horizontal, rough, undulating, tight —	H	grains (black in color) — 91.0-95.9' - yellowish gray, (5Y 8/1),] 1
-52.1			2	94.4' - Mechanical break or bedding plane,	H	strong HCl reaction, very weak to	R7: 20 minutes
	96.0		3	horizontal, rough, undulating, tight	14	weak (R1 to R2)	1
-	30.0		NR/	95.25' - Mechanical break or bedding plane, - horizontal, rough, planar, shell casts on	団	 91.0-93.2' - stained yellowish gray (5Y 7/2), highly fossiliferous (casts, 	First core run on 5/3/07
-			1	fracture surface, open 1/16"	$\vdash\vdash$	molds up to 3/4"), voids/casts (<1/8)	Water level 4.0' below
-				95.55' - Mechanical break or bedding plane,	口	over 20-25% of surface, 10-15% fine	ground surface at 07:49
-			0	horizontal, rough, undulating, tight, fossil cast on surface	Н	to medium grained sized medium dark gray (N4) grains in rock matrix	SC-3 collected at 97.35-
				95.65' - Mechanical break or fracture, 30 deg,	Ш	No Recovery 95.9-96.0	98.5'
	R8-NQ	06	4	rough, undulating, open 3/8"-1/4"	Н	Limestone	
]	5 ft 100%	86	1	96.3' - Fracture or mechanical break, 30 deg, rough, undulating, tight to open 3/4"	H	96.0-101.0' - yellowish gray, (5Y 8/1), fine to medium grained, strong HCl	1
				98.2' - Fracture or mechanical break,	Н	reaction, very weak (R1), chalk-like	1
1 ,,,			0	horizontal, rough, undulating, gray staining	囯	texture, highly fossiliferous (casts,	-
100 -57.1					Н	spiral-shaped up to 5/8" and molds),	R8: 4 minutes
			2	100.25' - Mechanical break, horizontal,	口	voids or casts (<1/16") over 25-30% of surface, trace black grains	
	101.0			rough, undulating, light gray staining, tight	H	(organics)	
					ш		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-09

SHEET 7 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724303.2 N, 458022.2 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, NQ tools, HW casing

CORING	METHOD AI	ND EC	JUIPIV	IENT : CME 55 S/N 316625, mud rotary, NQ tools, HW o	asing		ORIENTATION : Vertical
WATER	LEVELS: 4.0	ft bgs	s on 5		3/200		
≩ Ω≨	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
_			1	100.55' - Fracture, 50 deg, rough, undulating, tight 101.3' - Mechanical break or fracture,		Limestone Continuing - as 3/4" long x 1/8" wide grains, rock has a medium grained appearance	Driller's Remark: Continued 90-95% loss of circulation
_			2	horizontal, rough, undulating, gray staining over 100% of surface, tight 101.65' - Fracture, 80 to 90 deg, rough,		due to medium dark gray (N4) and yellowish gray (5Y 7/2) grains in rock matrix, microforams throughout,	-
_	R9-NQ 5 ft 96%	42	>10	undulating, gray staining, tight 102.0' - Fracture, 10 to 15 deg, rough, undulating, 40% gray staining, tight		trace elongated cavities 9/16"x1/16" rimmed with white (N9) mineral 98.1-101.0' - stained fine to medium	-
105_			3	102.5' - Fracture, 80 deg, rough, undulating, >1' length, tight, casts/molds on surface 104.15' - Fracture, 5 to 10 deg, rough,		grained yellowish gray (5Y 7/2) 101.0-105.8' - yellowish gray, (5Y 8/1), strong HCl reaction, very weak	
-62. 1 -	106.0		0 NR	undulating, tight, casts/molds on surface 104.3' - Fracture, 80 deg, rough, undulating, light gray staining on 70-80% of surface, tight 104.7' - Fracture or mechanical break, 30	Ħ	(R1), very fine to medium grained, mixture of visible white (N9), yellowish gray (5Y 7/2) and medium gray (N5) grains, voids or casts	R9: 4 minutes
- -			0	deg, rough, undulating, open up to 1"		(1/16") over 25-30% of surface, spheroidal to elongated in shape, rock has chalk-like feel, casts and	-
-	R10-NQ		0			molds up to 3/4" visible over upper 2.5' of sample, voids (<1/32"), white spheroidal grains predominant lower	-
<u> </u>	5 ft 100%	100	1	108.45' - Mechanical break or fracture, horizontal, rough, undulating, brown staining over 80% of surface, tight		2.5' of sample No Recovery 105.8-106.0' Limestone	-
110_ -67.1			0	109.2' - Mechanical break, horizontal, rough, stepped, tight		_ 106.0-111.0' - same as lower 2.5' of 101.0-105.8' except with areas of bioturbation horizontally oriented, bioturbated areas are yellowish gray	R10: 4 minutes
_	111.0		0	110.85' - Mechanical break, 70 deg, rough, undulating, tight	Ė	(5Y 8/1) with voids (<1/16") over 40-45% of surface, trace cavities up to 3/4", elongate in shape and	-
_			1	111.1' - Mechanical break or fracture, horizontal, rough, planar, open 1/16"		partially infilled like bioturbated areas, sample grades with depth to a yellowish gray (5Y 8/1) below 109.25'	
_	R11-NQ 5 ft	98	0	112.4' - Fracture or mechanical break, 15 to 20 deg, rough, undulating, open 1/8"		111.0-116.0' - yellowish gray grading to light gray at 114.5', (5Y 8/1 to N7), very fine grained, strong HCl	
-	100%	30	0	113.55' - Mechanical break, 20 deg, rough, undulating, tight		reaction, very weak (R1), medium to highly fossiliferous	-
115_ -72.1 -			0	– 115.45' - Mechanical break		114.5-116.0' - percentage of voids, — fossil casts, and cavities increases with depth, voids (1/16" to 3/16") over 15-30% of surface, 5-10% cavities	R11: 2 minutes
- -	116.0		1	116.1' - Fracture or mechanical break, horizontal, rough, planar		up to 9/16th rimmed with white (N4) mineral (possible mineral replacement in fossil casts), tubular	-
- -			1	117.45' - Fracture or mechanical break, 20		 and shell fossil casts up to 3/8" in size, color change also indicative of change from "chalk/powder" like feel 	SC-4 collected at 117.45-
-	R12-NQ 5 ft 70%	68	1	deg, rough, undulating, tight 118.55' - Fracture, 30 deg, rough, planar,		 to friable/gritty feel with depth, moderately to highly fossiliferous 	118.55' -
- - 120			1	open 1/16" 119.1' - Fracture or mechanical break, horizontal, rough, undulating, tight, fossil		-	-
-77.1 -	121.0		NR	casts on surface —		-	R12: 2 minutes



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-09

SHEET 8 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724303.2 N, 458022.2 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

WATER LIVELS 4.0 Ribes on \$5007					HENT . CIVIE 33 3/N 3 10023, HIND TOTALLY, INQ TOOLS, HWY C			ORIENTATION: Vertical
Section Sect	WATER	LEVELS: 4.0	ft bg:	s on 5		3/200		
1	>00	<u> </u>			DISCONTINUITIES	O	LITHOLOGY	COMMENTS
1	O N E	, ND ' (%)		S	DESCRIPTION	임	ROCK TYPE COLOR	
1	BHO	L, A	9	滿는			MINERALOGY, TEXTURE,	
1	H H A	GTF	5) 0	FS		BO		SMOOTHNESS, CAVING RATE AND
1	P.R.E.	ENS	Ø	RA		Σ		
1	ООШ	074	IĽ.	шп		S		
122.05 122.1 Bedding plane or mechanical break (2) 51 of 10 deg, rough, undulating, black specking as stains on 25% of surface, tight 1.22.6 1.23 1.24 1.2				4	404.051. 5	\vdash		
120. 1 22.1 - Bedding plane or mechanical break (2), 5 to 10 deg, rough, undulating, black speckling as stains on 25% of surface, 125. 125. 125. 125. 125. 125. 125. 125.				'		Ш		1
## break (2), 5 to 10 deg, rough, undulating, black specking as stains no 28% of surface, light 1 23.4". Mechanical break (2), mechanical break to get in to box (2), mechanical break to get in to box (2), mechanical break to get in to box (2), mechanical break to get in to box (2), mechanical break to get in to box (2), mechanical break to get in to box (2), mechanical break to get in to box (2), mechanical break to get in to box (2), mechanical break to get in to box (2), mechanical break, bortzontal, rough, undulating, black speckled stains; black speckled stains; black speckled stains; black speckled stains; black speckled stains; black speckled stains; black speckled stains; black speckled stains; black speckled stains; black speckled stains; black speckled stains; black speckled stains; black speckled stains; black speckled stains; black speckled stains; black speckled stains; black stains; black speckled stains; black stains; black speckled stains; black stains; black stains; black stains; black speckled stains; black stains; black stains; black stains; black stains; black stains; black stains; black stains; black stains; black speckled stains; black sta	-						to R2), highly fossiliferous	1
black speckling as sfains on 25% of surface, light 123.15, 123.4" - Mechanical break (2), mechanical break (2), mechanical break (2), mechanical break (2), mechanical break (3), mechanical break (4), mechanical break (5), mechanical break (6), mechanical break (7), mechanical break (8), -			2		╂┷	 (microforams, molds/casts), grades 	-	
128.1	l _						in color from light gray (N7) from	
mechanical break to get in to box 128.5 = Tracture, 80 to 70 deg, rough, undulating, tight rough, undulating, tight rough, undulating, tight rough, undulating, tight rough, undulating, tight rough, undulating, tight rough, undulating, tight rough, undulating, tight rough, undulating, tight rough, undulating, tight rough, undulating, tight rough, undulating, tight rough, planar, tight rough, planar, tight rough, undulating, tight rough, planar, ti				١.		\vdash		
126	-		98	1		╁		1
125	-	96%				仜		-
126.0 126.0 126.0 126.0 127.4, 1,24.65 Mechanical break, horizontal, rough, undulating, broken by offiler, tight 124.9' - Fracture, 80 deg, rough, undulating, black specified staining over 60% of surface, tight 124.9' - Fracture or mechanical break, 45 deg, rough, undulating, black stains, tight 125.05' - Mechanical break, 45 deg, rough, undulating, black stains, tight 125.05' - Mechanical break, 45 deg, rough, undulating, black stains, tight 125.05' - Mechanical break, 60 to 75 deg, rough, undulating, light to open 7/8' 126.0' - Fracture or mechanical break of the rough of th	_			1		╀		_
rough, undulating, broken by driller, tight 124.9 - Fracture, 80 deg, rough, undulating, black speckled staining over 60% of surface, light 125.05 - Mechanical break, <5 deg, rough, undulating, black stains, tight 126.15 - 126.45 - Fracture zone, subangular and subrounded limestone fragments 22 3 75.2% - Fracture zone, subangular and subrounded limestone fragments 23 75 - Fracture zone exhanical break, 60 to 70 deg, rough, undulating, light to open 7/8* horizontal, rough, undulating, light to open 7/8* horizontal, rough, undulating, light to open 7/8* horizontal, rough, planar, light 131.0	125					\vdash		
black speckled staining over 60% of surface, tight 126.0 S - Mechanical break, <5 deg, rough, undulating, black stains, tight 126.15-126.45' - Fracture zone, subangular and subrounded limestone fragments 34'-1-18' in size 127.85' - Fracture or mechanical break, 60 to 70 deg, rough, undulating, tight to open 7/8' 128.0' - Fracture or mechanical break or fracture (2), horizontal, rough, undulating, gen up to 9'''s 131.75' - Mechanical break to get in to box, tight 131.0 R15NO 8 n 90% 131.3 131.4' - Mechanical break or fracture (2), horizontal, rough, undulating, open 1/16'' 134.6' - Fracture or mechanical break to get in to box, tight 135.5' - Fracture, 25 deg, rough, undulating, open 1/16'' 134.6' - Fracture or mechanical break, 0 to 5 deg, rough, undulating, tight to open 1/16'' 134.6' - Fracture or mechanical break, 0 to 5 deg, rough, undulating, topen to 16'' 137.3' - Bedding plane, horizontal, rough, undulating, open to 16'' 137.3' - Bedding plane, horizontal, rough, undulating, open to 5'' 137.3' - Bedding plane, horizontal, rough, undulating, open to 5'' 137.3' - Bedding plane, horizontal, rough, undulating, topen to 5'' 137.3' - Bedding plane, horizontal, rough, undulating, topen to 5'' 137.3' - Bedding plane, horizontal, rough, undulating, topen to 5'' 137.3' - Bedding plane, horizontal, rough, undulating, topen to 5'' 137.3' - Bedding plane, horizontal, rough, undulating, topen to 5'' 137.3' - Bedding plane, horizontal, rough, undulating, topen to 5'' 137.3' - Bedding plane, horizontal, rough, undulating, topen to 5'' 137.3' - Bedding plane, horizontal, rough, undulating, topen to 5'' 137.3' - Bedding plane, horizontal, rough, undulating, tight to open 17/16'' 137.4' - Mechanical break or fracture, 50 deg, rough, undulating, tight to open 17/16'' 137.4' - Mechanical break or fracture, 50 deg, rough, undulating, tight to open 17/16'' 137.4' - Mechanical break or fracture, 50 deg, rough, undulating, tight to 0pen 17/16'' 137.4' - Mechanical break or fracture, 50 deg, rough, undulating, tight to 0pen 17/1	-82.1				rough, undulating, broken by driller, tight	ш		R13: 2 minutes
Section Sect	-			0	124.9' - Fracture, 80 deg, rough, undulating,	1		1 1
1	-	126.0		NR		1		-
undulating, black stains, tight 126 15-16.645 - Fracture zone, subangular and subrounded limestone fragments 3/4"-1-18" in size 17.85' - Fracture or mechanical break, 60 to 70 deg, rough, undulating, tight to open 17/8" 128.0' - Fracture or mechanical break, horizontal, rough, planar, tight 131.0 131.	_			<u> </u>		Д		l J
1 1 26.15-126.45- Fracture zone, subangular and subrounded limestone fragments 2/4"-1-1/8" in size 127.85- Fracture or mechanical break, 60 to 70 deg, rough, undulating, tight to open 7/8" 128.0° - Fracture or mechanical break, horizontal, rough, planar, tight 131.0 131.0 131.0 131.0 131.0 131.0 131.0 131.0 3 (131.3, 131.4° - Mechanical break, horizontal, rough, planar, tight 131.5° - Mechanical break or fracture (2), horizontal, rough, undulating, open 15/8" (2). Possible calcite crystals of the standard preak in box, tight 133.5-133.5° - Mechanical break to get in to box, tight 134.5° - Fracture or mechanical break, 5 to 10 deg, rough, planar, tight 10 deg, rough, planar, tight 134.5° - Fracture or mechanical break to get in to box, tight 134.5° - Fracture or mechanical break, borizontal, rough, undulating, tight to open 1/16° or 134.6° - Fracture or mechanical break, horizontal break, horizontal, rough, undulating, undulating, open to 5/8° or 134.6° - Fracture or mechanical break, horizontal break, horizontal, rough, undulating, open to 5/8° or 134.6° - Fracture or mechanical break, horizontal, rough, undulating, open to 5/8° or 134.6° - Fracture or mechanical break, horizontal, rough, undulating, open to 5/8° or 134.6° - Fracture or mechanical break, horizontal, rough, undulating, open to 5/8° or 134.6° - Fracture or mechanical break, horizontal break, horizontal break or facture, 50 deg, rough, planar, tight to open 1/16° or 134.6° - Fracture or mechanical break, horizontal break, horizontal break, horizontal break, horizontal break, horizontal break or facture, 50 deg, rough, undulating, tight to open 1/16° or 134.6° - Fracture or mechanical break or 5 the facture, 50 deg, rough, planar, tight to open 1/16° or 134.6° - Fracture or mechanical break, horizontal, rough, undulating, tight to open 1/16° or 134.6° - Fracture or mechanical break or 5 the facture, 50 deg, rough, undulating, tight to open 1/16° or 134.6° - Fracture or mechanical break or 5 the facture, 50 deg, rough, undulating, tight to o				10		\vdash		
R14-NO 5 ft 52% 22 3 3 73.4*1-1.18" in size 127.85". Fracture or mechanical break, 60 to 70 deg, rough, undulating, tight to open 718" 128.0" - Fracture or mechanical break, 60 to 70 deg, rough, undulating, tight to open 718" 128.0" - Fracture or mechanical break, 61 to 70 deg, rough, undulating, tight to open 718" 131.0	-					1		1
R14-NO 5 ft 22 3 3 127.85" - Fracture or mechanical break, 60 to 70 deg, rough, undulating, dight to open 7/8" 128.0" - Fracture or mechanical break, horizontal, rough, planar, tight 128.5" - Fracture or mechanical break, horizontal, rough, planar, tight 128.5" - Fracture or mechanical break, horizontal, smooth, planar, tight 128.5" - Fracture or mechanical break, horizontal, smooth, planar, tight 128.5" - Fracture or mechanical break, horizontal, smooth, planar, tight 128.5" - Fracture or mechanical break or fracture (2), horizontal, rough, undulating, open 41/8" 131.75" - Mechanical break or facture (2), horizontal, rough, planar, tight 132.3" - Fracture or mechanical break to get in to box, tight 133.5 - Fracture or mechanical break to get in to box, tight 133.5 - Fracture or mechanical break, 0 to 10 deg, rough, planar, mechanical break, 0 to 5 deg, rough, planar, tight to open 11/16" 134.55" - Fracture or mechanical break, 0 to 5 deg, rough, planar, mechanical break, 0 to 5 deg, rough, planar, tight to open 11/16" 136.6" - Fracture or mechanical break, 0 to 5 deg, rough, undulating, open to 5/8" 136.6" - Fracture or mechanical break, horizontal, rough, undulating, open up to 1" 137.3" - Bedding plane, horizontal, rough, undulating, open up to 1" 137.4" - Mechanical break, horizontal, rough, undulating, open up to 1" 137.4" - Mechanical break, horizontal, rough, undulating, open up to 1" 137.4" - Mechanical break, horizontal, rough, undulating, open up to 1" 137.4" - Mechanical break or fracture, 50 deg, rough, undulating, open up to 1" 137.4" - Mechanical break, horizontal, rough, undulating, open up to 1" 137.4" - Mechanical break, horizontal, rough, undulating, open up to 1" 137.4" - Mechanical break, horizontal, rough, undulating, open up to 1" 137.4" - Mechanical break, horizontal, rough, undulating, open up to 1" 137.4" - Mechanical break, horizontal, rough, undulating, open up to 1" 137.4" - Mechanical break, horizontal, rough, undulating, tight up to 100.0" 110.0" 110.0" 110.0" 110.0" 110.0" 110.0"	-			1		╙		1
7 deg, rough, undulating, tight to open 7/8" 128.0" - Fracture or mechanical break, horizontal, rough, planar, tight 131.0	I -					┢┼		-
130				3				
horizontal, rough, planar, tight 128.5 - Fracture or mechanical break, horizontal, rough, undulating, tight 131.0 3			22			Ш	weak (R1), voids/microforams casts	
NR horizontal, smooth, planar, tight microforams), fossil casts of shells and spiral tubes up to 9/16", echinoderms with white (N9) mineral replacement 9/16" x 3/16" in size, similar to 101.0-105.8 and spiral tubes up to 9/16", echinoderms with white (N9) mineral replacement 9/16" x 3/16" in size, similar to 101.0-105.8 and spiral tubes up to 9/16", echinoderms with white (N9) mineral replacement 9/16" x 3/16" in size, similar to 101.0-105.8 and spiral tubes up to 9/16", echinoderms with white (N9) mineral replacement 9/16" x 3/16" in size, similar to 101.0-105.8 and spiral tubes up to 19/16", echinoderms with white (N9) mineral replacement 9/16" x 3/16" in size, similar to 101.0-105.8 and spiral tubes up to 19/16", echinoderms with white (N9) mineral replacement 9/16" x 3/16" in size, similar to 101.0-105.8 and spiral tubes up to 19/16", echinoderms with white (N9) mineral replacement 9/16" x 3/16" in size, similar to 101.0-105.8 and spiral tubes up to 19/16", echinoderms with white (N9) mineral replacement 9/16" x 3/16" in size, similar to 101.0-105.8 and spiral tubes up to 19/16", echinoderms with white (N9) or in size, similar to 101.0-105.8 and spiral tubes up to 19/16", echinoderms with white (N9) or in size, similar to 101.0-105.8 and spiral tubes up to 19/16", echinoderms with white (N9) or in size, similar to 101.0-105.8 and spiral tubes up to 19/16", echinoderms with white (N9) or in size, similar to 101.0-105.8 and spiral tubes up to 101.0-105.8 and spiral tubes up to 19/16", echinoderms with white (N9) to 101.0-10.0 grades from frable/gritty to powder-like at 127.5', highly fossiliferous (casts up to 7/8", molds, microforams), 3-7% 3/4" endosince from frable/gritty to powder-like at 127.5', highly fossiliferous (casts up to 7/8", echinoderms (mineral tyles of 100.0-128.6' - medium repair to 101.0-105.8 and spiral tubes up to 101.0-10.0 grades from frable/gritty to powder-like at 127.5', highly fossiliferous (casts up to 7/8", echinoderms (mineral tyles of 106.0-128.6' - medium repair to 106.0-128.6'	-					╁		1
and spiral tubes up to 9/16", eshibite (Ng) mineral replacement 9/16" x 3/16" in size, similar to 101.0-105.8" 131.0 3	-							-
131.0 131.0 3				NR	horizontal, smooth, planar, tight	╨		
131.0 3	-87.1					\vdash		R14: 3 minutes
131.3, 131.4' - Mechanical break or fracture (2), horizontal, rough, undulating, open <1/8" 131.5' - Mechanical break or fault, horizontal, rough, planar, tight 132.3' - Fracture, 25 deg, rough, undulating, tight 132.3' - Fracture or mechanical break, 0 to 10 deg, rough, planar, mechanical break, 0 to 5 deg, rough, undulating, tight 134.5' - Fracture or mechanical break, 0 to 5 deg, rough, planar, tight to open 1/16" 136.6' - Fracture or mechanical break, 0 to 5 deg, rough, planar, tight to open 1/16" 136.6' - Fracture or mechanical break, 0 to 5 deg, rough, planar, tight to open 1/16" 137.3' - Bedding plane, horizontal, rough, undulating, open to 5/8" 137.4' - Mechanical break or fracture, 50 deg, rough, undulating, tight 138.1, 138.2' - Fractures (2), rough, undulating, tight 138.1, 138.2' - Fractures (2), rough, undulating, fracture intersecting 70" fractures with 6" lengths, tight 138.1, 138.2' - Fractures (2), rough, undulating, tight 138.1, 138.2' - Fractures (2	-	131 0						1
(2), horizontal, rough, undulating, open <1/8" 131.75 - Mechanical break or fault, horizontal, rough, undulating, tight 132.3' - Fracture, 25 deg, rough, undulating, tight 132.3' - Fracture or mechanical break, 0 to 10 deg, rough, planar, mechanical break, 5 to 10 deg, rough, undulating, tight 134.6' - Fracture or mechanical break, 0 to 5 deg, rough, planar, tight to open 1/16" 136.6' - Fracture or mechanical break, 0 to 5 deg, rough, planar, tight to open 1/16" 136.6' - Fracture or mechanical break, 0 to 5 deg, rough, planar, tight to open 1/16" 137.3' - Bedding plane, horizontal, rough, undulating, open to 5/8" 137.4' - Mechanical break, or fracture, 50 deg, rough, undulating, tight 138.1, 138.2' - Fractures (2), rough, undulating, fracture intersecting 70" fractures with 6" lengths, tight 140	-	131.0			•	╂┷		1
Nó Recovery 125.9-126.0' Limestone 131.75' - Mechanical break or fault, horizontal, rough, planar, tight 132.3' - Fracture, 25 deg, rough, undulating, tight 133.5-133.75' - Mechanical break, 0 to 10 deg, rough, planar, mechanical break to get in to box, tight 134.6' - Fracture or mechanical break, 0 to 5 deg, rough, planar, tight to open 1/16" 136.0 R15-NO 136.0 NR R15-NO 2 137.5' - Mechanical break, 0 to 10 deg, rough, undulating, tight to box, tight 133.5-133.75' - Mechanical break to get in to box, tight 134.6' - Fracture or mechanical break, 0 to 5 deg, rough, planar, tight to open 1/16" R16-NO 137.3' - Bedding plane, horizontal, rough, undulating, open up to 1" 138.1' 138.2' - Fracture or mechanical break, norizontal, rough, undulating, open up to 1" 138.1' 138.2' - Fracture or mechanical break or fault, horizontal break or fault, horizontal break to get in to box, tight 138.5-133.75' - Mechanical break, 0 to 5 deg, rough, undulating, tight to open 1/16" R16-NO 2 2 R16-NO 36 NR R15: 3 minutes No Recovery 125.9-126.0' Limestone 126.0-128.6' - medium gray to yellowish gray, (N5 to 5Y 7/2), strong HCI reaction, very weak to weak (R1 to R2), inverse sequence of 106.0-111.0', grades from friable/grifty to power-like at 127.5', highly fossiliferous (casts up to 7/8", molds, microforams), 3-7% 3/4" echinoderms (rimmed cavities with white (N9) to translucent mineralization), bottom-most 1' has 3/8" thick horizontal bioturbated lenses No Recovery 128.6-131.0' R15: 3 minutes No Recovery 128.9-126.0' R15: 3 minutes R15: 3 minutes R16: 6 minutes	I -			3	131.3, 131.4' - Mechanical break or fracture	\perp		-
R15-NQ 5 ft 90% 80 0 133.5-133.75' - Mechanical break, 0 to 10 deg, rough, planar, mechanical break to get in to box, tight 134.55' - Fracture or mechanical break, 5 to 10 deg, rough, undulating, tight to open 1/16" 136.0 NR 136.0 NR 136.0 NR 140 - 97.1 NR 140 - 97.1 NR 140 - 97.1 NR 15 molecular in the lamber of teath, horizontal, rough, planar, tight 132.3' - Fracture or mechanical break, 0 to 10 deg, rough, undulating, tight to open 1/16" 136.0 NR 140 - 97.1 NR 140 - 97.1 NR 15 molecular in the lamber of teath, horizontal, rough, undulating, tight 132.3' - Fracture or mechanical break, 0 to 5 deg, rough, planar, tight to open 1/16" 136.0 NR 15 molecular in the lamber of teath, one of the lamber of teath, one of the lamber of teath, one of the lamber of teath, one of the lamber of teath, one of the lamber of teath, one of the lamber of teath, one of the lamber of teath, one of the lamber of teath, one of the lamber of teath, one of the lamber of teath, one of the lamber of teath, one of the lamber of teath, one of the lamber of teath, one of the lamber of teath, one of the lamber of teath, one of the lamber of lamber of the lamber of the lamber of the lamber of lamber of the lamber of the lamber of	I _							
R15-NO 5 ft 90% 80 0 90% 80 0 133.5-133.75' - Mechanical break, 0 to 10 deg, rough, planar, mechanical break to get in to box, tight 134.55' - Fracture or mechanical break, 0 to 5 to 10 deg, rough, planar, midulating, tight to open 1/16" 136.0 NR 140						\vdash		00.5 !! + - + 400.0
tight 133.5-133.75' - Mechanical break, 0 to 10 deg, rough, planar, mechanical break, 5 to 10 deg, rough, undulating, tight to open 1/16" 136.0 R16-NQ 5 ft 50% R16-NQ 5 ft 50% R16-NQ 5 ft 50% R16-NQ 6 ft 50% R16-NQ 7-7.1 R16-NQ 8 ft 50% R15-133.75' - Mechanical break, 0 to 10 deg, rough, planar, mechanical break, 5 to 10 deg, rough, undulating, tight to open 1/16" R16-NQ 5 ft 50% R16-NQ 6 ft 50% R16-NQ 7-7.1 R16-NQ 8 ft 50% R15-133.75' - Mechanical break, 0 to 5 deg, rough, undulating, tight to open 1/16" R16-NQ 8 ft 50% R15-NQ 9-7.1 R16-NQ 8 ft 137.4' - Mechanical break of fracture, 50 deg, rough, undulating, tight 138.1, 138.2' - Fracture of mechanical break, horizontal, rough, undulating, tight 138.1, 138.2' - Fracture of mechanical break, horizontal, rough, undulating, open up to 1" 137.4' - Mechanical break of fracture, 50 deg, rough, undulating, fracture intersecting 70° fractures with 6" lengths, tight R16- 6 minutes R16- 6 minutes	_			1			126.0-128.6' - medium gray to	
135 -92.1 136.0 137.5-133.75' - Mechanical break, 0 to 10 deg, rough, planar, mechanical break to get in to box, tight 134.55' - Fracture or mechanical break, 0 to 5 136.0 NR 136.0 NR 136.0 NR 136.0 NR 137.3' - Bedding plane, horizontal, rough, undulating, open up to 1" 137.3' - Bedding plane, horizontal, rough, undulating, open to 5/8" 137.4' - Mechanical break or fracture, 50 deg, rough, undulating, tight 138.1, 138.2' - Fractures (2), rough, undulating, fracture intersecting 70° fractures with 6" lengths, tight NR 140 -97.1 NR 133.5-133.75' - Mechanical break, 0 to 10 deg, rough, planar, mechanical break, 0 to 5 deg, rough, undulating, open to 5/8" 136.0 - Fracture or mechanical break, 0 to 5 deg, rough, undulating, open up to 1" 137.3' - Bedding plane, horizontal, rough, undulating, open to 5/8" 137.4' - Mechanical break or fracture, 50 deg, rough, undulating, fight 138.1, 138.2' - Fractures (2), rough, undulating, fracture intersecting 70° fractures with 6" lengths, tight R16: 6 minutes	-	D15 NO				1-		1
135.5-133.75 - Mechanical break, 0 to 10 deg, rough, planar, mechanical break, 5 to 10 deg, rough, undulating, tight to open 1/16" 136.0 136.0 137.3 - Fracture or mechanical break, 5 to 10 deg, rough, undulating, tight to open 1/16" 138.0 NR 138.0 139.0	-			0		╀]]
in to box, tight 134.55' - Fracture or mechanical break, 5 to 10 deg, rough, undulating, tight to open 1/16" NR 136.0 NR 1 1 136.0 NR 1 1 136.6' - Fracture or mechanical break, 5 to 136.6' - Fracture or mechanical break, 6 to 5 deg, rough, planar, tight to open 1/16" 137.3' - Bedding plane, horizontal, rough, undulating, open up to 1" 137.3' - Bedding plane, horizontal, rough, undulating, open to 5/8" 137.4' - Mechanical break or fracture, 50 deg, rough, undulating, tight 138.1, 138.2' - Fractures (2), rough, undulating, fracture intersecting 70° fractures with 6" lengths, tight R16: 6 minutes						Д]
135 -92.1 136.0]
136.0 10 deg, rough, undulating, tight to open 1/16" 136.0 NR 10 deg, rough, undulating, tight to open 1/16" 134.6' - Fracture or mechanical break, 0 to 5 deg, rough, planar, tight to open 1/16" 11 deg, rough, undulating, tight to open 1/16" 136.6' - Fracture or mechanical break, horizontal, rough, undulating, open up to 1" 137.3' - Bedding plane, horizontal, rough, undulating, open to 5/8" 137.4' - Mechanical break or fracture, 50 deg, rough, undulating, tight 138.1, 138.2' - Fractures (2), rough, undulating, fracture intersecting 70° fractures with 6" lengths, tight 140 -97.1 R16: 6 minutes	105			2	, · · · · · · · · · · · · · · · · · · ·			1
134.6' - Fracture or mechanical break, 0 to 5 deg, rough, planar, tight to open 1/16" 136.0 NR 1 1 136.6' - Fracture or mechanical break, horizontal, rough, undulating, open up to 1" 137.3' - Bedding plane, horizontal, rough, undulating, open to 5/8" 137.4' - Mechanical break or fracture, 50 deg, rough, undulating, ight 138.1, 138.2' - Fractures (2), rough, undulating, fracture intersecting 70° fractures with 6" lengths, tight NR 140 -97.1 NR 134.6' - Fracture or mechanical break, 0 to 5 deg, rough, undulating, open up to 1" 136.6' - Fracture or mechanical break, 0 to 5 deg, rough, undulating, open up to 1" 137.3' - Bedding plane, horizontal, rough, undulating, ight 138.1, 138.2' - Fractures (2), rough, undulating, fracture intersecting 70° fractures with 6" lengths, tight R16: 6 minutes					10 deg, rough, undulating, tight to open 1/16"	\Box	— molds, microforams), 3-7% 3/4"	R15: 3 minutes
136.0 NR 136.0 NR 136.6' - Fracture or mechanical break, horizontal, rough, undulating, open up to 1" 137.3' - Bedding plane, horizontal, rough, undulating, open to 5/8" 137.4' - Mechanical break or fracture, 50 deg, rough, undulating, tight 138.1, 138.2' - Fractures (2), rough, undulating, fracture intersecting 70° fractures with 6" lengths, tight NR NR R16: 6 minutes				<u> </u>	134.6' - Fracture or mechanical break, 0 to 5	\bot		1710. O Hilliutes
1 136.6' - Fracture or mechanical break, horizontal, rough, undulating, open up to 1" 137.3' - Bedding plane, horizontal, rough, undulating, open to 5/8" 137.4' - Mechanical break or fracture, 50 deg, rough, undulating, tight 138.1, 138.2' - Fractures (2), rough, undulating, fracture intersecting 70° fractures with 6" lengths, tight 140 -97.1 R16: 6 minutes		136.0		NR	deg, rough, planar, tight to open 1/16"			
1 136.6' - Fracture or mechanical break, horizontal, rough, undulating, open up to 1" 137.3' - Bedding plane, horizontal, rough, undulating, open to 5/8" 137.4' - Mechanical break or fracture, 50 deg, rough, undulating, tight 138.1, 138.2' - Fractures (2), rough, undulating, fracture intersecting 70° fractures with 6" lengths, tight 140 -97.1 R16: 6 minutes]					\vdash]
horizontal, rough, undulating, open up to 1" 137.3' - Bedding plane, horizontal, rough, undulating, open to 5/8" 137.4' - Mechanical break or fracture, 50 deg, rough, undulating, tight 138.1, 138.2' - Fractures (2), rough, undulating, fracture intersecting 70° fractures with 6" lengths, tight NR R16: 6 minutes	-			1	136 6' Fracture or mechanical brook		lenses	1
R16-NQ 5 ft 50%	-			\vdash			 No Recovery 128.6-131.0' 	-
undulating, open to 5/8" R16-NQ 5 ft 36	_			2	, , , , , , , , , , , , , , , , , , , ,	┵	_]
R16-NQ 2 5 ft 50% 36 50% 140 -97.1 NR 138.1, 138.2' - Fractures (2), rough, undulating, fracture intersecting 70° fractures with 6" lengths, tight 138.1, 138.2' - Fractures (2), rough, undulating, fracture intersecting 70° fractures with 6" lengths, tight R16: 6 minutes				-	undulating, open to 5/8"			
rough, undulating, tight 138.1, 138.2' - Fractures (2), rough, undulating, fractures with 6" lengths, tight NR NR R16: 6 minutes	-	R16-NQ		2	137.4' - Mechanical break or fracture, 50 deg,			1
undulating, fracture intersecting 70° fractures with 6" lengths, tight NR NR NR R16: 6 minutes	-	5 ft	36	F-	rough, undulating, tight	╂┷	F	-
140 -97.1 -1 NR with 6" lengths, tight -1 R16: 6 minutes	-	50%			138.1, 138.2' - Fractures (2), rough,		-	-
140 -97.1 - R16: 6 minutes					with 6" lengths tight	\prod		
-97.1 R16: 6 minutes	140			NR	man o nongano, agric	\vdash		1
					_	仜		R16: 6 minutes
	-					_	_	-
	L	141.0				\vdash		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-09	SHEET	9	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724303.2 N, 458022.2 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

				IENT . CIVIE 33 3/N 3 10023, ITIUU TOLATY, NQ LOOIS, FIVY C				ORIENTATION: Vertical
WATER	LEVELS: 4.0) ft bg:	s on 5/		3/200	07	LOGGER: R. Bitely, K. Coke, A.	
⊋Q⊋	(%			DISCONTINUITIES	Ŋ	\vdash	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
ATICE ATIC	E R.C.	(%) Q	150 150	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	3 S		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
무유 무유	ORE	Ø	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	¥₩		AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ОΩШ	074	œ	╙╙	THICKNESS, SON ACE STAINING, AND HOTTINESS	S	_		
_			2				L imestone 131.0-135.5' - yellowish gray, (5Y	_
1 _			_	141.55' - Fracture or mechanical break,	Д	- 8	8/1), medium to coarse grained,	_
				horizontal, rough, undulating, 1/2" open 141.85' - Bedding plane or mechanical break,			strong HCl reaction, very weak to	
-			1	85 deg, smooth, undulating, open 1/16"	⊣		weak (R1 to R2), voids (<1/16") over 10-15% of surface,	<u> </u>
-	R17-NQ			142.25, 143.1, 143.45, 143.8' - Fractures (4), 20 to 60 deg, rough, undulating, tight	Ħ	1 0	chalk-like/powdery feel to sample,	-
-	5 ft 86%	60	3	20 to 60 deg, rough, undulating, tight	╨		5-10% coverage of 3/4"x3/16" cavities rimmed with white (N9)	-
-	0070			444.01.5	匚		mineralization, 134.75' contact	-
-			5	144.2' - Fracture or mechanical break, 10 deg, rough, undulating, tight	世		(sharp) very fine grained whitish imestone below, medium gray (N6)	Driller's Remark: Probable
145_ -102.1			0	144.55, 144.65, 144.8, 144.95' - Mechanical —	╁		discoloration as horizontal bands at	jostling of rock fragments —
-			NR	break or fractures (4), 0 to 10 deg, smooth, undulating, open <1/16"	F		132.0', moderately to highly	during coring _ R17: 16 minutes
-	146.0			undulating, open < 1/10	Н		fossiliferous (casts, molds) No Recovery 135.5-136.0'	K17. To fillifutes
-			1		Н	ֈ ւ	Limestone	-
-				146.8' - Fracture, 50 deg, rough, undulating,	口	1 1	136.0-138.5' - very light gray to medium light gray, (N8 to N6), strong	_
-			1	tight	┢		HCl reaction, weak to medium strong	_
l _				147.1' - Bedding plane or mechanical break, horizontal, rough, planar, tight	F		(R2 to R3) 136.0-137.25' - cavities up to 1-3/4"	_
1 _	R18-NQ 5 ft	78	1	147.6' - Mechanical break, horizontal, rough,	片		nfilled partially and entirely with very	_
	84%	70	'	undulating, tight 148.25' - Mechanical break, horizontal,	Н	- f	fine grained yellowish gray (5Y 8/1)	
				rough, undulating, tight	Ш		material, cavities have tubular casts 1/8" diameter, trace elongate shaped	_
150			2	148.5' - Fracture or mechanical break, rough, undulating, 15% black speckled staining, tight —	Т		cavities 3/4"x3/16" rimmed with white	_
-107.1			0	149.35-149.6' - Mechanical break or bedding	H		(N9) mineralization (possibly echinoderms with calcite	R18: 8 minutes
-	151.0		NR	plane, 5 to 10 deg, rough, undulating, open	Ħ		replacement)	-
-	131.0			<1/16"	1	† 1	137.25-138.5' - yellowish gray (5Y	
-					1		8/1), very fine grained, moderate to strong HCl reaction, medium strong	-
-					1	H ((R3), bioturbated areas with voids	-
-					-		<1/16" over 30-40% of infill, poorly to moderately fossiliferous (casts,	-
-					-	- r	molds)	-
-					-		No Recovery 138.5-141.0' Limestone	-
-					-		141.0-145.3' - yellowish gray, (5Y	-
-					1		8/1), medium grained, strong HCl	_
_				_			reaction, weak to very weak (R2 to R1), possible wavy-load structures,	_
_							grades from medium grained to fine	_
							grained to medium grained with depth	
1							141.7' - with 3-5% medium to coarse	
1 -					1		grained medium gray (N5) grains, norizontally to subhorizontally	_
1 -					1		aligned, poorly fossiliferous (shells,	_
-					1	r	molds, echinoderms)	-
-					1		No Recovery 145.3-146.0'	-
-					1			-
-					1	$ \cdot $		-
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-09	SHEET	10	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724303.2 N, 458022.2 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

				TENT . CIVIE 33 3/N 3 10023, ITIUU TOLATY, NQ LOOIS, HW C	aonig		ORIENTATION : Vertical
WATER	LEVELS: 4.0	ft bgs	s on 5/	/3/07 START : 5/1/2007 END : 5/3	3/200	7 LOGGER: R. Bitely, K. Coke, A.	Erickson, W. Elliott
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOOK TVDE OOLOD	
ON PER	Ã,Ą.Ϋ́	<u></u>	₩.	DEGORII HOIV	<u></u>	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
AACH	E E	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ	WEATHERING. HARDNESS.	FLUID LOSS, CORING RATE AND
[판주짓	S S S S S S S S S S S S S S S S S S S	Ø	R F	PLANARITY, INFILLING MATERIAL AND	Æ	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
E S E	822	œ	[문문]	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	Brot o, reot recognition
						Limestone	
-				-	1	- 146.0-150.2' - yellowish gray, (5Y	-
1 4				_	1	7/2), strong HCl reaction, weak (R2)	l -
						to medium strong (R3) rock, voids	
1 1					1	- (<1/16") over 10-15% of surface, poorly fossiliferous (casts, molds,	-
-				-	1	some echinoderms), medium grained	-
1 -				-		intervals have barely visible distinct	-
						grain colors, yellowish gray (5Y 7/2)	
					1	and light gray (N6), fine grained	_
1 -				-	1	intervals are yellowish gray (5Y 8/1)	-
1 -				_	-	in color and have voids (<1/16") over 20% of surface, trace infilled cavities	l –
				_		up to 1/4" diameter	_
1 7						149.6-150.2' - horizontal bedding	l -
1 1				-	1	No Recovery 150.2-151.0'	l -
1 -				-	1	- Bottom of Boring at 151.0 ft bgs on	-
				_	1	5/3/2007	l -
1 7				-	1	=	-
1 -				-	1	-	-
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1 7				_	1	_	_
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PROJECT NUMBER:

338884.FL

B-10

SHEET 1 OF 9

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723789.1 N, 457699.9 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

					20 S/N 252, mud rotary, catheau, NWJ rous, 5-7/6 tir-corie bit ORIENTATION : Vertical	
WATER	LEVELS	: 2.0 ft bo	JS 011 4///		START: 4/6/2007 END: 4/9/2007 LOGGER: C. Sump SOIL DESCRIPTION COMMENTS	\neg
≥ 9 £	CVMDIL	INTERVA	I (#\	STANDARD PENETRATION	O CONVINIENTS	\dashv
DEPTH BELOW SURFACE AND ELEVATION (#)	SAIVIPLE		. ,	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	
FAC		RECOVE			MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
DEP SUR ELE			#TYPE	6"-6"-6" (N)	CONSISTENCE, SOIL STRUCTURE, WINNERALOGY	
42.0	0.0			` , ,	Topsoil Cathead Operator: F. Cani	\neg
-		0.8	SS-1	2-3-5	\ \ 0.0-0.25' - brownish black to light brown, (5YR 2/1 to 5YR 5/6), moist, root matter, wood fragments, and \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	- 1
-	1.5			(8)	\organics, with fine silica sand \\ \ \rightarrow \qquad \qquad \qquad \qquad	- 1
-	1.0				Poorly Graded Sand With Silt (SP) 0.25-0.8' - brownish gray, (5YR 4/1), moist, loose,	- 1
-					very fine grained, silica sand, 5% nonplastic fines,	- 1
-					trace organics	- 1
-					1 1	- 1
-					1 1	- 1
-						- 1
5	5.0					- 1
37.0	5.0				Sandy Lean Clay (CL)	ᅥ
-		1.2	SS-2	4-4-3	5.0-6.2' - light gray, (N7), moist, medium stiff, medium plasticity, slow dilatancy, no HCl reaction, 30% very	- 1
-	6.5			(7)	fine silica sand	- 1
-	0.0				1 1	- 1
-					1 1	- 1
-					1 1	- 1
-					1 1	- 1
-					1 1	- 1
-					1 1	- 1
10	10.0				1 1	- 1
32.0	10.0				Clayey Sand (SC)	\neg
-		1.2	SS-3	4-22-22	10.0-10.5' - transitions from black to yellowish gray, (N1 to 5Y 8/1), moist to wet, soft, high plasticity, no to	- 1
-	11.5			(44)	\slow dilatancy, strong HCI reaction. <5% fine to	- 1
-					\medium grained carbonate sand -	- 1
-					10.5-11.2' - gravish grange. (10YR 7/4), dry to moist.	- 1
-					hard, nonplastic, rapid dilatancy, moderate to strong HCI reaction, 10% medium sand-sized, trace fine	- 1
-					gravel-sized limestone fragments, all carbonate	- 1
-					material -	1
					1	1
15	15.0				1	1
27.0					Silt (ML)	
1 7		1.0	SS-4	5-15-19 (34)	15.0-16.0' - Same as 10.5-11.2' except coarse gravel-sized limestone fragments (1") at top of	1
1 7	16.5			(07)	\times interval, no sand-sized material Driller's Remark: Light chatter, variable at	1
1 7					15-20', drill rate slowing	1
1 1					11	- 1
1 1					11	- 1
					11	1
1 1					11	1
1 7					11	1
20						1



PROJECT NUMBER:

338884.FL

B-10

SHEET 2 OF 9

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723789.1 N, 457699.9 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

DRILLIN	G METH	OD AND	<u>EQUIPM</u>	ENT : Dietrich D-5	50 S/N 232, mud rotary, cathead, NWJ rods, 3-7/8" tri-cone bit		ORIENTATION : Vertical
				/07	TART : 4/6/2007 END : 4/9/2007 LOGGEF	R : C.	Sump
				STANDARD	SOIL DESCRIPTION	U	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		SYMBOLIC LOG	
		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	1	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTH EVA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	MB	INSTRUMENTATION
SU				(N)			
22.0	2 0:8	0.3	SS-5	50\5.5 (50\5.5")	Silt (ML) 20.0-20.3' - Same as 15.0-16.0' except <5% fine	Ш	
l _				(3013.3)	sand-sized material		
						1	Driller's Remark: Slow advancement rate at
-					_	1	22-30', intermittent to constant heavy chatter, strong H2S odor from mud at 22-24'
-					_	1]
-					_	1	
-					_	1	
25	25.0				-	1	
17.0					Sandy Silt With Limestone Fragments (ML)	Ш	Driller's Remark: 100% loss of circulation at
-		1.0	SS-6	23-30-30 (60)	25.0-26.0' - grayish orange, (10YR 7/4), moist to wet, hard, nonplastic, rapid dilatancy, moderate to strong	1	24'
-	26.5			(00)	HCI reaction, 25-30% fine to coarse sand-sized, weak	1'''	1
-					(R2) limestone lenses (<1/2" thick) throughout, all carbonate material	1	Driller's Remark: Partial to full circulation
-						1	return with use of thicker mud
-					-	1	
-					-	1	-
-					-	1	-
-					-	1	-
- 20	20.0				-	1	-
30 <u> </u>	30.0				Sandy Silt (ML)	Ш	Driller's Remark: Moderate drilling rate at 30-
-		1.2	SS-7	11-24-30	30.0-31.2' - grayish orange, (10YR 7/4), moist to wet, hard, nonplastic, rapid dilatancy, moderate HCl	1	45', intermittent light to moderate chatter -
-	31.5			(54)	reaction, 30% very fine to fine sand-sized material,	Ш	-
-	31.3				very weak (R1) limestone lens (1/2" thick) at 30.0', trace organics, all carbonate material	1	-
-					Li ace organics, all carbonate material	ł	-
-					-	1	-
-					-	ł	-
-					-	1	-
-					-	1	-
	05.0				-	1	-
35 7.0	35.0				Silty Sand (SM)	111	-
-		1.5	SS-8	9-12-5	35.0-36.5' - moderate vellowish brown, (10YR 5/4),	$\ \ $	·
-		1.5	33-6	(17)	moist to wet, very stiff, fine to medium grained, moderate HCl reaction, 40% nonplastic fines,	-	-
-	36.5				interbedded (>5) extremely weak (R0) limestone		-
-					\lenses (<1" thick), all carbonate material	1	-
-					-	1	-
-					-	-	-
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-10	SHEET	3	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723789.1 N, 457699.9 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

DRILLIN	G METH	OD AND	<u>EQUIPM</u>	ENT : Dietrich D-5	50 S/N 232, mud rotary, cathead, NWJ rods, 3-7/8" tri-cone	bit		ORIENTATION : Vertical
WATER	LEVELS	: 2.0 ft b	gs on 4/7/	/07	START : 4/6/2007 END : 4/9/2007 LO	OGGEF	R : C.	Sump
				STANDARD	SOIL DESCRIPTION		(2)	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION			SYMBOLIC LOG	
OH A		RECOVE	- '	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,		PI C	DEPTH OF CASING, DRILLING RATE,
FAC		RECOVE	<u> </u>		MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOG		Bo	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
P.S.E.			#TYPE	6"-6"-6" (N)	CONSISTENCE, SOIL STRUCTURE, WIINERALOG	ī	S≺	INSTRUMENTATION
2.0	40.6	0.1	SS-9	50/4		Г	-	Driller's Remark: Light to heavy chatter at
-				(50/4")	\ 40.0-40.1' - moderate vellowish brown, (10YR 5/4).	, /-	ł	40-45', very dense, slow drilling rate
-					mild to moderate HCl reaction, medium to coarse sand-sized and fine gravel-sized fragments	-	1	-
-					Sand-Sized and line graver-sized fragments			_
l -						_		_
l _						_		
							1	
-						_	1	
-						-	1	1
-						-	1	18:30 on 4/6/07 End drilling for the day at
						-	1	49', water at ground surface
45 -3.0	45.0				Sandy Silt With Limestone Fragments (ML)		П	08:00 on 4/7/07 Resume drilling from 49'
-		١	00.45	17-29-31	45.0-46.4' - moderate yellowish brown, (10YR 5/4)		$\ \ $	Water level at 2' below ground surface –
-		1.4	SS-10	(60)	moist to wet, hard, nonplastic, rapid dilatancy, mild moderate HCl reaction, 35-40% fine to coarse	to	$\ \ $	_
l -	46.5				moderate HCI reaction, 35-40% fine to coarse	Γ-	ш	Driller's Remark: Moderately slow drilling rate at 45-60', intermittent light chatter –
l _					\(<1/2" thick) interbedded throughout sample, all	/_		_
					carbonate material			
-						_	1]
-						-	1	1
-						-	1	-
-						-	ł	-
-						-	1	-
50 -8.0	50.0				Sandy Silt With Limestone Fragments (ML)		Ш	-
-0.0				37-29-15	50.0-51.3' - Same as 45.0-46.4'	-	Ш	_
-		1.3	SS-11	(44)		_	Ш	_
-	51.5						ш	_
l _						_		
-						_	1	1
-						-	1	1
-						-	1	-
-						-	1	-
						-	1	-
55 <u> </u>	55.0	0.4	SS-12	50/5	Limestone Fragments		Н	-
10.0	55.4	0.4	33-12	(50/5")		, Γ-	F	-
-					mild HCl reaction, extremely weak (R0) limestone	-		_
-					lenses (<1/2" thick) interbedded with silt-sized material, all carbonate material		1	_
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PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	B-10	SHEET	4	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723789.1 N, 457699.9 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

						tary, cathead, NVVJ 1005, 3-77			ORIENTATION : Vertical
WATER	LEVELS	. ∠.∪ π b	ys on 4///		START : 4/6/2007	END: 4/9/2007 SOIL DESCRIPTION	LOGGEF	(: U.	Sump COMMENTS
ŞQ⊋	04**=		11 (6)	STANDARD PENETRATION		JOIL DEJORIF HON		8	COIVIIVILINTS
N (SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAM	ME, USCS GROUP SYMBOL,	COLOR	IC L	DEPTH OF CASING, DRILLING RATE,
H BI ACE		RECOVE	ERY (ft)		MOISTURI	E CONTENT, RELATIVE DEI	NSITY OR	Տ	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	CONSISTEN	NCY, SOIL STRUCTURE, MIN	NERALOGY	SYMBOLIC LOG	INSTRUMENTATION
<u>-18.0</u>	60.0		00.40	(N) 22-50/0.75	Sandy Silt (Mi	1)		1111	11:00 on 4/7/07 Set HW casing to 60.5' to
-	60.0 60.6	0.6	SS-13	(77/6.75")	60.0-60.6' - mo	oderate vellowish brown, (1	0YR 5/4),	Ш	begin NQ rock coring -
-					moist, hard, no	onplastic, rapid dilatancy, n medium to coarse sand-si	noderate HCI	-	
_					fine to coarse	gravel-sized material, all ca	arbonate -		
-					material, trace	e organic laminations		1	_
_					Begin Rock Co	oring at 61.0 ft bgs sheet for the rock core log	_	1	_
_					OCC THE HEAT S	street for the rock core log	_		
]
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65							-	1	1
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-10

SHEET 5 OF 9

ROCK CORE LOG

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723789.1 N, 457699.9 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

00111110	J WE ITTOD 7	TO L	3011 IV	ILIVI : Dietricii D-50 5/N 252, mad rotary, NQ tools, mv	odoni	9	ONLINIATION: Vertical
WATER	LEVELS : 2.0	ft bg	s on 4		9/200	· ·	,
>00	. ;;			DISCONTINUITIES	ا ي	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THE CONTROL OF STANDARD AND TOUR PROJECT OF STANDARD AND TOUR PROJECT OF STANDARD AND ADDRESS OF STANDARD AND ADDR	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	2,3,2	22		THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	
-	61.0 R1-NQ 61.5 0.5 ft 60%	0	2 NR 2	61.35, 61.4' - Fractures or mechanical break (2), <10 deg, smooth, undulating, tight 61.7, 62.15' - Fractures or mechanical break (2), <10 deg, smooth, undulating, open 1/4"		Limestone 61.0-61.3' - dark yellowish brown, (10YR 4/2), fine grained, strong HCI reaction, weak (R2), 15% laminated organics decreasing with depth, trace voids (<3/16") over surface, poorly	Begin rock coring at 61.0' R1: 1 minute SC-1 collected from 62.2- 63.25'
-	R2-NQ			63.25' - Mechanical break	H	fossiliferous No Recovery 61.3-61.5'	-
-	5 ft 100%	68	3	63.75' - Fracture, 30 deg, rough, undulating, open 1/4" 64.0' - Mechanical break	Ħ	62.5-64.3' - Same as 61.0-62.5' except extremely weak to very weak (R0 to R1), 10% laminated organics,	-
65_ -23.0			3	64.3' - Fracture, 20 deg, rough, undulating, open 1/4" 64.45' - Fracture, vertical, rough, undulating,	Ħ	poorly fossiliferous, trace voids (3/16"), few cavities (<1/2") 64.3-66.3' - Same as 61.0-62.5'	
-	66.5		4	tight 64.55, 64.85, 65.4' - Bedding plane (3), horizontal, smooth, planar, tight		- Silt And Limestone Fragments (ML) ┌	R2: 10 minutes Driller's Remark: 50%
-			1	65.25' - Fracture or mechanical break, 80 deg, rough, undulating, tight 65.6-66.3' - Fracture zone or mechanical	H	66.3-66.5' - dark yellowish brown, (10YR 4/2), moderate to strong HCl - reaction, with extremely weak (R0)	water loss at 66.5'
-			1	break, 80 deg and 85 deg, rough, undulating, some horizontal fractures, tight	Ħ	limestone and trace organics Limestone 66.5-66.7' - moderate yellowish	-
-	R3-NQ 5 ft 78%	66	1	66.3' - Bedding plane, horizontal, rough, undulating, soil contact, open <1/2" 66.7' - Bedding plane, horizontal, rough, undulating, open 1/2"		brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), very fine to fine grained, extremely weak (R0),	-
70_ -28.0			4	67.6' - Fracture or mechanical break, horizontal, rough, undulating, open 1/4"	Ħ	with silt, trace cavities (<1/2"), poorly fossiliferous 66.7-68.85' - Same as 66.5-66.7'	_
-	71.5		NR	68.85' - Fracture or mechanical break, horizontal, rough, undulating, open 1/4" 69.5' - Fracture or mechanical break, vertical,		except medium strong (R3), voids (<1/16") over 60-80% of surface, moderately fossiliferous with fossil	R3: 3 minutes
-			7	rough, undulating, open 1/4" 70.25-70.40' - Fracture zone, rough, undulating, open 1/2"		casts (<1/2") and many cavities (<1/2")	_
-			0	71.50-71.95', 71.95-72.40' - Fracture zone, vertical, rough, undulating, vertical fractures intersect bedding plane fractures or		- 68.85-70.4' - Same as 66.5-66.7' except moderate HCI reaction, extremely weak to very weak (R0 to	-
-	R4-NQ 5 ft 97%	70	2	mechanical breaks, open <1/2" 73.7, 73.75, 75.1' - Fractures or mechanical break, rough, undulating, tight to open 1/4"		R1), voids (<1/16") over 30-50% of surface, trace cavities (1/2"), poorly fossilierous	-
75_ -33.0	0170		1	74.0, 74.5, 75.9' - Mechanical break —		No Recovery 70.4-71.5' Limestone 71.5-72.45' - moderate yellowish	SC-2 collected from 75.1-
-			0		Ħ	brown, (10YR 5/4), very fine to fine grained, moderate to strong HCl reaction, weak to medium strong (R2	76.35' R4: 15 minutes
-	76.5		NR 1	76.65, 79.1, 79.15, 79.3, 79.55' - Bedding plane or mechanical break (5), <10 deg,		to R3), voids (<3/16") over 30-40% of surface, few cavities (<1/2"), moderately fossiliferous	-
-			0	rough, undulating, open <1/4" 77.3, 77.75, 78.7'		72.45-73.75' - Same as 71.5-72.45' except extremely weak to very weak (R0 to R1), voids (<3/16") over 30-50% of surface, few cavities	-
-	R5-NQ 5 ft 68%	54	3		Ħ	(<3/4") - 73.75-75.1' - Same as 71.5-72.45' except medium strong (R3), mottled	
80	3070		1	· -	Ħ	with very light gray (N8), voids — (<3/16") over 30-60% of surface,	
-38.0			NR			_ trace organics, many cavities <1/8"	R5: 21 minutes



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-10	SHEET	6	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723789.1 N, 457699.9 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

WATER	LEVELS : 2.0) ft bg:	s on 4/	/7/07 START : 4/6/2007 END : 4/9	9/200	7 LOGGER : C. Sump	
				DISCONTINUITIES	П	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
불병	RUF. VER	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	1 5	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EV#	ORE SOCI	αD	RAC ER F	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	298	ď	뜐핆	THICKNESS, SURFACE STAINING, AND TIGHTNESS	ŝ	CHARACTERISTICS	, , ,
	81.5				Н	75.1-76.35' - Same as 73.75-75.1' - except very light gray, (N8), medium	16:30 on 4/7/07 End drilling for the day at 81.5', water
			_	81.5-82.0' - Fracture zone, rough, undulating,	Ш	strong to strong (R3 to R4), voids	level at ground surface
-			5	angular gravel-sized (<1-1/2") fragments	ҥ	(<1/16") over 20% of surface,	07:30 on 04/09/07 Resume
-				-	F	 elongate cavities (<2"x1") with secondary, dark yellowish brown 	drilling, water level at 1.0' - below ground surface
-			0	82.95, 84.0' - Mechanical break (2)		(10YR 4/2) infill	Solow ground carrace
-	R6-NQ			-	╙	No Recovery 76.35-76.5' Limestone	1
-	5 ft	62	1	-	仜	76.5-79.9' - very light gray	1
-	74%			84.4' - Bedding plane or mechanical break,	╁	 transitioning to dark yellowish brown 	1 -
85 <u>-</u>			0	rough, undulating, open 1/2"		with depth, (N8 to 10YR 5/4), very fine to fine grained, moderate to	Drillaria Barrariti Cara
-43.0				_		 strong HCl reaction, medium strong 	Driller's Remark: Core barrel locked in formation -
l _			NR	_	\vdash	to strong (R3 to R4), voids (<3/16")	at 85', advance NW casing
l _	86.5			_	ш	over 10-50% of surface increasing with depth, few cavities (<1/2") with	from 0.0-80' R6: 20 minutes
			0		Н	trace secondary infill, trace organic	SC-3 collected from 86.5-
			"	07.2.00.01 Machanical break (2)	H	laminae, extremely weak rock (R0) lens (1/2" thick) at 76.65'	87.3'
-				87.3, 89.0' - Mechanical break (2)	H	No Recovery 79.9-81.5'	1
-			>10	88.05-88.4', 89.4-89.5' - Fracture zone,	H	Limestone	1
-	R7-NQ			rough, undulating, angular gravel-sized (<2")		 81.5-85.2' - moderate yellowish brown to dark yellowish brown, 	1
-	5 ft	46	>10	fragments 88.6' - Fracture or mechanical break, rough,	╁	(10YR 5/4 to 10YR 6/1), very fine to	1 -
l	68%		1	undulating, open <1")		fine grained, mild HCl reaction, weak to medium strong (R2 to R3), voids	1
90 <u> </u>				89.6' - Fracture or mechanical break, rough,	╀	(<3/16") over 50% of surface with	_
-40.0				undulating, tight -	ш	20% very fine infill, elongate cavities	D7: 40 minutes -
-			NR	-	口	(<2"x1") over 40% of surface, 80% of cavities with pale yellowish brown	R7: 19 minutes
l -	91.5			_	┢	(10YR 6/1) weak to medium strong	
l _				_		(R1 to R3) secondary infill, poorly fossiliferous	Driller's Remark: Core loss (91.5-92.8') due to core
l _			NR			No Recovery 85.2-86.5'	barrel blockage
				02.0.02.41. Expetime many values undulating		Limestone	
-			>10	92.8-93.1' - Fracture zone, rough, undulating, angular gravel-sized (<1") fragments	世	 86.5-89.9' - moderate yellowish brown, (10YR 5/4), very fine to fine 	1
-	R8-NQ			93.2' - Fracture or mechanical break, <10	╁	grained, mild HCl reaction, weak to	1
-	5 ft 74%	54	1	deg, rough, undulating, tight 93.85' - Fracture or mechanical break, 30	广	 medium strong (R2 to R3), voids (<3/16") over 25-40% of surface, few 	1 1
-	1 70		\vdash	deg, rough, undulating, tight		elongate cavities (<1/2"x1/4"),	-
95 <u> </u>			0	94.0, 95.0, 95.55' - Mechanical break (3) —	F	 transition from poor to moderately 	I
-			\vdash	95.15, 96.2, 96.25' - Fractures or mechanical break (3), smooth to rough, undulating, tight	仜	fossiliferous with depth, molds (<1/4"), trace laminations at	R8: 33 minutes
-			3	to open <1/8"	\vdash	 86.9-87.4', very weak (R0) lenses 	-
-	96.5			-	F	from 87.1-87.35' and 89.4-89.5' No Recovery 89.9-92.8'	-
-			>10	07.0741.5	Ľ	_ Limestone]
-				97.0-97.1' - Fracture zone, rough, undulating, angular gravel-sized (1"-1-1/2") fragments	\vdash	92.8-95.6' - moderate yellowish]
I _			>10	97.45-97.65' - Fracture zone or bedding	口	brown, (10YR 5/4), very fine to fine grained, mild HCl reaction, weak to	l J
				plane, rough, undulating, open <1/2"	\vdash	medium strong (R2 to R3), very weak]
I -	R9-NQ		F 40	98.65, 98.9' - Fracture zone or mechanical	H	(R1) from 93.6-93.9', voids (<3/16") over 40-60% of surface, few cavities	1
1 -	5 ft 95%	64	5-10	break (2), 35 deg, rough, undulating, tight to	世	(<2"x1"), light gray (N8) medium	1 1
100	33,0			open 1/4" 99.15' - Fractures (2), vertical, rough,	圧	strong (R3) secondary infill,	1 1
-58.0			>10	undulating, tight	仜	moderately fossiliferous, trace organics	I
-			\vdash	99.35' - Bedding plane, rough, undulating,	\vdash		R9: 15 minutes
-			0	tight	F		
					1		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-10	SHEET	7	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723789.1 N, 457699.9 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.0	ft bg	s on 4/	7/07 START: 4/6/2007 END: 4	/9/200	7 LOGGER : C. Sump	
30€	<u> </u>			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP SUR ELE		a a		THICKNESS, SURFACE STAINING, AND TIGHTNESS 99.75-100.0' - Fracture zone, rough,	SYM	AND ROCK MASS CHARACTERISTICS 95.6-96.5' - yellowish gray, (5Y 8/1),	DROPS, TEST RESULTS, ETC.
-	101.5		NR	undulating, angular gravel-sized (<2")	干	- very fine to fine grained, strong HCl reaction, extremely weak to very	-
-			1	fragments 101.65' - Bedding plane or mechanical break,	F	weak (R0 to R1), trace voids	-
-			0	horizontal, rough, undulating, tight to open 1/8"	F	 (<3/16"), poorly fossiliferous, few molds (<1/2" diameter) 	-
_			0			96.5-98.2' - yellowish gray, (5Y 8/1), very fine grained, strong HCl	
-	R10-NQ 5 ft	95	0	104.0, 105.2' - Mechanical break (2)	\pm	reaction, weak to medium strong (R2 to R3), extremely weak to very weak	-
-	100%			104.0, 103.2 - Mechanical Break (2)	\pm	- (R0-R1) from 97.0-97.5', trace voids (<3/16"), trace bioturbation	-
105_ -63.0			0	-	\pm	98.2-100.0' - Same as 96.5-98.2'	_
-			_		士	 except voids (<3/16") over 30-40% of surface, moderately to highly 	R10: 13 minutes
	106.5		1	400 41 5 4 05 1 1 1 1 1	上	fossiliferous with molds (<1/2"), <20% organic laminations	_
_			0	106.4' - Fracture, 65 deg, rough, undulating, tight to open <1/4"	上	concentrated in extremely weak (R0)	_
-			_		\pm	_ 100.0-101.25' - Same as 98.2-100.0'	-
-			0	107.5, 109.0, 110.3' - Mechanical break (3)	士	except moderately fossiliferous, few cavities (<1") with secondary infill,	-
-	R11-NQ				士	trace organics No Recovery 101.25-101.5'	-
-	5 ft 100%	100	0		\dagger	Limestone 101.5-106.5' - yellowish gray, (5Y	-
110			0	_	上	8/1), very fine to fine grained, strong HCl reaction, very weak to weak (R1	
-68.0					上	to R2), voids (<3/16") over 20-40% of	
-			0		丰	surface, few cavities (<1"x1/2") with secondary infill, moderately to highly	R11: 18 minutes
-	111.5			111.65-113.95' - Bedding plane or fracture	上	fossiliferous with elongate molds and casts (<1x1/2"), trace organics	-
-			>10	(17), <10 deg, smooth to rough, planar to	世	106.5-111.5' - yellowish gray, (5Y 8/1), very fine to fine grained,	-
			6	undulating, tight to open <1-1/2"	F	moderate to strong HCl reaction, very weak to weak (R1 to R2),	-
-			0		F	moderate yellowish brown (10YR	SC-4 collected from 113.1- 113.9'
-	R12-NQ 5 ft	68	1		\perp	5/4) from 107.1-108.0', extremely weak (R0) from 107.75-108.3', voids	-
	100%				+	(<3/16") over 30% of surface, laminated bedding from 107.1-108.0',	-
115_ -73.0			1	114.8' - Fracture, 45-50 deg, rough, - undulating, tight	oxdot	— highly fossiliferous with elongate molds, casts (<3/4x1/4")	-
-				and allowing, agric	E	111.5-116.5' - Same as 106.5-111.5'	R12: 11 minutes
	116.5		0		E	except strong HCl reaction, voids over 10-30% of surface, poorly]
_			>10	116.5-116.7' - Fracture zone, rough, undulating, angular gravel-sized (<1-1/2")	E	fossiliferous with molds at 116.0-116.5'	_
-				fragments 117.1' - Fracture, vertical, rough, undulating,	+	116.5-121.3' - Same as 111.5-116.5' except fossil molds concentrated	-
-			>10	open 1", runs from 116.7' to 117.6'	世	_ from 120.25-121.3'	-
-	R13-NQ			117.6-117.8' - Fracture zone, rough, undulating, angular gravel-sized (<2")	世	-	-
-	5 ft 96%	64	>10	fragments 118.0' - Fracture, vertical, rough, undulating,	#	<u> </u>	-
120_			>10	open <1" 118.85-119.1' - Fractures (3), vertical, rough,	1		
-78. 0			- 10	undulating, open <1/2"	片	<u></u>	
					₽		R13: 6 minutes



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-10	SHEET	8	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723789.1 N, 457699.9 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER LEVELS: 2.0 ft bgs on 4/7/07 START: 4/6/2007 END: 4/9/2007 LOGGER: C. Sump DISCONTINUITIES LITHOLOGY ROCK TYPE, COLOR, MINRRALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS 121.5 ON THICKNESS, SURFACE STAINING, AND TIGHTNESS ON THICKNESS, SURFACE STAINING, AND TIGHTNESS ON Recovery 121.3-121.5' Limestone 121.5-126.5' - Same as 116.5-121.3' except moderately fossiliferous overall with poorly fossiliferous interval from 124.0-125.0', secondary infill at 121.8', very fine grained from 123.25, 124.1, 124.8' - Fractures or mechanical break (3), 60 deg, rough, undulating, tight 12583.0 126.5	COMMENTS SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
121.5	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
121.5	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
121.5	DROPS, TEST RESULTS, ETC.
121.5	
NR Open 1", length is from 119.1-119.5' 119.95-120.25' - Fracture zone, rough, undulating, angular gravel-sized (<2") 121.5-126.5' - Same as 116.5-121.3' except moderately fossiliferous overall with poorly fossiliferous interval from 124.0-125.0', secondary infill at 121.8', very fine grained from 125.2-125.4' 125.2-125.4'	
undulating, angular gravel-sized (<2") ragments 1 R14-NQ 5 ft 100% 125 -83.0 100 100 11 11 11 11 11 125 -83.0	
R14-NQ 5 ft 100% 125 -83.0 100 1 1 1 0 0 1 1 1 0 0 0 0 0 0 0 0 0	
R14-NQ 5 ft 100% 125 -83.0 100 1 1 1 1 123.25, 124.1, 124.8' - Fractures or mechanical break (3), 60 deg, rough, undulating, tight 123.9, 124.0, 124.2, 125.0' - Mechanical break (4) 1 1 1 125 - 83.0 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	- - - R14: 10 minutes
R14-NQ 5 ft 100% 1 1	
100% 123.9, 124.2, 125.0' - Mechanical break (4)	R14: 10 minutes
125 -83.0 - - 0	R14: 10 minutes
	R14: 10 minutes
	R14: 10 minutes
	_
	_
126.6, 128.4, 129.8, 131.25' - Fractures or mechanical break (4), horizontal, smooth,	_
HCI reaction, very weak to weak (R1	_
to R2), voids over <10% of surface except from 126.5-127.6' (30%),	_
poorly fossiliferous, becoming vellowish gray (5Y 7/2) at	_
- 5 ft 93 0 - 129.0-129.65 ^t \	_
99%	-
130 -88.0	_
^{····}	R15: 5 minutes
-	-
131.5 No Recovery 131.45-131.5'	-
Limestone (3), horizontal, smooth, undulating, infilling 131.5-136.45' - yellowish gray, (5Y	_
132.55, 132.9, 134.4, 134.55, 134.62' - 5/1), very fine to fine grained,	-
0 Fractures or mechanical break (5), horizontal, smooth, undulating, tight — moderate to strong HCl reaction, very weak to weak (R1 to R2), light	SC-5 collected from 133.1-
R16-NQ Tionzonial, smooth, directiating, light olive gray (5Y 6/1) from	133.9' -
- 5 ft 87 2 132.5-132.65', extremely weak (R0) from 132.0-132.5', voids and cavities	_
(<1/2") over <10% of surface, poorly fossiliferous with molds (1/4")	_
-93.0 2 2 1 Tossilirerous with molds (1/4"), laminated from 132.45-132.65'	
	R16: 6 minutes
136.5	
NR No Recovery 136.45-136.5'	
137.0, 137.1, 137.2, 137.25, 137.3, 137.35, 136.5-141.45' - yellowish gray from	_
horizontal, smooth, undulating, tight brown from 138.5-141.45', (5Y 8/1,	-
137.25-137.50' - Fracture zone, rough, undulating angular grayel-sized (<1-1/2")	-
R17-NQ	-
139.65, 140.75' - Bedding plane or poorly fossiliferous (fossils up to	-
140	_
(4) at intervals 130.0-130.7 ;	R17: 6 minutes
139.20-139.70'	

Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-10	SHEET	9	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723789.1 N, 457699.9 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

00111110	J WILL THOU 7 II	10 20	2011 11	NENT : Dietiich D-30 3/N 232, mud totaly, NQ tools, HW	odon	·9	ORIENTATION: Vertical
WATER	LEVELS: 2.0	ft bgs	s on 4	/7/07 START : 4/6/2007 END : 4/	9/200	17 LOGGER : C. Sump	
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOCK TYPE COLOR	
	N. 4. 5.		FRACTURES PER FOOT	BESONII HOIY	으	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
H H S E		(%) 0	J. J. J. J. J. J. J. J. J. J. J. J. J. J	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
世界点		Ø	SAC ER I	PLANARITY, INFILLING MATERIAL AND	Į₩	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
		œ	F F	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	
	141.5		1		ш		
-	141.5		NR/	·	Н	No Recovery 141.45-141.5'	-
-			1	440 4 440 4 444 0 445 7L Paddian slave	╀	_ Limestone	-
l _				142.1, 143.4, 144.9, 145.7' - Bedding plane or mechanical break (4), <10 deg, smooth,	П	141.5-143.5' - yellowish gray to olive	
				undulating, tight except for open 1" at 143.4'	Н	gray, (5Y 5/1 to 5Y 6/1), very fine to	
-			1	undulating, light except for open 1 at 143.4	+	fine grained, moderate HCl reaction, very weak to medium strong (R1 to	-
-					口	R3), voids (<3/16") over 10-20% of	-
l _	R18-NQ 5 ft	91	0		ᅪ	surface, many elongate cavities	
	94%	91	0		Н	(1-1/2"x1") with secondary infill,	
	0170			•	仜	poorly fossiliferous, trace laminated	1
145			1	_		bedding	_
-103.0					╨	143.5-146.2' - very light gray, (N8),	
1			1]		very fine to fine grained, moderate	R18: 15 minutes
1 -				·	厂	HCl reaction, medium strong to strong (R3 to R4), voids (3/16") over	-
-	146.5		NR)	146 F 146 O' Frosture	₽	10-30% of surface, cavities (<2"x1")	-
I _			>10	146.5-146.9' - Fracture zone, rough, undulating, angular gravel-sized (<1-1/2")	\Box	over 30% of surface, 60% of cavities	
			/10	fragments		with secondary infill, poorly	
-				147.1, 147.25, 147.5, 148.0, 148.7, 149.8,	╨	- fossiliferous	1 -
-			2	149.9' - Bedding plane or mechanical break	╁┼	No Recovery 146.2-146.5'	-
l _				(7), smooth, undulating, tight to open <1/2"		Limestone	
	R19-NQ			148.45, 149.0, 149.6' - Mechanical break (3)	ш	146.5-147.25' - light olive gray and moderate yellowish brown, (5Y 6/1,	
-	5 ft	43	0	-	╆	10YR 5/4), very fine to fine grained,	-
-	73%					very weak to weak (R1 to R2), voids	-
150			2	_	ш	(3/16") over 20% of surface, many	
-108.0				1	Н	cavities (<1-1/2"x1/4") over >5% of	
-			ND		Ľ	surface, secondary infill of 50% of	R19: 12 minutes
-			NR		╙	cavities, poorly to moderately fossiliferous	-
l _	151.5				ь	147.25-147.5' - Same as	
					ı	146.5-147.25' except voids (<3/16")	18:00 on 4/9/07 Water
-					1	over 30% of surface, trace secondary	, level at ground surface -
-				-	-	 infill of cavities, few cavities 	-
l _					1	<1-1/2"x1/4"	_
					ı	147.5-149.8' - Same as	
-					1	- 146.5-147.25' except no to moderate HCl reaction, medium strong (R3),	11
-					1	voids (<3/16") over 0-30% of surface	
-					1	increasing with depth, trace voids	
1					1	with secondary infill, trace laminated	
1 -				_	1	bedding/slump feature, trace	
-					1	organics, poorly to moderately	-
-					4	fossiliferous - 149.8-150.15' - Same as	
1					1	149.8-150.15 - Same as	
I -					1	No Recovery 150.15-150.5'	
-					1	Bottom of Boring at 151.5 ft bgs on	'
-					1	- 4/9/2007	_
1					1		
1 -					1	Γ	1
-					1	F	-
I -]	1	L	
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						I.	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-11	SHEET	1	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723966.3 N, 457786.7 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

DRILLIN	G METH	OD AND	<u>EQUIPM</u>	ENT : CME 55 S/I	N 299205, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 6.0 ft b	gs on 5/2	0/07	START : 5/19/2007 END : 5/20/2007 LOGGER : J. Burkard, C. Dellaria, B. Ellis
				STANDARD	SOIL DESCRIPTION COMMENTS
Š₽€	SAMPLE	INTERVA	J (ft)	PENETRATION	
DEPTH BELOW SURFACE AND ELEVATION (ft)				TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY
AACH		RECOVE	ERY (π)		MOISTURE CONTENT, RELATIVE DENSITY OR 📗 🧖 DRILLING FLUID LOSS, TESTS, AND
무유한			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
				(N)	
42.7	0.0			2.4.5	Poorly Graded Sand (SP) 0.0-0.2' - pale yellowish brown, (10YR 6/2), dry, loose,
l		1.5	SS-1	3-4-5 (9)	road material, fine silica sand
-	1.5			(5)	Topsoil
-	1.0				↑ 0.2-1.5' - brownish black, (5YR 2/1), dry to moist, stiff,
-	-				\70% organic fines, 30% roots/vegetation/ _
-					
Ι.					
-	1				1 1
-	1				1
-	-				-
5 37.7	5.0				Lean Clay (CL)
37.7				0-2-4	5.0-5.9' - light olive gray, (5Y 5/2), moist to wet, firm,
I -		0.9	SS-2	(6)	high plasticity, no dilatancy, 10-15% very fine to fine
	6.5			``'	\silica sand
-]
-	1				1 1
-	-				
-					
l _					
-	1				1 1
10	10.0				1
32.7	10.0				Silt (ML)
-		1 40	000	6-13-16	10.0-11.0' - moderate yellow, (5Y 7/6), wet, very stiff, -
-		1.0	SS-3	(29)	nonplastic, rapid dilatancy, moderate HCl reaction,
l -	11.5				10-15% fine to medium sand-sized, all carbonate
]]
I -	1				1
-	1				
-	-				
-]
I _]
15	15.9				
27.7		0.1	SS-4	50/1.5	Silt With Limestone Fragments (ML) Driller's Remark: Lost a little circulation
-	1			(50/1.5")	\ 15.0-15.1' - grayish yellow, (5Y 8/4), wet, hard, honplastic, rapid dilatancy, moderate HCl reaction,
-	1				10-15% fine to medium sand-sized, all carbonate.
-					limestone lenses 1/4" thick
-					
_]
Ι -]
I -	1				1
-	1				
-	-				-
-					
20					
I	L				



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-11	SHEET	2	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723966.3 N, 457786.7 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

WATER	LEVELS	: 6.0 ft bo	gs on 5/20	0/07	START : 5/19/2007 END : 5/20/2007 LOGGER : J. Burkard, C. Dellaria, B. Ellis	
				STANDARD	SOIL DESCRIPTION 0 COMMENTS	
SAMPLE INTERVAL (ft) PENETR TEST RE			L (ft)	PENETRATION TEST RESULTS		
H BE ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND	
LEV.			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	1
22.7	20.0			(14)	Silty Sand (SM)	┨
-		1.2	SS-5	21-24-11	20.0-21.2' - grayish yellow, (5Y 8/4), moist to wet, dense, mild to moderate HCl reaction, fine to coarse	\exists
-	21.5			(35)	├ grained, 35% nonplastic fines, trace angular fine	1
-	21.5				\gravel-sized, all carbonate / -	1
-	1				1 1	1
-					1	1
]]
					<u> </u>	4
25 17.7	25.0					_
- 17.7	-			9-8-6	Silty Sand (SM) 25.0-26.0' - yellowish gray, (5Y 7/2), wet, medium	4
-	-	1.0	SS-6	(14)	dense, moderate HCl reaction, fine to coarse grained, 30-40% nonplastic fines, all carbonate	\exists
-	26.5				-	\exists
-	-					+
-	-				- 1	\exists
-	-				-	1
-	1				- 1	1
-	1				1 1	1
30	30.0				1	1
12.7	30.3	0.3	SS-7	50/4 (50/4")	Silty Sand With Limestone Fragments (SM) 30.0-30.3' - dusky yellow, (5Y 6/4), wet, very dense,	
				(50/4)	\ mild to moderate HCl reaction, fine to coarse grained, /]
-					\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	
-					-	4
	-				_	4
-	-					4
-	-				-	+
-	-				-	\exists
						\exists
35 7.7	35.0			22-50/3	Silty Sand (SM)	┨
-	35.8	0.6	SS-8	(72/9")	35.0-35.6' - moderate yellow, (5Y 7/6), moist to wet, very dense, strong HCl reaction, fine to coarse	1
-	1				\grained, 30% nonplastic fines, trace fine gravel, all / \bigci_	1
-	1				\(\text{carbonate}\) -	1
-]				1	1
]]]
]	
-]	4
-	-]]	4
40						4



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-11	SHEET	3	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723966.3 N, 457786.7 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

		: 6.0 ft bo			START : 5/19/2007	END: 5/20/2007			Burkard, C. Dellaria, B. Ellis
				STANDARD		SOIL DESCRIPTION		Ŋ	COMMENTS
N (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	00" 1111	E 11000 00010 0044001 00	OL OD	O LO	DEDTILOF CACINO DOWN INC. DATE
H BE ACE ATIO		RECOVE	RY (ft)		MOISTURE	E, USCS GROUP SYMBOL, CONTENT, RELATIVE DENS	ITY OR	30 Li	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	CONSISTENC	CY, SOIL STRUCTURE, MINEI	RALOGY	SYMBOLIC LOG	INSTRUMENTATION
2.7	40.6	0.3	SS-9	50/3	Limestone Frag	gments	101 [Ħ	
				(50/3")	reaction, coarse	sky yellow, (5Y 6/4), strong He e sand-sized to fine gravel-si	ized /]	
l _									_
_ ا								1	_
-								-	_
-								-	-
-								┨	-
-								┨	-
45	45.0							1	-
-2.3	45.4	0.4	SS-10	50/5	Silty Sand With	h Limestone Fragments (SM	/I)		
				(50/5")	strong HCI read	sky yellow, (5Y 6/4), wet, ver ction, fine to coarse grained,	15%]]
_					\nonplastic fines \fragments, all c	s, 40% fine to coarse limesto carbonate	ne		_
_					eraginaria, am a			-	-
-								-	-
-								┨	-
-								┨	-
-								┨	-
50	50.0							1	-
-7.3	50.4	0.3	SS-11	50/5	Limestone Frag	gments	(D.5(4) [╆	Soil sampling completed at 10:55 on 5/19/07
				(50/5")	\ strong HCl reac	derate yellowish brown, (10) ction, fine to coarse sand-siz	ed and]]
_					∖fine to coarse g			1	
-					See the next sh	ring at 51.5 ft bgs neet for the rock core log		-	-
-								-	-
-								┨	-
-								┨	-
-								1	-
55								1	1
-12.3							_]	
_									
_								1	_
-								-	-
-								-	-
-								+	-
-								1	-
-								1	
60								1	
								1	
								\perp	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-11 SHEET 4 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723966.3 N, 457786.7 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

COMING	INCITIODA	ND L	ZOIFIV	MENT: CIME 55 S/N 299205, mud rotary, NQ tools, HW (asiriy		ORIENTATION : Vertical
WATER	LEVELS: 6.0	ft bg	s on 5	/20/07 START : 5/19/2007 END : 5	20/20	D7 LOGGER : J. Burkard, C. Dellaria	a, B. Ellis
300	<u></u>			DISCONTINUITIES	U	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
ᆱ병흔	ER'A	(%	FRACTURES PER FOOT			MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
F A F	SEF	Q D (%)	CT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	/BO	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	REGE	S. O	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	51.5			51.55-52.3' - Fracture zone, 0-15 deg, rough,	+	Limestone	Rock coring begins at
-			4	undulating, bedding plane fractures or	믚	- 51.5-54.5' - moderate yellowish	11:25 on 5/19/07 –
l -				mechanical breaks, up to 3/4" fragments	╨	brown, (10YR 5/4), very fine to	Driller's Remark: Soft at
l _			>10	52.6-54.25' - Fracture zone, rough,	丌	coarse grained, strong HCl reaction, weak (R2), 40% coverage of voids	52.0-52.5', 53.0-53.5', 54.5- 54.9'
			10	undulating to stepped, fine to coarse angular gravel, up to 2" diameter	Н	1/16" or less on surface, few cavities	04.0
	R1-NQ			graver, up to 2 diameter		<1/2" diameter, trace secondary infill	1
-	5 ft 60%	8	>10		╨	 recrystallization 	-
	60%				╨	_ No Recovery 54.5-56.5'	-
55 <u> </u>				_	╁	—	_
-12.5			NR		丰	-	
					Н		R1: 3 minutes
	56.5]
-	- 3.0			56.5-56.6' - Fracture zone, smooth to rough,	1—	Limestone] 1
-			>10	undulating, fine to coarse angular gravel 56.9-57.55' - Fracture zone, smooth to rough,		- 56.5-59.95' - pale yellowish brown,	1
-				undulating, fine to coarse angular gravel	╨	(10YR 6/2), very fine to fine grained, strong HCl reaction, weak (R2), 40%	-
-			3	57.8' - Mechanical break, 30 deg, rough,	世	 coverage of voids 1/16" or less on 	-
-				undulating, tight to <1/16" open	╁┼	surface, few cavities some elongate	-
l _	R2-NQ 5 ft	20	0	58.25' - Bedding plane, 10 deg, smooth, undulating, <1/4" open		and some spherical, trace spots of black organic material <1/2" diameter	_
	69%			58.4-58.5 - Fracture zone, smooth to rough,	Н	Sidest eliganie material me diameter	
60			0	undulating, fine to coarse angular gravel	Ш		_
-17.3				59.05' - Mechanical break – 59.5' - Mechanical break	1—	No Recovery 59.95-61.5'	_
-			NR	oc.s Modianical broak	仁	-	R2: 5 minutes
-					╀	-	-
l -	61.5				-	Limestone	-
-			1	61.7-61.8' - Fracture zone	╁	- 61.5-64.4' - moderate yellowish	-
l -					\bot	brown, (10YR 5/4), fine to medium	_
			4	62.65' - Fracture, horizontal, rough, stepped		grained, mild HCl reaction, weak to medium strong (R2 to R3), 0-10%	
			4	62.9' - Fracture, horizontal, smooth,	\perp	coverage of voids 1/16" or less	
_	R3-NQ			undulating 63.1' - Fracture, horizontal, smooth to rough,		except 20% coverage of voids up to	1
-	5 ft	24	3	undulating	┰	 1/8" on surface at 61.5-61.8', no visible fossils or cavities except 	-
	58%			63.2' - Fracture, horizontal, rough, undulating	世	61.5-61.8' cavities up to 3/8"	-
-22.3				63.5-63.6' - Fracture zone 64.1' - Fracture, 28 deg, rough, stepped	$+$ \Box	— covering 5% of rock, trace black	-
			NR	64.4' - Mechanical break	-	organic staining No Recovery 64.4-66.5'	DO: 5 milioutes
-				65.9-66.1' - Fracture zone	\bot	- 140 (1600 very 04.4-00.0	R3: 5 minutes
	66.5			00.9-00.1 - Flacture 2011e	片	_	Driller's Remark: Soft at 66.0-67.0'. 68.0-68.5'
-					\vdash	Limestone	00.0-07.0, 00.0-08.5
-			3		世	 66.5-66.95' - Same as 61.5-64.4' 66.95-67.75' - moderate yellowish] 1
-				67.3, 67.4' - Fractures (2), <10 deg, rough,	╁	brown, (10YR 5/4), fine to medium	-
-			4	stepped 67.6, 67.4, 67.6, 67.9' - Fractures (4), 0-18	世	 grained, mild HCl reaction, very weak] -
-	DANO			deg, rough, undulating	₩	(R1), 30% coverage of voids 1/16" or less on surface, trace dark organic	-
-	R4-NQ 5 ft	37	1	00015 1 001	\perp	- inclusions, no visible cavities or	-
_	66%			69.0' - Fracture, 20 deg, smooth to rough, undulating	┰	fossils]
70			0	undulating]
-27.3				_	╨	_	
-			NR		世	-	R4: 4 minutes
-					╂┼┤	_	-
	71.5				一		
							<u> </u>



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-11 SHEET 5 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723966.3 N, 457786.7 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

				HENT : CIVIE 33 3/N 299203, ITINU TOTALY, INQ 10018, HW C			ORIENTATION : Vertical
WATER	LEVELS : 6.0) ft bgs	s on 5		20/200		
≥□≎	(%)			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	0175 AND DEDTH OF 040ING
ᆱ႘ᆮ	Z,H A,H	(%) Q	R P		1 월	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H A A	GTI SOV) Q	PF	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	<u>8</u>	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	SEN SEN SEN SEN SEN SEN SEN SEN SEN SEN	S S	F.RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	<u>}</u>	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	014			74 F 74 OL Frankura zona miagos to 4" v O"	0,	Limestone	Deille de Demondo 71 70
l _			10	71.5-71.8' - Fracture zone, pieces to 1" x 3"	Н	- 67.75-69.8' - moderate yellowish	Driller's Remark: 71-72' and 74-74.5' void
			'	72.0' - Bedding plane, <5 deg, smooth to	ш	brown, (10YR 5/4), fine to medium	and 7 1 7 1.0 Void
-				rough, undulating, 1/4" open, missing faces	Н	grained, mild HCl reaction, weak	1 1
-			10	72.8-72.9' - Fracture zone, pieces to 1/2"	Н	 (R2), 0-10% coverage of voids 1/16" 	1
-				diameter 73.15' - Bedding plane, horizontal, smooth,	\Box	or less except 10% coverage of 1/8"	1 -
	R5-NQ	37	3	planar, tight	Н	voids on surface and trace cavities to 5/16" at 68.1-68.4', no visible fossils.	1
	5 ft 70%	31	٦	73.9' - Fracture, 15 deg, smooth, undulating,	ш	trace black organic staining	1 1
	. 070		3	tight	ш	No Recovery 69.8-71.5'	1 1
75 <u> </u>				74.25' - Bedding plane, horizontal, smooth to —	Н	— Limestone	I
-52.5				rough, undulating, tight to 1/4" open	口	71.5-74.4' - moderate yellowish]
			NR	74.4' - Bedding plane, rough, undulating, tight to 1/4" open	ш	brown, (10YR 5/4), fine grained, mild HCl reaction, weak (R2), 0-10%	R5: 6 minutes
1 7	76.5			74.6' - Bedding plane, horizontal, smooth to	Н	coverage of voids 1/8", no visible	1 1
-	70.0			rough, undulating, tight to 1/4" open	口	fossils, no visible cavities except	1
-			10	74.7' - Fracture, vertical, smooth, undulating,	₽₩	trace cavities up to 1 3/16" x 3/8" at	-
_				tight		72.1-73.2', some infilled with similar	-
				74.85' - Fracture, 60 deg, smooth, undulating, tight	НН	material to surrounding rock except slightly darker color	1
-			10	77.25-77.8' - Fracture zone, pieces to 2"	口	74.4-75.0' - moderate yellowish	1 1
-	R6-NQ			diameter	₽	brown, (10YR 5/4), fine to medium	1 -
-	5 ft	43	0	-	Ш	grained, mild HCl reaction, very weak	-
l _	54%				Ш	(R1), 25-35% coverage of voids 3/8" or less, 10% coverage of 9/16" x]
80					Н	9/16" cavities, trace dark organic	
-37.3			ND	_	ш	inclusions, moderate to highly	1
-			NR	-	\vdash	fossiliferous with casts to 3/16"	R6: Run time not recorded
-					Н	No Recovery 75.0-76.5'	-
I _	81.5				Ш	Limestone - 76.5-77.4' - Same as 66.95-67.75']
				81.5-81.6, 82.45-82.55, 82.8-82.95,	Н	Silt (ML)	End of drilling for 5/19/07
			2	83.65-83.66' - Fracture zone, rough to smooth, undulating to stepped, fine to coarse	ш	77.4-77.7' - moderate yellowish	Resume drilling 5/20/07 - 07:35
-				size gravel 1-2" diameter, fragments up to 2"	Ш	brown, (10YR 5/4), carbonate	Water level is 6.0' below
-			8	diameter -	HH	_ derived, overlying dark gray (N3) fat	ground surface -
				82.1, 83.15, 83.25, 83.45' - Bedding plane or	口	clay (CH)	Ďriller's Remark: Soft at
1 7	R7-NQ		1	mechanical break, 10 deg, smooth to rough,	Ш	Limestone	82-82.5', 83-83.5', 84.5-85'
1 7	5 ft 46%	10		undulating to stepped, <1/2" open 82.6, 82.9' - Fractures (2), 70 deg, rough,	Ш	 77.7-79.2' - grayish orange, (10YR 7/4), fine grained, moderate HCI 	1 1
-	4070			stepped to undulating, double fracture	П	reaction, medium strong (R3), 0-15%	1
85			ND	——————————————————————————————————————	Н	coverage of voids 1/8" or less, trace	_
-42.3			NR	_	Ш	cavities up to 1 3/4" x 3/4" with dark	l J
					$\vdash\vdash\vdash$	yellowish orange (10YR 6/6), infill and increased % voids, trace fossil	R7: 5 minutes
-	00.5			-	Н	casts to 3/16" x 3/8" in size	1 1
-	86.5			86.35' - Bedding plane or mechanical break,	Ш	No Recovery 79.2-81.5'	1
-			2	10 deg, smooth to rough, undulating, tight to	$\vdash\vdash$	Limestone	-
			Ĺ	3/4" open	Щ	81.5-82.9' - moderate yellowish	
1 7				86.5-86.6' - Fracture zone, with pieces to 2" - diameter	Ш	brown, (10YR 5/4), very fine to fine grained, strong HCl reaction, weak to	1
-			0		HH	medium strong (R2 to R3), except for	1 1
-	R8-NQ			-	口	bands 3/4"-1" (lighter colored) from	1
-	5 ft	58	1	88.6' - Mechanical break	Н	_ 81.9-82.1' and 82.5-82.8', 40%	SC-1 collected at 88.7-
	80%		Ľ.		Ш	coverage of voids <1/16" on surface,	89.55'
90				89.4-89.65' - Fracture zone, 0-10 deg,	П	few elongate cavities <3/4" diameter	1
-47.3			6	smooth to rough, undulating, all bedding plane fractures, tight to 1/2"	╁┼┤		⊢
-			<u> </u>	90.25-90.5' - Fracture zone, with pieces to 2"	団	_	R8: 4 minutes
-			NR	diameter	H	_	No. 4 minutes
	91.5		'''`		Ш		<u> </u>
					П		
	_	_	_		_		



PROJECT NUMBER:	BORING NUMBER:					Т
338884.FL	B-11	SHEET	6	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723966.3 N, 457786.7 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

				IENT : CME 55 S/N 299205, mud rotary, NQ tools, HW c			ORIENTATION : Vertical
WATER	LEVELS : 6.0) ft bgs	s on 5	<u>/20/07 START : 5/19/2007 END : 5//</u> DISCONTINUITIES	20/20	D7 LOGGER : J. Burkard, C. Dellaria LITHOLOGY	, B. Ellis COMMENTS
중무 분	(%) 				90.		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-			>10	92.1-92.9' - Fracture zone		82.9-83.8' - very pale orange, (10YR 8/2), strong HCl reaction, very strong to extremely strong (R5 to R6), very fine grained, 15% coverage of voids	-
-			>10	92.95, 93.0, 93.2' - Fractures (3), horizontal, rough, undulating	few black laminations	-	
-	R9-NQ 5 ft 88%	29	7	93.3-93.8' - Fracture zone, horizontal, rough, undulating, fractures along bedding plane 94.0' - Fracture, horizontal, smooth,		No Recovery 83.8-86.5' Limestone 86.5-90.5' - moderate yellowish	-
95 <u> </u>			9	undulating 94.1' - Fracture, horizontal, rough, undulating 94.5, 94.6' - Fractures (2), horizontal, smooth		brown, (10YR 5/4), fine to medium — grained, strong HCl reaction, weak (R2), 40% coverage of voids 1/16" or less, cavities to 3/4" diameter 5% of	R9: 5 minutes
-	96.5		NR	to rough, undulating 94.7, 94.9, 95.0' - Fractures (3), horizontal, smooth to rough, planar	崫	 rock, trace fossil casts to 1/4" diameter 	-
-			>10	95.1, 95.25, 95.3, 95.8' - Fractures (4), horizontal, smooth, planar to undulating		No Recovery 90.5-91.5' Limestone 91.5-92.2' - pale vellowish brown	Driller's Remark: Sampler clogged; shoe jammed
- - -	R10-NQ			96.5-97.0' - Fracture zone, horizontal, dark stains on faces, pieces 3" x 2", many bedding plane fractures		91.5-92.2' - pale yellowish brown, (10YR 6/2), fine grained, strong HCl reaction, weak (R2), 5% coverage of voids 1/16" or less, 5% cavities up to 1" x 3/8" partially infilled with fine grain carbonaceous material	closed with rock resulting in sample loss -
100 -57.3	5 ft 10%	0	NR	- -		92.2-93.8' - moderate yellowish brown, (10YR 5/4), fine to medium grained, moderate to strong HCI reaction, very weak (R1), 10-20% coverage of voids 1/2" or less, trace	- R10: 9 minutes
-	101.5			-	H	cavities up to 3/8" in diameter, moderately fossiliferous, trace black	-
_			1	101.6-101.8' - Fracture zone		organic material at 93.6' up to 1/16" diameter 93.8-95.9' - pale yellowish brown,	-
- - - 105_ -62.3	R11-NQ 5 ft 10%	0	NR	- - - -		- (10YR 6/2), fine grained, strong HCI reaction, weak (R2), 5% coverage of voids 1/16" or less, 5% cavities up to - 1" x 3/8" partially infilled with fine grain sized material (carbonaceous), clay seam at 95.2-95.4' (CL) yellowish gray (5Y 7/2) No Recovery 95.9-96.5' Limestone	- - - -
- -	106.5					 96.5-97.0' - grayish yellow, (5Y 7/2), fine grained, strong HCl reaction, very weak to weak (R1 to R2), trace voids 1/16" or less, no visible cavities 	R11: Run time not recorded -
_			7	106.8' - Bedding plane, horizontal, smooth, planar, tight	Ħ	or fossils No Recovery 97.0-101.5' Limestone	-
_			>10	106.9, 106.95, 107.0, 107.1, 107.2 107.5' - Bedding plane (6), horizontal, smooth, undulating to stepped	H	101.5-102.0' - very pale orange to grayish orange, (10YR 8/2, 10YR	-
-	R12-NQ 5 ft 69%	0	>10	107.5-109.3' - Fracture zone, horizontal, smooth, undulating, bedding plane fractures, up to 1/8" open		7/4), fine to medium grained, strong HCl reaction, very weak (R1), 15% coverage of voids 3/16" or less, fossil casts up to 10%	- -
110 -67.3	09%		>10	109.3-109.65' - Fracture zone —		No Recovery 102.0-106.5' Limestone 106.5-109.95' - Same as	_
_	111.5		NR			101.5-102.0' except extremely weak (R0) from 107.2-109.3' No Recovery 109.95-111.5'	R12: Run time not recorded -
						-	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-11	SHEET	7	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723966.3 N, 457786.7 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT: CME 55 S/N 299205, mud rotary, NQ tools, HW casing

	- WETTIOD 74	10 L	ZOII IV	IENT : CME 55 S/N 299205, mud rotary, NQ tools, HW c	asiriy		ORIENTATION : Vertical
WATER	LEVELS: 6.0	ft bg	s on 5/	/20/07 START : 5/19/2007 END : 5/3	20/200	D7 LOGGER: J. Burkard, C. Dellaria	a, B. Ellis
	<u> </u>			DISCONTINUITIES	(J	LITHOLOGY	COMMENTS
N S S			S	DESCRIPTION	1 ŭ l	ROCK TYPE, COLOR,	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ПОП	0715	œ	шш		S		
-			>10	111.5-111.9' - Bedding plane, horizontal, smooth, planar, 1" bedding 111.9-112.4' - Fracture zone	Ħ	Limestone - 111.5-111.65' - Same as _ 101.5-102.0' - 111.65-115.25' - yellowish gray, (5YR	-
-	R13-NQ		>10	112.65-115.75' - Bedding plane, smooth, planar to undulating, 1/8" to 1/2" beds	H	7/2), fine grained, very weak (R1), trace voids up to 1/16", thinly bedded (1/8"-3/4"), extremely weak rock (R0)	
-	5 ft 85%	0	>10	-		= at 114.3-114.9'	
115 -72.3			>10	_	H	<u> </u>	R13: 5 minutes
			NR	-	H	No Recovery 115.75-116.5'	1713. 3 minutes
-	116.5		>10	116.6, 116.7, 116.85, 117.45, 117.55, 117.7, 117.9, 118.0, 118.1, 118.15, 118.5, 118.8' -	Ħ	Limestone - 116.5-119.1' - yellowish gray, (5Y	
-			7	Bedding plane or mechanical break (12), 10 deg, rough, undulating 117.0-117.2' - Fracture zone		8/1), medium grained, strong HCI reaction, weak (R2), trace voids up to 1/16", no visible cavities, trace fossil	
-	R14-NQ 5 ft	13	>10	119.0-119.5' - Fracture zone		casts 3/8" X 3/16", trace dark organic material	
120 -77.3	72%		1			119.1-120.1' - yellowish gray, (5Y 8/1), medium to coarse grained, — strong HCl reaction, weak (R2),	_
-11.5			NR	tight -	Ħ	15-25% coverage of voids to 3/16", fossil casts up to 1" x 3/8" over 60% of rock	R14: 3 minutes
_	121.5			-	ш	No Recovery 120.1-121.5'	
-			4	121.65, 121.75, 121.8, 122.4, 122.65, 122.8' - Bedding plane or mechanical break (6), 10 deg, rough to smooth, planar to undulating,	H	Limestone - 121.5-123.25' - Same as - 116.5-119.1'	
-	R15-NQ		10	1/8"-1/4" open 122.9-123.25' - Fracture zone or bedding plane, 10 deg, smooth, undulating, 1/4" open,		- _ 123.25-123.85' - Same as	
-	5 ft 47%	12		beds are 1/2" thick 123.35-123.6' - Fracture zone, fine to coarse pieces	Ħ	119.1-120.1' except 5-10% coverage of <3/8" fossil casts No Recovery 123.85-126.5'	
12 <u>5</u> -82.3			NR	123.75' - Fracture, 20 deg, rough, undulating			R15: 4 minutes Driller's Remark: Last foot
_	126.5		6	126.6, 126.95, 127.1, 127.2, 127.35, 127.4,		Limestone - 126.5-128.4' - Same as 116.5-119.1'	"feels like gravel"
			6	127.6, 127.7, 127.8' - Fractures (9), horizontal, smooth to rough, undulating, along bedding, tightly healed to 1/8" open			
	R16-NQ 5 ft	8	7	127.85-127.95' - Fracture zone 128.2, 128.4, 128.6, 128.75, 128.85, 129.0, 129.2, 129.45, 129.6, 129.75, 129.8' -		128.4-129.25' - Same as 119.1-120.1'	
] -	70%	J		Fractures (11), horizontal, rough, undulating, 1/8" -1/4" open		_	
130			3	_	H		_
-87. 3			NR		崫		R16: 3 minutes
	131.5				Ш		
					П		
	ı		ı I		1 1		1



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-11 SHEET 8 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723966.3 N, 457786.7 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT: CME 55 S/N 299205, mud rotary, NQ tools, HW casing

CORING	METHOD A	ND E	QUIPN	IENT : CME 55 S/N 299205, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
WATER	LEVELS : 6.0	ft bg	s on 5	/20/07 START : 5/19/2007 END : 5/	20/20	D7 LOGGER : J. Burkard, C. Dellaria	a, B. Ellis
300	(0			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-			4	131.5-131.7' - Fracture zone 131.95-132.2' - Bedding plane, 5 deg, smooth, planar to undulating, 1/4" open		Limestone 129.25-130.0' - yellowish gray, (5YR 7/2), medium grained, weak (R2), trace small (<1/16") voids and trace fossil casts interbedded with medium to coarse grained limestone with	Driller's Remark: Brief loss of circulation
- 135 -92.3 -	R17-NQ 5 ft 17%	0	NR	- - - -		15-25% coverage by small (1/16") voids and 60% coverage by fossil casts, layers are 2"-4" thick No Recovery 130.0-131.5' — 131.5-132.35' - Same as 116.5-119.1' No Recovery 132.35-136.5'	- R17: 5 minutes
-	136.5		>10	136.5-137.7' - Fracture zone or bedding plane, 10 deg, smooth, planar to stepped, thin beds, 1/3" open, beds are 1/4"-2"		Limestone - 136.5-137.6' - Same as 116.5-119.1'	
-			>10	137.7-138.95' - Fracture zone or bedding plane, 5 deg, rough, planar to undulating,	Ħ	137.6-139.85' - very pale orange, (10YR 8/2), medium grained, strong HCl reaction, weak (R2), 5-15%	
-	R18-NQ 5 ft 67%	0	>10	open 1/8" or less	H	coverage of voids to 1/8", trace fossil casts 3/8" x 3/16", no visible cavities, trace dark gray and light gray	
140 -97.3			1	mechanical break (3), 10 deg, rough, planar, tight		inclusions, dark laminations at 138.35-138.5', thin beds and laminates 1/4"-1/2"	-
-	141.5		NR		Ħ	No Recovery 139.85-141.5'	R18: 5 minutes
-	·		5	141.55, 141.7, 141.9, 142.3, 145.05, 145.15' - Bedding plane or mechanical break (6), 10 deg, smooth to rough, planar, 1/8"- 1/4" open	Ē	Limestone 141.5-143.2' - yellowish gray, (5YR 7/2), medium grained, strong HCI	
-			>10	142.4, 143.2' - Fractures (2), <5-90 deg, smooth to rough, planar, bedding plane separation zone, beds are up to 1" thick	H	reaction, weak (R2), trace voids up to 1/16", no visible cavities, trace fossil casts 3/8" X 3/16", trace dark organic	
-	R19-NQ 5 ft 78%	14	>10	143.2-144.15' - Fracture zone, 0-90 deg, rough, undulating to stepped, open up to 1", angular fragments		material 143.2-144.2' - yellowish gray, (5Y 7/2), fine grained, strong HCl	
145 -102.3			1	144.15-144.7' - Fracture zone —	F	reaction, medium strong (R3), trace — voids up to 1/16", 10-15% coverage of cavities up to 1 9/16" x 3/8"	-
_	146.5		NR	145.43' - Mechanical break, 20 deg, tight		partially infilled with medium grain sized carbonate material, fossil molds, trace dark (organic) infill	R19: Run time not recorded
_			7	146.6, 146.7, 147.1, 147.15, 147.25, 147.9' - Bedding plane or mechanical break (6), 10 deg, smooth, undulating, tight to 1/4" thick	Ħ	144.2-145.3' - pale yellowish brown, (10YR 6/2), fine grained, weak (R2), 5-10% coverage of voids up to 3/16",	
-			2	146.9-147.1' - Fracture zone 147.5-147.65' - Fracture zone	E	5-10% coverage of cavities up to 3/8" x 9/16", dark laminations at 145.1' 145.3-145.4' - yellowish brown,	
-	R20-NQ 5 ft 62%	30	1	149.2-149.6' - Fracture, 70 deg, smooth to	Ħ	(10YR 6/2), mild HCI reaction, medium strong (R3), no visible fossils or cavities, dark red staining on fracture surfaces	
150_ -107.3			0 NR	rough, undulating, tight		No Recovery 145.4-146.5'	-
-	151.5		INIX				R20: Run time not recorded
			1		1		I



PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	B-11	SHEET	9	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723966.3 N, 457786.7 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

				TENT . CIVIE 55 3/N 299205, ITIUU TOLATY, NG					ORIENTATION: Vertical
WATER	LEVELS: 6.0) ft bgs	on 5		END : 5/2	20/20	007	LOGGER : J. Burkard, C. Dellaria	
>	(6			DISCONTINUITIES		U	<u></u>	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION		SYMBOLIC LOG		ROCK TYPE, COLOR,	
ᆱ႘ᇋ	ZUN H, A ŒR'	(%) Q	URE			일		MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YF A	RE FIST) O	ACT R FC	DEPTH, TYPE, ORIENTATION, ROUG PLANARITY, INFILLING MATERIAL	HNESS, AND	JBC		WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	COF	A Q	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND	TIGHTNESS	S۲۱		CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
		_				-	1	imestone	Drilling completed at 14:56
-					-		- 1	46.5-147.9' - moderate yellowish	on 5/20/07 -
1 _					_		b	prown to yellowish gray, (10YR 6/4 to	_
							5	SY 7/2), medium to coarse grained, strong HCl reaction, very weak (R1),	
1 7					_	1		race voids to 1/16", no visible	1
-					-		[c	cavities or fossils	-
-					-		F 1	47.9-149.35' - dusky yellow, (5Y	-
-					-		F 10	6/4), fine to medium grained, noderate HCl reaction, medium	-
l _							— s	strong (R3), trace coarse grain sized	_
					_		ir	nclusions, trace voids up to 1/16", no	
								risible cavities or fossils	
					_			No Recovery 149.6-151.5 Bottom of Boring at 151.5 ft bgs on] 1
-					-			5/20/2007	-
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PROJECT NUMBER:

338884.FL

B-12

SHEET 1 OF 8

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723919.8 N, 457828.5 E (NAD83)

ELEVATION: 43.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

WATER	LEVELS	: 4.3 ft bo	s on 5/17	7/07 S	START : 5/8/2007 END : 5/17/2007 LOGGE	R : F	R. Gomez, R. Bitely, T. Stewart
				STANDARD	SOIL DESCRIPTION	ن ا	COMMENTS
AND N (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COIL NAME TIEGG COOLD OVARDOL COLOR		DEPTH OF CASING, DRILLING RATE,
H BE ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	MOISTURE CONTENT, RELATIVE DENSITY OR	
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SVMBOLICITOR	INSTRUMENTATION
43.3	0.0			(1.1)	Poorly Graded Sand With Organics (SP)	+	
_		1.3	SS-1	0-2-2 (4)	0.0-1.25' - dark gray grading to very light to light gray, (N3 to N8 to N7), moist, very loose, very fine to fine	1	1
-	1.5			(+)	grained, 20% organics decreasing to <5% with depth, trace nonplastic fines, sand is silica	1	4 1
					trace nonplastic lines, sand is sinca]]
_						1	_
_						4	-
-						4	-
-						4	1
	5.0					1	
5 38.3	5.0				Poorly Graded Sand With Silt (SP-SM)		For SS-2 the last 6" SPT was weight of
-		1.5	SS-2	2-1-0 (1)	5.0-6.5' - dusky yellow, (5Y 6/4), wet, véry loose, very fine to fine grained, trace roots, trace concretions to	18	hammer
	6.5			(1)	coarse sand-sized, 8% nonplastic fines, sand is silica		<u>.</u>
_						1	
_						4	1
_						4	-
-						4	1
-						1	1
10	10.0					1	1
33.3	10.0	0.8	SS-3	34-50/4	Silt (ML)	1	┪
	10.8	0.0	00-0	(84/10")	10.0-10.8' - yellowish gray, (5Y 7/2), moist to wet,	Щ	Ц]
					reaction, trace to 10% very fine to fine sand-sized carbonate		
_					(our bornaio	1	-
-						4	-
-						+	-
-						1	1
-						1	1
15	15.0					1	1
28.3		0.8	SS-4	47-50/4	Silt (ML) 15.0-15.8' - yellowish gray, (5Y 7/2), moist to wet,		T
	15.8	_		(97/10")	\vdash hard, nonplastic, very rapid dilatancy, mild HCl	Щ	4]
_					reaction, carbonate, trace fine gravel-sized limestone fragments	1]
-						-	1
-						+	1
-						+	Driller's Remark: Harder at 18'
-						1	1
-						1	1
20						1	1
I						1	



PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	B-12	SHEET	2	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723919.8 N, 457828.5 E (NAD83)

ELEVATION: 43.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

DHILLIN	GIVIETH	JU ANU	EQUIPIVII	ENT : CIVIE 33 S/I	N 299205, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 4.3 ft bo	s on 5/17	7/07	TART : 5/8/2007 END : 5/17/2007 LOGGER : R. Gomez, R. Bitely, T. Stewart
1.				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
표유한		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
T A Y			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
SCIE			<i>"</i>	(N)	\times \sigma_{\text{\sigma}}
23.3	20.0				Silt With Sand (ML)
_	1	1.2	SS-5	15-17-14	20.0-21.2' - dusky yellow, (5Y 6/4), moist to wet, - dense, fine to coarse grained, nonplastic, rapid
-	21.5			(31)	人 dilatancy, mild to moderate HCl reaction, 5% fine
-	21.5				\gravel-sized, 20% fine to coarse sand, all carbonate / -
-	-				
-	-				
-					
-					- -
-					
_					
25_	25.0				
18.3		0.7	SS-6	17-50/6	Silty Sand With Limestone Fragments (SM)
I -	26.0	0.7	აა- ი	(67/12")	25.0-25.7' - dusky yellow, (5Y 6/4), moist to wet, very - 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
-					\reaction, 25-30% nonplastic fines, 15% fine / T
-	1				\gravel-sized limestone, all carbonate
-					- 1
-	1				- 1
-					
-					
-					-
_					
30	30.0				
13.3				00.45.0	Limestone Fragments
l _		0.9	SS-7	26-15-8 (23)	wafer shaped fragments to 1/2" thick
	31.5			(==)	Silt With Sand (ML)
					\ 30.4-30.9' - dusky yellow, (5Y 6/4), moist to wet, very stiff, rapid dilatancy, mild to moderate HCl reaction,
-	1				\20-25% very fine to medium grained sand, all
-					carbonate
-					
-					
-					
35 8.3	35.0				Silty Sand With Limestone Fragments (SM)
5.5 -			00.0	6-10-19	35.0-36.0' - dusky vellow. (5Y 6/4), moist to wet □ □ □ □
-		1.0	SS-8	(29)	medium dense, fine to coarse grained, mild to
-	36.5				\fine-coarse gravel-sized limestone, all carbonate
-					
1 -					」
I _]
1					Driller's Remark: Hit hard layer at 38'
					1
I -					1
40					
+ 0					



PROJECT NUMBER:

338884.FL

B-12

SHEET 3 OF 8

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723919.8 N, 457828.5 E (NAD83)

ELEVATION: 43.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

WATER	LEVELS	: 4.3 ft b	gs on 5/17	7/07	START : 5/8/2007 END : 5/17/2007 LOGGER : R. Gomez, R. Bitely, T. Stewart
				STANDARD	SOIL DESCRIPTION O COMMENTS
AND (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	
ACE ATIO		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
3.3	40.0	0.3	SS-9	50/3	Limestone Fragments Driller's Remark: Run was hard until last few
_				(50/3")	\ \delta \ 40.0-40.3' - light olive gray, (5Y 5/2), mild HCl \ \reaction, fragments up to 1" in size \ \delta \ \ \delta \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
_					. .
-					-
-					
-					-
-					
45	45.0				-
-1.7					Silt (ML) 45.0-46.5' - moderate olive brown, (5Y 4/4), moist to
		1.5	SS-10	10-18-20 (38)	wet, dense, fine to coarse grained, mild HCl reaction,
_	46.5				57% nonplastic fines, 15-20% fine gravel-sized limestone fragments, all carbonate
-					
-					-
-					
-					-
_					1
50_	50.0				1
-6. 7				24-37-48	Silty Sand With Limestone Fragments (SM) 50.0-51.3' - moderate olive brown, (5Y 4/4), moist to
-		1.3	SS-11	(85)	wet, dense, fine to coarse grained, mild HCl reaction, 25% nonplastic fines and 30-35% fine to coarse
-	51.5				gravel-sized limestone fragments
-					
-					†
-					1
]
_					. .
55 <u> </u>	55.0				Silty Sand With Limestone Fragments (SM)
-11.7		0.8	SS-12	21-31-50/1 (81/7")	55.0-55.8' - moderate olive brown, (5Y 4/4), moist to
-	56.1			(01/1)	wet, dense, fine to coarse grained, mild HCl reaction, 25% nonplastic fines and 30-35% fine to coarse
-					\gravel-sized limestone fragments / -
-					1
-] [
_	60.0]
-	60.0	0.1	SS-13	50/1	Limestone Fragments 60.0-60.1' - moderate clive brown (5V 4/4) mild HCl End soil sampling at 60.0'
				(50/1")	\ \\ 60.0-60.1' - moderate olive brown, (5Y 4/4), mild HCl / reaction, one limestone fragment recovered \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
60					Begin Rock Coring at 60.0 ft bgs
					See the next sheet for the rock core log



PROJECT NUMBER:

33884.FL

B-12

SHEET 4 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723919.8 N, 457828.5 E (NAD83)

ELEVATION: 43.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT: CME 55 S/N 299205, mud rotary, NQ tools, HW casing

Comparison of the content of the c	CORING METHOD A	ND E	QUIPN	MENT : CME 55 S/N 299205, mud rotary, NQ tools, HW c	asıng		ORIENTATION : Vertical
DESCRIPTION Section DESCRIPTION Section DESCRIPTION Section DESCRIPTION DESCRIPTION DEPTH. TYPE, ORIENTATION, ROUGHNESS, BLANARTY, INFILLING MATERIAL AND TIGHTINES DEPTH. TYPE, ORIENTATION, ROUGHNESS, BLANARTY, INFILLING MATERIAL AND TIGHTINES DEPTH. TYPE, ORIENTATION, ROUGHNESS, BLANARTY, INFILLING MATERIAL AND TIGHTINES DEPTH. TYPE, ORIENTATION, ROUGHNESS, BLANARTY, INFILLING MATERIAL AND TIGHTINES DEPTH. TYPE, ORIENTATION, ROUGHNESS, BLANARTY, INFILLING MATERIAL AND TIGHTINES DEPTH. TYPE, ORIENTATION, ROUGHNESS, BLANARTY, INFILLING MATERIAL AND TIGHTINES DEPTH. TYPE, ORIENTATION, ROUGHNESS, BLANARTY, INFILLING MATERIAL AND TIGHTINES DEPTH. TYPE, ORIENTATION, ROUGHNESS, BLANARTY, INFILLING MATERIAL AND TIGHTINES DEPTH. TYPE, ORIENTATION, ROUGHNESS, BLANARTY, INFILLING MATERIAL AND TIGHTINES DEPTH. TYPE, ORIENTATION, ROUGHNESS, BLANARTY, INFILLING MATERIAL AND TIGHTINES DEPTH. TYPE, ORIENTATION, ROUGHNESS, BLANARTY, INFILLING MATERIAL AND TIGHTINES DEPTH. TYPE, ORIENTATION, ROUGHNESS, BLANARTY, INFILLING MATERIAL AND TIGHTINES DEPTH. TYPE, ORIENTATION, ROUGHNESS, BLANARTY, INFILLING MATERIAL AND TIGHTINES DEPTH. TYPE, ORIENTATION, ROUGHNESS, BLANARTY, INFILLING MATERIAL AND TIGHTINES DEPTH. TYPE, ORIENTATION, ROUGHNESS, BLANARTY, INFILLING MATERIAL AND TIGHTINES DEPTH. TYPE, ORIENTATION, ROUGHNESS, BLANARTY, INFILLING MATERIAL AND TIGHTINES DEPTH. TYPE, CREATE, TYPE, TYPE, CREATE, TYPE, TYPE, CREATE, TYPE, TYPE, CREATE, TYPE, T	WATER LEVELS : 4.	3 ft bg	s on 5		17/200		
1-16.7 60.0 5 60.1-60.3"-Mechanical break, rough, undulating, undulating, undulating, undulating, undulating, undulating, open, dark gray accretion over 30% of surface, <0.0 1' flinks of St. 5 58 >10 0.75 - Fracture, borizontal, rough, undulating, undulati	\$Q₽ 08			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
1-16.7 60.0 5 60.1-60.3 - Mechanical break, rough, undulating, undulating, undulating, undulating, undulating, open, dark gray accretion over 30% of surface, <0.0 11 flick of surface, <0.0 11 flick of surface, <0.0 11 flick of surface, <0.0 11 flick of surface, <0.0 11 flick of surface, <0.0 11 flick of surface, <0.0 11 flick of surface, <0.0 11 flick of surface, <0.0 11 flick of surface, <0.0 11 flick of surface, <0.0 11 flick of surface, <0.0 11 flick of surface, <0.0 11 flick of surface, <0.0 11 flick of surface, <0.0 11 flick of surface, trace organics, of surface, surface of surface, su	DEPTH BELO SURFACE AN ELEVATION (f CORE RUN, LENGTH, AND	Ø	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
R1-NQ 5 ft 98% 5 8 >10	40.7			undulating, multiple angles 60.4' - Fracture, 50 deg, rough, undulating, open, dark gray accretion over 30% of		 60.0-61.8' - pale yellowish brown, (10YR 6/2), fine grained, mild to moderate HCl reaction, medium 	Begin rock coring at 60'
1 tight 62.3 - Bedding plane, horizontal, at interface with soft material 62.4-6.2 5 - Fracture zone, soft material, multiple fragments 63.6 - 6.2 5 - Fracture zone, soft material, multiple fragments 63.3 6.4 2.6 4.4 - Bedding plane (3), horizontal, rough, undulating, tight 64.5 - Fracture, 20 deg, rough, undulating, open 5 ft 80% 1 - Fracture, 20 deg, pieces missing could be because soft material or dissolution, open 4/18" 88.7 - Fracture, 20 deg, rough, undulating, open 67.8 - 70.0 - moderate olive brown, 67.8 - 10.0	- 5 ft			60.75' - Fracture, horizontal, rough, undulating, tight 61.15-61.3' - Fracture zone, rough, undulating, multiple angles		over 40% of surface, trace organics, 5% voids to 3/8" - 61.8-62.6' - pale yellowish brown, (10YR 6/2), mild HCl reaction,	-
75 75.0 R2-NQ 6 1				tight 62.3' - Bedding plane, horizontal, at interface with soft material 62.4-62.6' - Fracture zone, soft material,		R1), trace to 30% organics 62.6-63.25' - Same as 60.0-61.8' except up to 50% coverage of small voids and trace fossil molds/casts	R1: 8 minutes
R2-NQ 5 ft 64% 40 0 2 68.2' - Bedding plane, <20 deg, pieces missing could be because soft material or dissolution, open <1/8" 68.8' - Fracture, 75 deg, rough, undulating, open <1/8" 69.1' - Fracture, 40-50 deg, rough, undulating, open <1/8" 70.7 71.85, 72.5 and 73.45' - Bedding plane (2), <10 deg, pieces missing could be because soft material or dissolution, open <1/8" 70.7 71.85, 72.5 and 73.45' - Bedding plane (2), <10 deg, pieces missing could be because soft material or dissolution, open <1/8" 70.7 71.85, 72.5 and 73.45' - Bedding plane (2), <10 deg, pieces missing could be because soft material or dissolution, open <1/8" 70.7 71.85, 72.5 and 73.45' - Bedding plane (2), <10 deg, pieces missing could be because soft material or dissolution, open <1/8" 70.7 71.85, 72.5 and 73.45' - Bedding plane (2), <10 deg, pieces missing could be because soft material or dissolution, open <1/8" 70.7 71.85, 72.5 and 73.45' - Bedding plane (2), <10 deg, pieces missing could be because soft material or dissolution, open <1/8" 70.7 71.85, 72.5 and 73.45' - Bedding plane (2), <10 deg, pieces missing could be because soft material or dissolution, open <1/8" 70.7 71.85, 72.5 and 73.45' - Bedding plane (2), <10 deg, pieces missing could be because soft material or dissolution, open <1/8" 70.7 71.85, 72.5 and 73.45' - Bedding plane (2), <10 deg, pieces missing could be because soft material or dissolution, open or 1/8" 70.7 71.85, 72.5 and 73.45' - Bedding plane (2), <10 deg, pieces missing could be because soft material or dissolution, open or 1/8" 70.7 71.5 4.5 ft. Vilva ft. Vi			0	63.3, 64.2, 64.4' - Bedding plane (3), horizontal, rough, undulating, tight 64.5' - Fracture, 20 deg, rough, undulating,		64.5-64.9' - Same as 60.0-61.8' except 10% coverage of small voids No Recovery 64.9-65.0' Limestone 65.0-66.0' - light olive gray, grading to yellowish brown, (5Y 5/2, 10YR	
R3-NQ	_ 5 ft		0	missing could be because soft material or		surface, deep dissolution cavity up to 1-1/2"x1" at 65.8' No Recovery 66.0-67.8' Limestone 67.8-70.0' - moderate olive brown,	Driller's Remark: Hard at 68.0-70.0'
83-NQ 5 ft 80% 48 2 2 Solution of the process in the pieces missing could be because soft material or dissolution, open <1/8" 70.7, 71.85, 72.5 and 73.45' - Bedding plane (4), <5 deg, rough, undulating, open <1/8" 70.85, 71.1' - Bedding plane (2), <5 deg, rough, undulating, tight				68.8' - Fracture, 75 deg, rough, undulating, open <1/8" 69.1' - Fracture, 40-50 deg, rough, —		silts, trace fossils on surface, trace small voids to 1/16" 70.0-73.45' - light olive gray,	
NR 71.15-71.45' - Fracture zone 71.15-71.45' - Fracture zone 71.95' - Bedding plane, <5 deg, rough, undulating, open 1/2" 73.8-74.0' - Fracture zone 75.0-75.3' - Fracture zone 75.0-75.3' - Fracture zone 75.4, 75.6, 75.7' - Bedding plane (3), <10 deg, rough, undulating, open to 1/8" 76.25' - Bedding plane, <10 deg, rough, undulating, open to 1/8", not fully broken 73.45-74.0' - yellowish brown, (10YR 5/4), moderate HCI reaction, very weak (R1), tightly compacted silts, shows "infill" of pale olive 10YR 6/2 and medium light gray (N6), shallow dissolution features to 1/2", trace fossils to 1/4", in both the rock and tightly compacted silts the clasts/infill are up to 1/4" No Recovery 74.0-75.0' Driller's Remark: No resistance felt-very soft a			>10	69.7, 69.9 - Bedding plane (2), <10 deg, pieces missing could be because soft material or dissolution, open <1/8" 70.7, 71.85, 72.5 and 73.45 - Bedding plane (4), <5 deg, rough, undulating, open <1/8" 70.85, 71.1 - Bedding plane (2), <5 deg,		brown, (5Y 5/2, 10YR 5/9 and 5Y 4/4), moderate HCl reaction, weak (R2), very weak (R1) from 70.7-71.5, <10% small voids to 1/16", no fossils	-
75		40	>10	71.15-71.45' - Fracture zone 71.95' - Bedding plane, <5 deg, rough, undulating, open 1/2"		- 5/4), moderate HCl reaction, very	R3: 8 minutes
R4-NQ Driller's Remark: No resistance felt-very soft a			>10	75.4, 75.6, 75.7' - Bedding plane (3), <10 deg, rough, undulating, open to 1/8"		shows "infill" of pale olive 10YR 6/2 and medium light gray (N6), shallow dissolution features to 1/2", trace fossils to 1/4", in both the rock and tightly compacted silts the clasts/infill are up to 1/4"	-
42% 77.0-77.5' and 78.0-78.2' Assume core loss from 77.1' onward 77.1' onward				undulating, open to 1/8", not fully broken		No Recovery 74.0-75.0'	resistance felt-very soft at 77.0-77.5' and 78.0-78.2' Assume core loss from
R4: 6 minutes	80 80.0		141			-	_



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-12	SHEET	5	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723919.8 N, 457828.5 E (NAD83)

ELEVATION: 43.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

				HENT : CIVIE 33 3/N 299203, ITING TOTALLY, INQ TOOLS, HAVE		
WATER	LEVELS: 4.3	ft bg	s on 5		17/20	
≥□≎	<u> </u>			DISCONTINUITIES	ပ္က	LITHOLOGY COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,
ᆱ႘ᆮ	Ş,Ÿ	(%) Q	N N		1 🖺	MINERALOGY, TEXTURE, MINERALOGY, TEXTURE, FLUID LOSS, CORING RATE AND
YFA AFA	E SO) O	P	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	B _C	WEATHERING, HARDNESS, AND ROCK MASS
		a Q	F.RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ž	CHARACTERISTICS DROPS, TEST RESULTS, ETC.
-36.7	014	ш.	ш.п.	<u> </u>		
-30.7			1	80.1' - Fracture zone, rough		Limestone End drilling for the day, 80.0' at 1800 hrs on 5/9/07
			'		Н	except color grades from pale olive P. De Sa'Rego begins
-					⇈	(10Y 6/2) to light olive grey (5Y 5/2) logging borehole
-			6	81.2, 81.3' - Fracture (2), 7 deg, rough,	仜	at 75.2', moderate yellowish brown SC-1 collected at 80.2-
_				undulating 81.4-81.6' - Fracture zone	⊢	(10YR 5/4) mottling, moderate HCl 81.1'
	R5-NQ			81.8' - Mechanical break, 60 deg, rough,		reaction, very weak, weak to medium strong (R2 to R3) at 75.6-77.1',
	5 ft 72%	23	3	undulating, tight	ш	tightly compacted silts, <10% small
-	12/0			82.1' - Fracture, horizontal, rough, planar,	╁	voids to 1/16", no fossils seen on
-			2	open <1/8"	+	_ surface
				82.3' - Bedding plane, horizontal, smooth, planar		No Recovery 77.1-80.0'
			NR	82.4, 82.75, 83.1, 83.4' - Fractures, <10 deg,	\vdash	Silt (ML)
0.5	05.0			smooth to rough, undulating	亡	80.0-80.2' - moderate yellowish
85 <u> </u>	85.0				仜	brown, (10YR 5/4), medium plasticity, 3/4" limestone fragments
			4	85.2-85.25' - Fractures (2), 20-30 deg,	\vdash	Limestone -
				smooth to rough, planar		80.2-83.6' - moderate yellowish
1 1				85.35, 85.55' - Fractures (2), horizontal, rough, planar	щ	brown, (10YR 5/4), moderate HCI
-			4	86.2' - Fracture, horizontal, rough, undulating,	╁	reaction, weak to medium strong (R2
-	50.110			tight		to R3), small (1/16") voids 15-20% of
l _	R6-NQ 5 ft	20	- 10	86.3' - Mechanical break, 45 deg	╙	surface, larger cavities/fossil molds up to 3/4", fine grained interval from
	62%	20	>10	86.9' - Fracture, horizontal, rough to smooth,	Н	91 3 92 51 Diller's Remark. Suit
-				undulating, tight 87.2-87.3' - Fracture zone		No Bosovony 92 6 95 0' Zones 87.5-88.0', 89.5-
-				87.2-87.3 - Fracture zone 87.6-87.8' - Fracture zone, 30 deg, rough,	╙	Limestone -
-			NR	stepped to undulating, possible mechanical	一	85.0-86.0' - moderate yellowish
			INIX	break		brown, (10YR 5/4), medium grained, R6: 5 minutes - 30-40% voids up to 1/8" in size, trace
90	90.0				⊬	fossil molds/cavities up to 3/8", trace
-46.7	30.0			90.0-90.6' - Fracture zone	仜	fossil casts up to 5/16"
-			>10	-	₩	- 86.0-88.1' - Same as 85.0-86.0' -
-				_	├-	except fine grained, weak (R2),
			,	91.1' - Mechanical break, <5 deg, rough,		10-20% inclusions of dark orange material up to 3/8" from 87.2-87.4'
			4	undulating, tight, possibility due to large	Н	No Recovery 88.1-90.0'
-	R7-NQ			cavity - 91.65-92.2' - Fracture zone, 0-30 deg, rough,	<u> </u>	Limestone
-	5 ft	37	4	planar to undulating	仜	_ 90.0-92.2' - Same as 85.0-86.0' -
	80%			'	\vdash	92.2-94.0' - grayish orange, (10YR SC-2 collected at 92.6-
				93.0' - Fracture, horizontal, rough, undulating,	亡	7/4), fine grained, weak (R2), voids 93.45' [93.45]
			2	1/8" relief 93.2' - Fracture, horizontal, smooth, planar	\coprod	trace fossils casts/cavities up to
-				93.6' - Fracture, horizontal, smooth, planar,		3/8"x1-3/16" at 92.8' and at R7: 8 minutes
-			NR	1/4" relief		_ 93.2-93.7', very weak rock (R1) at _
95	95.0			_	╙	93.0-93.2'
-51.7				95.05' - Fracture, horizontal, smooth,		No Recovery 94.0-95.0'
1 7			>10	anadiating, or rollion	广	95.0-96.3' - very pale orange, (10YR
-				95.32-95.56' - Clay seam, horizontal, smooth, planar, contact on both sides, tight, some	╀	8/2), very fine to fine grained, weak
-			5	black staining on lower surface		(R2), <5% voids up to 1/16" in size,
			Ĺ	95.8-96.0' - Fracture zone		dark laminae over 50% of surface at
1 7	R8-NQ		1	96.2-96.3' - Fracture zone		95.5-95.7' 96.3-97.4' - Same as 95.0-96.3'
-	5 ft	28		96.65-96.95' - Mechanical break	口	except very weak (R1), voids
-	48%			-	-	(1/16"-1/8") up to 15%, fossil
						molds/cavities up to 3/8"x3/16" over
			NR			5-10% of rock, poorly to moderately
				·	1—	fossiliferous with depth No Recovery 97.4-100.0'
-				-	Ľ	NO NECOVERY 37.4-100.0
100	100.0				\Box	



PROJECT NUMBER:

33884.FL

B-12

SHEET 6 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723919.8 N, 457828.5 E (NAD83)

ELEVATION: 43.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

				HENT . CIVIE 33 3/N 299203, ITIUU TOLAIY, NQ LOOIS, HW C			ORIENTATION: Vertical
WATER	LEVELS: 4.3	ft bg	s on 5		17/20		
>				DISCONTINUITIES	ڻ ا	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
HH	L, A	(%	FRACTURES PER FOOT		임	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
HÄÄ	GTE	(%) Q	FS	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
P. E. E.	E E S	a Q	RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	0716	IĽ.	шп		S	017.00.012.00.000	
-56.7			3	100.2' - Fractures (3), 40 deg, planar, small	\vdash	Limestone	M. Faurote begins logging borehole
			3	fragments		100.0-103.4' - very pale orange,	borenole
-				100.4' - Mechanical break, 2-5 deg, smooth,	┨	(10YR 8/2), very fine to fine grained, strong HCl reaction, extremely weak	1
-			5	planar	╂┷	(R0), exhibits 8-15% fossil cast	-
				101.2, 101.6' - Mechanical break, 0-2 deg, smooth, planar		related open space, and there are	_
	R9-NQ			101.8' - Fracture, 60 deg, rough, undulating,		sporadic small <1/4" shells, blebs of	
-	5 ft	26	>10	open, the fracture is sub parallel to another	╁	carbon are visible at 1% or less	1
-	68%		>10	fracture that is not separated		_	-
_			/10	101.9, 101.95' - Fractures (2), fragments are	┢	No Recovery 103.4-105.0'	_
				1" in diameter		No Recovery 103.4-103.0	
1 7			NR	102.5, 102.65, 102.7' - Bedding plane (3), smooth, undulating	ш	_	R9: 4 minutes
-				SSout, arradiating	1-	-	-
105 <u> </u>	105.0			_	╂	_	
-01./			>10	105.2-106.05' - Fracture zone, 0-3 deg,	Д	Limestone]
			- 10	smooth, undulating, bedding plane	Н	105.0-108.45' - very pale orange,	
-				separations, primarily depositional, 1/2"	╁	 (10YR 8/2), very fine to fine grained, strong HCl reaction, extremely weak 	1 1
-			2	spacing	匚	(R0), thin bedding, the organic	1 -
_				106.7' - Mechanical break	┢	 content remains the same, but 	_
	R10-NQ		- 10	107.1' - Mechanical break		exhibits planar surface coating at	
	5 ft 69%	28	>10	107.2-107.7' - Fracture zone, 0-3 deg,	Ш	105.1', numerous 1/2" beds with	1
-	0070		0	smooth, undulating, bedding plane separations, primarily depositional, 1/2"	╁	distinctive partings in two zones. The thin bedded materials show 10-15%	1
-				spacing		open space from fossil casts and	-
_				108.0' - Mechanical break, horizontal	ш	_ molds. The more persistent, larger	
			NR	, in the second of the second	\vdash	beds exhibit larger shell openings	R10: 5 minutes
110	110.0					and small dissolution cavities up to	1
-66.7	110.0			-	╨	3/8" No Recovery 108.45-110.0'	
-			3			Limestone	There is a carbonate sand associated with some of
I _				110.7-112.0' - Bedding plane, multiple		_ 110.0-113.45' - very pale orange,	the lost recovery zones.
				partings with beds from 1/8" or less to 8" or	\vdash	(10YR 8/2), very fine to fine grained,	This limestone continues to
-			2	more	ш	 strong HCl reaction, extremely weak (R0), exhibits 8-15% fossil cast 	at least 115.0'
-	R11-NQ				╁	related open space, and there are	1 -
-	5 ft	22	>10		╨	- sporadic small <1/4" shells, blebs of	l -
	69%					carbon are visible at 1% or less	
			>10		\vdash] 1
-				,		No Recovery 113.45-115.0'] 1
-			NR		Ш	-	R11: 6 minutes
-			INK		+	-	End drilling for the day at
115	115.0						17:51 on 5/10/07
-71.7					\vdash	No Recovery 115.0-120.0'	D. Whitaker begins logging
-						-	borehole -
-						-	Core barrel slid back to
_					╀		bottom of hole
1 7	R12-NQ						Medium dark sand grains
-	5 ft	0	NR		1	-	on outside of barrel
-	0%				厂	_	may/may not not be carbonate
_					\vdash	_ _	J
1 7					\Box		R12: 5 minutes
					+	-	
120	120.0		_				
					1		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-12	SHEET	7	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723919.8 N, 457828.5 E (NAD83)

ELEVATION: 43.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

CORING	I WE I HOD AI	ND EC	JUIPIV	IENT: CME 55 S/N 299205, mud rotary, NQ tools, HW	casing		ORIENTATION : Vertical
WATER	LEVELS: 4.3	ft bgs	s on 5/	117/07 START : 5/8/2007 END : 5	/17/20	D7 LOGGER: R. Gomez, R. Bitely,	T. Stewart
				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ις.	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표원인	ΥCN +,Α ER)	(%	뿔		의	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
TH X	RE FIGURE	Q D (%)	FCT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	₽	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	SEN	S. O.	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S⊀I	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-76.7					+	No Recovery 120.0-125.0'	Water level 4.3' below
-					\blacksquare	-	ground at 08:00, 05/17/08 -
_					ᅪ	_	Interval may be send not
I _					┸	=	Interval may be sand, not rock
					Н		l .co.v
	R13-NQ				\vdash		1
	5 ft 0%	0	NR		1	_	1 1
-	0,0				Ш	-	1 1
-						_	1 -
-					+	_	R13: 4 minutes
-					-	=	- T(10. 4 minutes
125	125.0			_	┵┦	L., -	_
-81.7					」	No Recovery 125.0-130.0']
]					H		1
						-	1 1
-					╁┼	-	1 1
-	R14-NQ				世	-	1 -
-	5 ft	0	NR		+	-	1 -
-	0%				-	_	1 -
_					ᅪ	<u>-</u>	_
_					\Box	_	
							R14: 3 minutes
130	130.0				Н		
-86.7				130.0-130.4' - Fracture zone, rough,		Limestone	
-			>10	undulating, gravel size fragments <2" diameter	111	 130.0-132.3' - yellowish gray, (5Y 8/1), fine to medium grained, strong 	1 1
-				130.5-132.25' - Bedding plane (14), <10 deg,	世	HCl reaction, extremely weak to very	1 -
-			>10	smooth to rough, undulating, tight to open	+	 weak (R0 to R1), trace voids, no 	1 -
-	D45 NO		>10	1/2"	#	cavities, no fossil molds	-
-	R15-NQ 5 ft	0	-10		┵	- No Recovery 132.3-135.0'	_
_	46%				Щ	_	
					Н		
			NR		\Box		1
					1		R15: 4 minutes
125	125.0				1円	-	1 1
135_ -91.7	133.0		\vdash	135.0-135.1, 135.5-135.6, 135.8-135.9,	世	Limestone	-
-			>10	136.05-136.2, 138.1-138.2, 138.3-138.4' -	+	135.0-135.7' - yellowish gray, (5Y	-
-				Fracture zone (6), rough, undulating, gravel	##	 8/1), very fine to medium grained, 	-
			>10	size fragments <1" diameter 135.2-135.45, 135.6, 135.85-135.95,	\bot	extremely weak to very weak (R0 to R1), trace coarse grains]
				136.35-138.05' - Bedding plane or	Щ	135.7-136.2' - Same as 135.0-135.7'	
	R16-NQ			mechanical break (18), <10 deg, smooth to rough, undulating, open <3/4"	\mathbb{H}	except very fine to fine grained,	1
1 7	5 ft 70%	20	1	rough, unuulaung, open <3/4	1	medium strong (R3), no voids _ 136.2-138.5' - Same as 135.0-135.7'	1
-			>10		1-1-1	except fine to coarse grained, strong	1
-			HŤ		世	HCl reaction, voids 1/4" or less over	-
-					+	_ 10% of surface, trace fossils and fossil molds, no cavities	R16: 5 minutes
-			NR		\Box	No Recovery 138.5-140.0'	-
140	140.0				$\perp \!\!\!\!\perp \!\!\!\!\perp$		1



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-12	SHEET	8	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723919.8 N, 457828.5 E (NAD83)

ELEVATION: 43.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

WATER	LEVELS : 4.3	ft bgs	s on 5/		17/20		
ŞΩ£	(%			DISCONTINUITIES	Ŋ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
E SE	S F.A	(%) Q	<u> </u> 58	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	딩	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
F F F	N S S S S S S S S S S S S S S S S S S S	OΩ	SAC ER F	PLANARITY, INFILLING MATERIAL AND	₩ WB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	822	22	F F	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	3.10. 0, 120. 1202. 0, 2.0.
-96.7			9	140.1-140.9' - Bedding plane (8), <10 deg,	Н	Limestone - 140.0-141.0' - yellowish gray, (5Y	
			9	slickensided to rough, undulating, open 1/2" or less	工	8/1), very fine to medium grained,	
-				140.95-141.4. 142.0-142.4' - Fracture zone	╆	strong HCl reaction, extremely weak	-
-			>10	(2), rough, stepped to undulating, fine to		 to very weak (R0 to R1), trace small (1/16" or less) voids, few fossils, 	-
-	l R17-NQ		>10	coarse gravel sized fragments <2" diameter	╫	trace recrystallization, trace coarse	-
-	5 ft	10	- 10		┰	– grained	-
-	48%				╁┼╴	141.0-142.4' - yellowish gray, (5Y 8/1), very fine grained, moderate HCl	-
_					\Box	reaction, medium strong (R3), <5%	_
_			NR			coverage of small (1/16") voids, 10%	_
1 _					\vdash	cavities and fossil molds, trace fossils	R17: 9 minutes
145	145.0				世	No Recovery 142.4-145.0'	
-101.7				_	1—	Limestone	
-			2	145.6' - Fractures (2), 60 deg, smooth and		145.0-146.05' - yellowish gray, (5Y	
-				undulating, rough and stepped, perpendicular	╁	8/1), very fine grained, moderate HCI reaction, weak (R2), 5% voids 1/16"	-
-			3	fractures, open <1/8" 146.0' - Mechanical break	╨	over 50% of interval, no cavities or	-
-	R18-NQ			146.3-146.9' - Bedding plane (5), <10 deg,	世	L fossils 146.05-149.5' - yellowish gray, (5Y	SC-3 collected at 147.0-
-	5 ft	72	0	slickensided to rough, undulating, open <1/2"	╁╌	8/1), very fine to medium grained,	148.0'
-	90%			148.0' - Mechanical break		strong HCl reaction, very weak (R1),	-
-			1	146.0 - Medianical Dreak		20% coverage of voids 1/16", trace fossils and fossil molds	-
-				148.85-149.45' - Bedding plane (4), <10 deg,	₽	-	
-			3	slickensided to rough, undulating, open <1/2"	口		R18: 8 minutes
150_	150.0		NR		上	No Recovery 149.5-150.0'	
-106.7						Bottom of Boring at 150.0 ft bgs on - 5/17/2007	Total depth is 150.0'
						3/1//2007	
-					1	_	1
-					1	-	
-					1	-	
-					1	-	-
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PROJECT NUMBER:	BORING NUMBER:	
338884.FL	B-13	SHEET 1 OF 8

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723995.1 N, 457903.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

WATER	LEVELS	: 2.0 ft bo	gs on 6/0	5/07 5	START : 6/5/2007 END : 6/6/2007 LOGGER : R. McComb
				STANDARD	SOIL DESCRIPTION COMMENTS
SAMPLE INTERVAL (ft) PENETRATION TEST RESULTS				PENETRATION	ğ
ACE TO TO TO TO TO TO TO TO TO TO TO TO TO	RECOVERY (ft)		RECOVERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
42.2	0.0			(. •/	Topsoil
_		0.9	SS-1	2-2-2	\ 0.0-0.1' - dark gray, (N2), moist, very fine to fine \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
-	1.5			(4)	Poorly Graded Sand With Organics (SP)
-					\ \ 0.1-0.9' - light to medium gray, (N7 to N6), moist, very -
					\\ \10-15% organic fines and rootlets, decreasing with \\ \depth, silica sand
_					uepiii, siiica saiiu
-					-
-					-
	5 0				-
5 37.2	5.0				Silty Sand (SM)
-		0.6	SS-2	1-1-0	5.0-5.6' - moderate yellowish brown, (10YR 5/4), wet, very loose, no HCl reaction, 10% fines, trace black
-	6.5			(1)	(non carbonate) gravel, silica sand
]
_					<u> </u>
-					-
-					-
					-
10 <u> </u>	10.0				Silt (ML)
-		1.1	SS-3	29-30-34	10.0-11.1' - grayish orange, (10YR 7/2), wet, hard, rapid dilatancy, mild HCl reaction, trace very
-	11.5			(64)	fine-grained sand, all carbonate
]
_]
_					<u> </u>
-					4
-					
4.5	15.0				-
15 <u> </u>	15.9	0.1	SS-4	50/1	Limestone Fragments
-				(50/1")	\ \ 15.0-15.1' - grayish orange, (10YR 7/2), mild HCl reaction, extremely weak (R0), coarse sand-sized \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
-					pyrite nodules
]
]
_]
-]]
-					
-					-
20					++



WATER LEVELS: 2.0 ft bgs on 6/05/07

PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-13	SHEET	2	OF	8	

SOIL BORING LOG

LOGGER: R. McComb

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723995.1 N, 457903.5 E (NAD83)

START: 6/5/2007

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

END: 6/6/2007

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

SOIL DESCRIPTION COMMENTS STANDARD LOG DEPTH BELOW SURFACE AND ELEVATION (#) PENETRATION TEST RESULTS SAMPLE INTERVAL (ft) SYMBOLIC SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION #TYPE 6"-6"-6" (N) Silty Gravel With Sand (GM) 20.0 20.0-21.2' - grayish orange, (5Y 8/4), wet, very dense, 29-36-26 SS-5 1.2 fine to coarse grained, mild HCI reaction, 30% fine to (62)coarse limestone gravel, 30% nonplastic fines 21.5 Some rig chatter from 20-25' 25_ 17.2 25.0 Sandy Silt (ML) 25.0-25.6' - grayish yellow, (5Y 8/4), wet, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction, 5-11-14 0.6 SS-6 (25)25-30% fine to medium grained sand, trace fine 26.5 gravel, all carbonate 30 0.0 SS-7 50/2 No Recovery 30.0-30.2' (50/2")35.0 Silty Sand With Limestone Fragments (SM) 35.0-36.3' - grayish yellow, (5YR 8/4), wet, very dense, fine to coarse grained, mild to moderate HCI 32-43-50/5 SS-8 1.3 (93/11")reaction, 20-25% nonplastic fines, 30% fine to coarse 36.4 limestone gravel, organic black staining on some rock fragments, all carbonate Hard drilling at 38' Limestone Fragments 0.1 SS-9 50/2.5 40.0-40.1' - light olive gray, (5Y 5/2), mild HCI reaction, extremely weak (R0) (50/2.5")40



PROJECT NUMBER:

338884.FL

B-13

SHEET 3 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723995.1 N, 457903.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

COMM	IVILITIODAI	ND L	ZOIFIV	IENT: CME 550 S/N 1860/3, mud rotary, NQ tools, NW	Casin	<u> </u>	ORIENTATION : Vertical
WATER	LEVELS: 2.0	ft ba	s on 6	/05/07 START: 6/5/2007 END: 6/	6/2007	7 LOGGER : R. McComb	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)				- l	EITHOLOGY	COMMENTO
N S S	z Z Z Z		ES	DESCRIPTION		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
프링은	S-F	(%) _Q	50	DEDTH TYPE OPICHTATION POLICHNESS	וֿבָּוּ	MINERALOGY, TEXTURE,	FLUID LOSS, CORING RATE AND
₽₽₹	% <u>p</u> 2		P. F.	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	IĕI	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
		S. O.	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
2.2				40.0.40.051.5.4	1 "		A1 40 01 11 1 1
2.2	40.0		10	40.0-40.35' - Fracture zone, limestone fragments, various orientations	Н	Limestone - 40.0-41.7' - dusky yellow, (5Y 6/4),	At 40.0' switched over to NQ rock coring -
			10	40.35' - Bedding plane or mechanical break,	Ш	mild to moderate HCl reaction, weak	NQ TOCK COILING
-				horizontal, rough, planar, loose	Ш	(R2), fossiliferous (casts/molds) with	-
-			1	41.35' - Fracture, horizontal to 40 deg, rough,	₽₩	- some cavities generally 3/8"x3/16",	_
				stepped, loose	Ш	voids up to 1/16" over 25%-30% of	
-	R1-NQ			,,	Ш	rock surface, light olive gray	_
-	5 ft	20			ш	 intraclasts, suspended in fine grained 	-
l _	34%				Н	matrix (intraclasts typically 3/8"x3/16"	_
			NR		Н	or less).	
-			' ' ' '		Ш	No Recovery 41.7-45.0'	-
-					Н	_	
					Н		R1: 3 minutes
45	45.0				Ш		1
-2.8	73.0			45.11 Fracture 70 dos reush planes distri		 Limestone	-
			4	45.1' - Fracture, 70 deg, rough, planar, tight	╀┦	- 45.0-49.4' - Same as 40.0-41.7'	
				45.5' - Bedding plane, horizontal, undulating,	Н	except very weak (R1)	
-				loose 45.65' - Fracture, 60 deg, rough, stepped,			Driller's Remark: 46.0-48.0'
-			0	loose	ш	_	very soft -
l -				45.9' - Fracture, 50 deg, rough, undulating,	Н	_	_
	R2-NQ	00		loose	Н		
-	5 ft 88%	69	2	47.2' - Bedding plane, horizontal to <5 deg,			1
-	0070			rough, stepped, loose	╁┼┤	_	
l -			1	47.5, 47.8' - Fractures (2), horizontal to >80	Н	_	_
			l '	deg, rough, undulating, extending into			
-			0	incipient fracture trace that dies out 48.75' - Bedding plane, <5 deg, rough,	Ш	-	R2: 3 minutes
-			NR	undulating, loose, intersected by incipient	Н	No Recovery 49.4-50.0'	-
50	50.0		NK	fracture that is nearly vertical and dies out at _	Ы		
-7.8				end of R2		Limestone	
-			2	50.35' - Fracture, 20 deg, rough, undulating,	ш	- 50.0-53.5' - Same as 40.0-41.7'	-
-				tight	Н	except cavities more common up to	-
			1	50.7' - Fracture, 70 deg, rough,		3-5%, fossiliferous cast/molds becoming more fossiliferous with	
			'	stepped/undulating, tight, black organic	ш	depth, extremely weak zone (R0)	
-	R3-NQ			staining on 1-3% surface 51.8' - Fracture or mechanical break, <5 deg,	Н	from 52.65 to 56.85', incipient	-
-	5 ft	72	1	rough, stepped, loose	+	- fracture from 50.9-51.2', inclined 70	
	82%	_		52.65' - Fracture or mechanical break, <5		degrees.	Driller's Remark: 52.5-53.0'
Ι -				deg, rough, stepped, tight	1 + 1	53.5-54.1' - yellowish gray, (5Y 7/2),	soft -
I -			3	53.01' - Fracture, 40 deg, rough, undulating,	╂╨┤	 fine to very fine grained, moderate to 	Driller's Remark: 53.5-54.5'
l -			<u> </u>	tight		strong HCl reaction, weak to medium	soft -
				53.3-53.45' - Fracture zone, rough, stepped		strong (R2 to R3), voids covering	R3: 5 minutes
			NR	to undulating, 60-70 deg to horizontal, tight to	ш	- 10%-15%, cavities rare	1
55 <u> </u>	55.0			loose _	╂┼┦	(<3/16"x3/16"). No Recovery 54.1-55.0'	_
12.0			1			- Limestone	1 -
				55.95' - Bedding plane or mechanical break,	Щ	55.0-55.9' - Same as 53.5-54.1'	
I -				horizontal to <5 deg, rough, stepped, loose	+	55.9-58.5' - dusky yellow to moderate	SC-1 collected at 55.0-
-			>10	56.38-56.7' - Fracture zone, gravel-sized	+	 olive brown, (5Y 6/4 to 5Y 5/6), mild 	55.95' –
l _				limestone rock fragments, various	Ш	HCl reaction, weak (R2), with thin	
I -	R4-NQ			orientations	H	wispy laminae of black organic (N1)	1
l -	5 ft	18	10	56.9-57.05' - Fracture zone, various	╂╨┤	material, fossiliferous (casts and	-
l -	70%			orientations		molds), voids covering 35-40% of surface and cavities generally less	_
			2	57.4-57.6' - Fracture zone, same as		than 3/16"x3/16".	1
I -				56.38-56.7'	144	No Recovery 58.5-60.0'	I -
-					+	-	R4: 5 minutes
l -			NR				TAT. O HIIIIULES
60	60.0				Ш		
					\Box		
							1

APPENDIX 2BB-504 Rev. 7



PROJECT NUMBER:

338884.FL

B-13

SHEET 4 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723995.1 N, 457903.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION : Vertical

				IENT . CIVIE 550 5/N 186075, Hidd Totally, NQ tools, NVV	odonig		ORIENTATION : Vertical
WATER	LEVELS : 2.0	ft bg	s on 6	/05/07 START : 6/5/2007 END : 6/	6/2007	LOGGER : R. McComb	
> -	<u> </u>			DISCONTINUITIES	(7)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
필프	N <u> </u>	(9)	FRACTURES PER FOOT		- 의	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
FXF	H TES	(%) Q	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	<u>8</u>	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
PR R	유필의	Ø	RAC	PLANARITÝ, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Į₹I	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	025	œ	ш а		S		
-17.8				57.9-58.25' - Fracture zone, horizontal to 60	Ш	Limestone	
-			3	deg, rough, with bedding plane fractures at 58.15' and 58.25', inclined fracture from	H	 60.0-63.45' - dusky yellow to moderate olive brown, (5Y 6/4 to 5Y 	1
-				57.9-58.15', rough, undulating to stepped,	口	4/4), fine to very fine grained,	-
-			0	loose.	₽₩	- moderate to strong HCl reaction,	-
l _				60.5, 60.6, 60.7' - Bedding plane (3),	Ш	weak to medium strong (R2 to R3),	
	R5-NQ			horizontal to <5 deg, rough, stepped, loose		fossiliferous (casts/molds), voids up	Driller's Remark: 62.0-64.0'
-	5 ft	55	10	62.15-62.55' - Fracture zone, rough, extremely soft rock, some bedding plane	╀┼┼	to 1/16" covering up to 50-60% surface, extremely weak rock (R0)	very soft -
-	69%			fractures horizontal to vertical,	╆	from 60.1' to 62.5' with some silt and	Driller's Remark: All fairly
l -			0	undulating/stepped, tight to loose	\vdash	- sand-sized limestone rock	soft to 64.0'
				3 · · · · · · · · · · · · · · · · · · ·	Н	fragments, some voids up to 3/8-3/4"	0011 10 0 110
-	1		NR		Ш	x 3/8-3/4".	R5: 4 minutes
					╁┼┼	No Recovery 63.45-65.0'	-
65 <u> </u>	65.0				╂╫	<u> </u>	
			4	65.1, 65.2' - Bedding plane (2), horizontal to	Щ	Limestone - 65.0-69.4' - Same as 60.0-63.45']
			_	<5 deg, rough, stepped, loose 65.5' - Bedding plane, <5 deg, rough, loose	Н	except extremely weak rock (R0)	
-	1			65.8, 66.35' - Bedding plane (2), <5 deg,	Ħ	(similar to 62.1-62.5') from 66.0-66.7'	1
-			2	rough, loose	╂┴┼	- and 69.0-69.4'.	-
-	50.110			66.7- 67.7' - Fracture zone, >80 deg to	╂┼┼	_	-
l _	R6-NQ 5 ft	26	>10	vertical, series of several fractures, rough,		_	
	88%	20	10	undulating to stepped, loose	Н		
-					$\dagger \dagger \dagger$	=	1
-			0		口	-	-
-					₽₩	_	l
l _			1	69.0-69.1' - Fracture zone, horizontal to 60 deg, rough, undulating, tight			R6: 4 minutes
70	70.0		NR	deg, rough, undulating, tight	Н	No Recovery 69.4-70.0'	Driller's Remark: 69.5-70.0'
-27.8				70.1-70.15' - Fracture zone, horizontal to 60	1++	Limestone	very soft —
-			1	deg, rough, stepped, loose			
I _				1 - 3, - 3 , 1 ,	╓	- 70.0-73.1' - light olive gray, (5Y 5/2),	1 1
					Ħ	moderate HCl reaction, weak to]
l _			2	71.15' - Fracture, horizontal to 40 deg, rough,		moderate HCl reaction, weak to medium strong (R2 to R3),	SC-2 collected at 70.15-
-			3	stepped, loose		moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with	71.1'
-	R7-NQ		3	stepped, loose 71.35' - Mechanical break or fracture, 50 deg,		moderate HCl reaction, weak to medium strong (R2 to R3),	71.1' Tiller's Remark: 71.5-72.0'
- - -	R7-NQ 5 ft	16	3	stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight		moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae	71.1'
- - -				stepped, loose 71.35' - Mechanical break or fracture, 50 deg,		moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine	71.1' Driller's Remark: 71.5-72.0' _ soft
- - -	5 ft			stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side		moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained.	71.1' Driller's Remark: 71.5-72.0' soft - Driller's Remark: 73.0-74.5'
- - -	5 ft		10	stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough,		moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine	71.1' Driller's Remark: 71.5-72.0' _ soft
- - - -	5 ft			stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose		moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained.	71.1' Driller's Remark: 71.5-72.0' soft - Driller's Remark: 73.0-74.5'
- - - - -	5 ft 62%		10	stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose 72.72' - Bedding plane or mechanical break,		moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0'	71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes
- - - - - - 75	5 ft		10	stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.73-73.1' - Fracture zone, horizontal to >80		moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0' Limestone	71.1' Driller's Remark: 71.5-72.0'
 75_ -32.8	5 ft 62%		10 NR	stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.73-73.1' - Fracture zone, horizontal to >80 deg, rough, undulating, loose, with horizontal		moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0' Limestone 75.0-76.5' - Same as 70.0-73.1' except with lithoclasts from	71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes
	5 ft 62%		10	stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.73-73.1' - Fracture zone, horizontal to >80 deg, rough, undulating, loose, with horizontal fracture at 72.9' which propagates ½		moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0' Limestone 75.0-76.5' - Same as 70.0-73.1' except with lithoclasts from 76.3-76.5'; clasts up to 3/8" in length;	71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes End on 6/5/07, water approx. 2.0' below ground surface Start on 6/6/07, water
	5 ft 62%		10 NR	stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.73-73.1' - Fracture zone, horizontal to >80 deg, rough, undulating, loose, with horizontal fracture at 72.9' which propagates ½ diameter of core		moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0' Limestone 75.0-76.5' - Same as 70.0-73.1' except with lithoclasts from 76.3-76.5'; clasts up to 3/8" in length; medium gray (N5), mild reaction to	71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes End on 6/5/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground
	5 ft 62%		10 NR	stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.73-73.1' - Fracture zone, horizontal to >80 deg, rough, undulating, loose, with horizontal fracture at 72.9' which propagates ½ diameter of core 75.7' - Fracture, 70 deg, rough, undulating/stepped, tight		moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0' Limestone 75.0-76.5' - Same as 70.0-73.1' except with lithoclasts from 76.3-76.5'; clasts up to 3/8" in length; medium gray (N5), mild reaction to HCl, rounded clasts.	71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes End on 6/5/07, water approx. 2.0' below ground surface Start on 6/6/07, water
	5 ft 62%	16	10 NR	stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.73-73.1' - Fracture zone, horizontal to >80 deg, rough, undulating, loose, with horizontal fracture at 72.9' which propagates ½ diameter of core 75.7' - Fracture, 70 deg, rough, undulating/stepped, tight 75.85' - Bedding plane, horizontal to 70 deg,		moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0' Limestone 75.0-76.5' - Same as 70.0-73.1' except with lithoclasts from 76.3-76.5', clasts up to 3/8" in length; medium gray (N5), mild reaction to HCl, rounded clasts. 76.5-77.3' - medium dark gray, (N4),	71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes End on 6/5/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground
	5 ft 62%	16	10 NR 2 >10	stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.73-73.1' - Fracture zone, horizontal to >80 deg, rough, undulating, loose, with horizontal fracture at 72.9' which propagates ½ diameter of core 75.7' - Fracture, 70 deg, rough, undulating/stepped, tight 75.85' - Bedding plane, horizontal to 70 deg, rough, planar, loose		moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0' Limestone 75.0-76.5' - Same as 70.0-73.1' except with lithoclasts from 76.3-76.5'; clasts up to 3/8" in length; medium gray (N5), mild reaction to HCl, rounded clasts. 76.5-77.3' - medium dark gray, (N4), very fine grained, moderate HCl reaction, medium strong (R3), trace	71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes End on 6/5/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground surface
	5 ft 62% 75.0 R8-NQ 5 ft	16	10 NR	stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.73-73.1' - Fracture zone, horizontal to >80 deg, rough, undulating, loose, with horizontal fracture at 72.9' which propagates ½ diameter of core 75.7' - Fracture, 70 deg, rough, undulating/stepped, tight 75.85' - Bedding plane, horizontal to 70 deg, rough, planar, loose 76.3' - Bedding plane, horizontal, rough,		moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0' Limestone 75.0-76.5' - Same as 70.0-73.1' except with lithoclasts from 76.3-76.5'; clasts up to 3/8" in length; medium gray (N5), mild reaction to HCl, rounded clasts. 76.5-77.3' - medium dark gray, (N4), very fine grained, moderate HCl reaction, medium strong (R3), trace fossil casts/molds, zones of thinly	71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes End on 6/5/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground
	5 ft 62%	16	10 NR 2 >10	stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.73-73.1' - Fracture zone, horizontal to >80 deg, rough, undulating, loose, with horizontal fracture at 72.9' which propagates ½ diameter of core 75.7' - Fracture, 70 deg, rough, undulating/stepped, tight 75.85' - Bedding plane, horizontal to 70 deg, rough, planar, loose 76.3' - Bedding plane, horizontal, rough, planar		moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0' Limestone 75.0-76.5' - Same as 70.0-73.1' except with lithoclasts from 76.3-76.5'; clasts up to 3/8" in length; medium gray (N5), mild reaction to HCl, rounded clasts. 76.5-77.3' - medium dark gray, (N4), very fine grained, moderate HCl reaction, medium strong (R3), trace fossil casts/molds, zones of thinly laminated limestone with <1.0%	71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes End on 6/5/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground surface
	5 ft 62% 75.0 R8-NQ 5 ft	16	10 NR 2 >10	stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.73-73.1' - Fracture zone, horizontal to >80 deg, rough, undulating, loose, with horizontal fracture at 72.9' which propagates ½ diameter of core 75.7' - Fracture, 70 deg, rough, undulating/stepped, tight 75.85' - Bedding plane, horizontal to 70 deg, rough, planar, loose 76.3' - Bedding plane, horizontal, rough, planar 76.4-76.9' - Fracture zone, gravel (limestone) various orientations, generally planar to		moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0' Limestone 75.0-76.5' - Same as 70.0-73.1' except with lithoclasts from 76.3-76.5', clasts up to 3/8" in length; medium gray (N5), mild reaction to HCl, rounded clasts. 76.5-77.3' - medium dark gray, (N4), very fine grained, moderate HCl reaction, medium strong (R3), trace fossil casts/molds, zones of thinly laminated limestone with <1.0% voids grading to zones with voids up	71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes End on 6/5/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground surface
	5 ft 62% 75.0 R8-NQ 5 ft	16	10 NR 2 >10 3 1	stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.73-73.1' - Fracture zone, horizontal to >80 deg, rough, undulating, loose, with horizontal fracture at 72.9' which propagates ½ diameter of core 75.7' - Fracture, 70 deg, rough, undulating/stepped, tight 75.85' - Bedding plane, horizontal to 70 deg, rough, planar, loose 76.3' - Bedding plane, horizontal, rough, planar 76.4-76.9' - Fracture zone, gravel (limestone) various orientations, generally planar to undulating, rough to smooth, loose		moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0' Limestone 75.0-76.5' - Same as 70.0-73.1' except with lithoclasts from 76.3-76.5'; clasts up to 3/8" in length; medium gray (N5), mild reaction to HCl, rounded clasts. 76.5-77.3' - medium dark gray, (N4), very fine grained, moderate HCl reaction, medium strong (R3), trace fossil casts/molds, zones of thinly laminated limestone with <1.0%	71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes End on 6/5/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground surface Incipient fracture 75-75.6'
	5 ft 62% 75.0 R8-NQ 5 ft	16	10 NR 2 >10	stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.73-73.1' - Fracture zone, horizontal to >80 deg, rough, undulating, loose, with horizontal fracture at 72.9' which propagates ½ diameter of core 75.7' - Fracture, 70 deg, rough, undulating/stepped, tight 75.85' - Bedding plane, horizontal to 70 deg, rough, planar, loose 76.3' - Bedding plane, horizontal, rough, planar 76.4-76.9' - Fracture zone, gravel (limestone) various orientations, generally planar to undulating, rough to smooth, loose 77.3' - Bedding plane, rough, undulating to		moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0' Limestone 75.0-76.5' - Same as 70.0-73.1' except with lithoclasts from 76.3-76.5'; clasts up to 3/8" in length; medium gray (N5), mild reaction to HCl, rounded clasts. 76.5-77.3' - medium dark gray, (N4), very fine grained, moderate HCl reaction, medium strong (R3), trace fossil casts/molds, zones of thinly laminated limestone with <1.0% voids grading to zones with voids up to 10-15%; cavities rare, generally <3/8" in diameter. 77.3-78.2' - Same as 75.0-76.5'	71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes End on 6/5/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground surface
-32.8 - - - - - - -	5 ft 62% 75.0 R8-NQ 5 ft 64%	16	10 NR 2 >10 3 1	stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.3, 72.5' - Fractures (2), horizontal, rough, stepped, loose 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.73-73.1' - Fracture zone, horizontal to >80 deg, rough, undulating, loose, with horizontal fracture at 72.9' which propagates ½ diameter of core 75.7' - Fracture, 70 deg, rough, undulating/stepped, tight 75.85' - Bedding plane, horizontal to 70 deg, rough, planar, loose 76.3' - Bedding plane, horizontal, rough, planar 76.4-76.9' - Fracture zone, gravel (limestone) various orientations, generally planar to undulating, rough to smooth, loose		moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0' Limestone 75.0-76.5' - Same as 70.0-73.1' except with lithoclasts from 76.3-76.5'; clasts up to 3/8" in length; medium gray (N5), mild reaction to HCl, rounded clasts. 76.5-77.3' - medium dark gray, (N4), very fine grained, moderate HCl reaction, medium strong (R3), trace fossil casts/molds, zones of thinly laminated limestone with <1.0% voids grading to zones with voids up to 10-15%; cavities rare, generally <3/8" in diameter.	71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes End on 6/5/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground surface Incipient fracture 75-75.6'
-32.8 - - - - - - -	5 ft 62% 75.0 R8-NQ 5 ft	16	10 NR 2 >10 3 1	stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.73-73.1' - Fracture zone, horizontal to >80 deg, rough, undulating, loose, with horizontal fracture at 72.9' which propagates ½ diameter of core 75.7' - Fracture, 70 deg, rough, undulating/stepped, tight 75.85' - Bedding plane, horizontal to 70 deg, rough, planar, loose 76.3' - Bedding plane, horizontal, rough, planar 76.4-76.9' - Fracture zone, gravel (limestone) various orientations, generally planar to undulating, rough to smooth, loose 77.3' - Bedding plane, rough, undulating to		moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0' Limestone 75.0-76.5' - Same as 70.0-73.1' except with lithoclasts from 76.3-76.5'; clasts up to 3/8" in length; medium gray (N5), mild reaction to HCl, rounded clasts. 76.5-77.3' - medium dark gray, (N4), very fine grained, moderate HCl reaction, medium strong (R3), trace fossil casts/molds, zones of thinly laminated limestone with <1.0% voids grading to zones with voids up to 10-15%; cavities rare, generally <3/8" in diameter. 77.3-78.2' - Same as 75.0-76.5'	71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes End on 6/5/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground surface Incipient fracture 75-75.6'
-32.8 	5 ft 62% 75.0 R8-NQ 5 ft 64%	16	10 NR 2 >10 3 1	stepped, loose 71.35' - Mechanical break or fracture, 50 deg, rough, undulating stepped, tight 71.7-72.3' - Fracture zone, vertical to >80 deg, tapering from mid-point of core to one side 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.72' - Bedding plane or mechanical break, horizontal, rough, undulating, loose 72.73-73.1' - Fracture zone, horizontal to >80 deg, rough, undulating, loose, with horizontal fracture at 72.9' which propagates ½ diameter of core 75.7' - Fracture, 70 deg, rough, undulating/stepped, tight 75.85' - Bedding plane, horizontal to 70 deg, rough, planar, loose 76.3' - Bedding plane, horizontal, rough, planar 76.4-76.9' - Fracture zone, gravel (limestone) various orientations, generally planar to undulating, rough to smooth, loose 77.3' - Bedding plane, rough, undulating to		moderate HCl reaction, weak to medium strong (R2 to R3), fossiliferous (casts and molds) with voids up to 1/16" over 15-20% of surface and occasional cavities, some thin black organic laminae (e.g. at 72.25'), fine to very fine grained. No Recovery 73.1-75.0' Limestone 75.0-76.5' - Same as 70.0-73.1' except with lithoclasts from 76.3-76.5'; clasts up to 3/8" in length; medium gray (N5), mild reaction to HCl, rounded clasts. 76.5-77.3' - medium dark gray, (N4), very fine grained, moderate HCl reaction, medium strong (R3), trace fossil casts/molds, zones of thinly laminated limestone with <1.0% voids grading to zones with voids up to 10-15%; cavities rare, generally <3/8" in diameter. 77.3-78.2' - Same as 75.0-76.5'	71.1' Driller's Remark: 71.5-72.0' soft Driller's Remark: 73.0-74.5' very soft R7: 4 minutes End on 6/5/07, water approx. 2.0' below ground surface Start on 6/6/07, water approx. 2.0' below ground surface Incipient fracture 75-75.6'

Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-13

SHEET 5 OF 8

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723995.1 N, 457903.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION: Vertical WATER LEVELS: 2.0 ft bgs on 6/05/07 START: 6/5/2007 END: 6/6/2007 LOGGER: R. McComb DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) DESCRIPTION FRACTURES PER FOOT ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -37.8 77.78' - Bedding plane, <5 deg, rough to Limestone 0 smooth, loose 80.0-81.2' - fine grained, moderate to 77.9' - Bedding plane, <5 deg, rough, loose strong HCI reaction, medium strong 78.05' - Fracture, 60 deg, rough, planar (R3), trace fossils becoming more 81.2-81.3' - Fracture zone, <5 deg, rough, undulating, tight with 0.05' black common with depth (molds/casts), voids grading from 10% to 20% with 3 Driller's Remark: 81.5-82.5' soft carbonaceous (organic) clay lining, soft, wet depth, cavities becoming more R9-NQ 81.6' - Bedding plane, horizontal to <5 deg, common with depth up to 3/8"x3/8". 82 0 5 ft smooth, stepped to planar, loose 96% Clay (CL) 81.9' - Bedding plane, <5 deg, rough, 81.2-81.3' - black, wet, soft, rapid undulating, loose dilatancy, (carbonaceous, organic 0 SC-3 collected at 83.35laver) 84.40' Limestone R9: 6 minutes 0 81.3-81.9' - pale yellowish brown, (10YR 6/7), fine grained, mild HCl 85 85.0 NR -42 8 reaction, becoming thinly laminated 0 with depth and variegated (mottled), voids (15-20%) decreasing with depth. 0 81.9-84.8' - Same as 80.0-81.2' except cavities up to 1" in diameter. No Recovery 84.8-85.0' R10-0 71 5 ft Limestone 80% 85.0-87.55' - Same as 81.9-84.8' 87.55-89.0' - yellowish gray, (5Y 7/2), 88.0' - Bedding plane or mechanical break, Driller's Remark: 100% 10 horizontal, rough, undulating, loose mild HCI reaction, medium strong loss of water 88.55-88.75' - Fracture zone, horizontal, (R3), fine grained with some medium Driller's Remark: 88.5-89.5' rough, undulating, gravel sized fragments, to coarse grained interclasts, NR fossiliferous, (casts/molds) very R10: 7 minutes common, cavities up to 1" in 90 90.0 -47.8 diameter, some cavities filled with 90.0-90.35' - Fracture zone, limestone rock fragments, various orientations 90.35' - Fracture, horizontal, smooth, planar black organic material, voids and >10 cavities over 40-50% of surface. No Recovery 89.0-90.0' to undulating, loose 90.5' - Bedding plane or mechanical break, Limestone 1 90.0-91.4' - Same as 87.55-89.0' 91.4-91.7' - white to very light gray, horizontal, rough, undulating/stepped, loose 91.4' - Bedding plane, horizontal to 50 deg, Driller's Remark: 5% water R11-NO rough, undulating, loose (N9 to N8), very fine grained, strong 53 1 returns 5 ft HCI reaction, extremely weak (R0), voids over 3%-5%, clayey. 92.07' - Bedding plane or mechanical break, SC-4 collected at 92.0-10 deg, smooth, planar, tight 92.87 0 Silty Clay (CL-ML) 91.7-91.85' - white, (N9), moist, soft, no to slow dilatancy, cohesive. R11: 9 minutes NR Limestone 91.85-92.3' - Same as 91.4-91.7' 95.0 -52.8 except gradational with unit below. 95.17' - Fracture, >80 deg, rough, stepped, 92.3-93.8' - white to very light gray, 5 loose (N9 to N8), very fine grained, strong 95.4, 95.6, 95.72, 95.9' - Fractures (4), HCl reaction, medium strong (R3), horizontal to 30 deg, rough, planar to 10 fossils rare to absent, voids <1/16 undulating, loose to tight over 1%-3%, rare cavities (3/8" x 96.0' - Fracture, horizontal to <10 deg, rough, 3/8") with dark stain. Driller's Remark: Medium R12-NC planar, loose 26 10 Clay (CL) 93.8-93.85' - dark brown, dry, no hard run 5 ft 96.2-96.75' - Fracture zone, 70 to 80 deg, 95% rough, undulating, loose 97.0' - Fracture, horizontal, smooth, dilatancy, strong HCI reaction, 3 undulating, loose 97.05-97.5' - Fracture zone, vertical to 0 deg, friable No Recovery 93.85-95.0' R12: 7 minutes rough, loose 1 100 100.0



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-13 SHEET 6 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723995.1 N, 457903.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

CORING	IVIL IT IOD AI	ND EC	JUIPIV	1ENT: CME 550 S/N 186073, mud rotary, NQ tools, NW	Casin	9	ORIENTATION : Vertical
WATER	LEVELS : 2.0	ft bgs	s on 6	/05/07 START : 6/5/2007 END : 6/	6/200	7 LOGGER : R. McComb	
	_			DISCONTINUITIES	(1)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SCE	LEN REC	R	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-57.8 - -			NR) 4 10	97.6, 97.9' - Fractures (2), horizontal, rough, planar, loose 98.0' - Fracture, 40 to 50 deg, rough, planar, loose 98.2, 98.4' - Fractures (2), horizontal, rough, undulating to stepped, loose		Limestone 95.0-96.0' - Same as 92.3-93.8' except with voids becoming more common (up to 5-10%) with depth. 96.0-99.75' - light gray, (N8), very fine to fine grained, strong HCl	- - -
-	R13-NQ 5 ft 100%	34	1	99.05' - Fracture, <10 deg, rough, stepped, loose 100.25, 100.35, 100.6' - Bedding plane or	Ė	reaction, weak (R2), fossiliferous (casts/molds) common, possible intraclasts, gastropod casts and	-
-	10070		>10	mechanical break (3), <5 deg, rough to smooth, undulating 100.6-100.95' - Fracture, 70 to 80 deg,	H	molds common, voids and cavities over 40%-50% of rock surface. No Recovery 99.75-100.0'	-
105_	105.0		10	smooth, undulating, tight 101.1-101.57' - Fracture zone, horizontal to >80 deg, producing fine gravel limestone rock fragments		Limestone 100.0-105.0' - Same as 96.0-99.75' except fossils become less common along with voids and cavities; cavities □ along with voids and cavities; cavities	R13: 7 minutes
-62.8 - - - -	R14-NQ		NR	102.35' - Fracture or mechanical break, horizontal, rough, stepped, tight 103.2-103.6' - Fracture zone, vertical to <5 deg, rough, undulating to stepped, loose to tight		and voids common from 100.0'-100.9' and from 102.2'-103.0', intervals in between consist of very fine grained limestone, with void and cavities over 10%-15% of surface. No Recovery 105.0-107.5'	Suspect siliceous unconsolidated sand 105 107.5'
-	5 ft	16			7.7	Poorly Graded Sand (SP)	-
-	50%		>10	108.35-109.0' - Fracture zone, vertical and		− 107.5-108.35' - moderate yellowish brown, (10YR 5/4), wet, loose, fine	<u>-</u>
-			10	horizontal planes, tight 109.5-109.6' - Fracture zone, horizontal to >80 deq	Ē	grained, moderately cohesive, moderate to well sorted, subangular to subrounded, trace to 5% heavy dark minerals, sharp contact with	R14: 8 minutes
-67.8 -	110.0		5		Ē	underlying limestone, sand is siliceous Limestone	_
- -	R15-NQ		9	111.7, 111.75, 111.8, 112.15, 112.28, 112.4, 112.5, 112.55, 112.62, 112.9, 113.1, 113.15, 113.2, 113.25, 113.5' - Bedding plane or mechanical break (26), horizontal, rough, planar to undulating, and loose, vertical		 108.35-110.0' - light gray to white, (N9 to N8), fine to very fine grained, very strong HCl reaction, very weak to weak (R1 to R2), with extremely 	- - -
-	5 ft 74%	0	10	fractures between horizontal discontinuities at 111.35-111.5' and 112.9-113.25'		weak (R0) zone from 109.5'-109.6' containing some clay, fossiliferous (very small echinoids) and other fossils, voids and cavities over	- - -
- 115	115.0		NR		Ħ	5%-10% with percentage increasing with depth. 110.0-113.7' - yellowish gray, (5Y 7/2), very fine grained, very strong	R15: 4 minutes
-72.8 -			5	115.15, 115.3, 115.36, 115.65, 115.9, 116.1, 116.25, 116.3, 116.4, 116.47' - Bedding plane (10), horizontal, rough, planar to slightly	F	HCl reaction, very weak to weak (R1 to R2), fossils rare, voids generally less than 3/16" over 1%-2% of rock, occasional cavity (worm burrow), 3/8	
-	B40 NO		10	undulating, tight	Ė	x 3/8", matrix very "chalk-like". No Recovery 113.7-115.0' Limestone	Driller's Remark: 117.5- 118.5' Suspect sand bed, – barrel plugged up, no circulation, tried to stop
-	R16-NQ 5 ft 57%	10	NR		Ė	115.0-116.5' - Same as 110.0-113.7' No Recovery 116.5-118.5' -	pump, barrel stalled, also – evidenced by decreasing core diameter suggesting
-			10	undulating, loose	片	 	abrasion by sand -
-			4	119.17, 119.32, 119.6, 119.8' - Bedding plane (4), smooth to rough, planar to slightly	Ħ	-	R16: 6 minutes
120	120.0			undulating, loose	╀		
					\bot		



PROJECT NUMBER:

338884.FL

B-13

SHEET 7 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723995.1 N, 457903.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

CORING	NETHOD A	ND EC	JUIPIV	IENT: CME 550 S/N 1860/3, mud rotary, NQ tools, NW	casing		ORIENTATION : Vertical
WATER	LEVELS : 2.0	ft bgs	s on 6	/05/07 START : 6/5/2007 END : 6/	6/200	LOGGER : R. McComb	
300	<u> </u>			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
SURF.	CORE LENG RECO	RQD	FRAC PER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-//.8 - -			4	120.1, 120.3, 120.47, 120.8, 121.04, 121.57, 121.78, 122.2, 122.37, 122.62, 123.21, 123.3, 123.36, 123.55, 123.8' - Bedding plane or	Ė	Limestone 118.5-120.0' - yellowish gray, (5Y 7/2), fine to very fine grained, strong HCl reaction, weak (R2), fossiliferous	
-	R17-NQ		3	mechanical break (15), horizontal to <5 deg, rough, planar to undulating, loose	H	with numerous casts/molds (gastropods, pelecypods, echinoids); cavities and voids over 20%-30% of]
-	5 ft 78%	32	4	122.44' - Bedding plane, horizontal, smooth, within thin laminae, loose		- surface. 120.0-120.6' - yellowish gray, (5Y 7/2), fine to medium grained, strong]
-			5		H	 HCl reaction, weak (R2), fossiliferous (casts/molds) unfilled burrowed cavities/voids over 70%-80%, 	R17: 7 minutes
125 <u> </u>	125.0		NR	125.05, 125.1, 125.22, 125.27, 125.55, 125.7,		cavities up to 3/8" x 3/8". 120.6-123.2' - yellowish gray, (5Y 7/2), fine to very fine grained, strong	
_			7	125.97, 126.25, 126.43, 126.52, 126.55, 126.7, 126.85, 126.97, 127.1, 127.32, 127.35, 127.5, 127.82, 127.92, 128.0, 128.1, 128.14,		 HCl reaction, very weak to weak (R1 to R2), fossils rare, voids and cavities rare, some mottling, very thinly laminated from 122.4 to 122.6'.]
_	R18-NQ	0	7	128.2, 128.25, 128.32, 128.37, 128.42, 128.48, 128.55, 128.67, 128.78, 128.9 - Bedding plane or mechanical break (33),		123.2-123.9' - Same as 120.0-120.6' No Recovery 123.9-125.0' Limestone	-
-	5 ft 81%	U	>10	horizontal, rough to smooth, planar to undulating, generally loose; at 126.7' black carbonaceous coating on 40% of surface, fracture zone 127.35-127.5'		125.0-129.05' - Same as 120.6-123.2' except laminations absent.	
-			10 / NR	128.97, 128.99' - Bedding plane or mechanical break (2), horizontal, rough to	E	No Recovery 129.05-130.0'	R18: 5 minutes
130 -87.8 -	130.0		4	smooth, planar to undulating, generally loose		Limestone - 130.0-131.3' - yellowish gray, (5Y	-
-			9	131.17, 131.25, 131.39, 131.5, 131.67, 131.71, 131.85, 131.99, 132.32, 132.85' - Bedding plane or mechanical break (15),		7/2), fine to medium grained, strong HCl reaction, very weak to weak (R1 to R2), fossiliferous with numerous	-
-	R19-NQ 5 ft 84%	24	2	horizontal to <5 deg, smooth to rough, planar to undulating, loose	H	casts/molds, echinoids, gastropods, cavities and voids up to 40% increasing in depth, some intraclasts present.	
-			3	133.0-133.3' - Fracture, 80 deg, rough, undulating, loose 133.5' - Fracture, horizontal to 80 deg, rough,		. 131.3-132.0' - yellowish gray, (5Y – 7/2), very fine to fine grained, strong HCl reaction, "grainy" appearance,	
~~ ~	135.0		0 NR	stepped, loose		thinly laminated, voids and cavities rare. 132.0-133.6' - Same as 130.0-131.3'	R19: 4 minutes
-92.8 - -			>10	135.2-135.9' - Fracture zone, horizontal to 90 deg, smooth to rough, undulating to planar, loose		except very weak (R1), medium to coarse grained (coarse particularly at 132.0' to 132.3'), similar to coquina, very fossiliferous.	
-	R20-NQ		7	136.06, 136.13, 136.24, 136.42, 136.8, 136.93, 136.97, 137.2' - Bedding plane or mechanical break (8), horizontal, rough to		 133.6-134.2' - Same as 131.3-132.0' except very thinly laminated, voids/cavities rare to absent. 	-
-	5 ft 44%	7		smooth, undulating to planar, loose	Ħ	No Recovery 134.2-135.0' Limestone 135.0-135.2' - Same as 131.3-132.0'	
_			NR			135.2-137.03' - Same as 130.0-131.3' except fine grained, very weak (R1), fossiliferous, very thinly laminated at base with	R20: 4 minutes
140	140.0				Ħ	organics.	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-13	SHEET	8	OF	8	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723995.1 N, 457903.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

COMING	IVILITIOD AI	ND LC	ZUIFIV	IENT . CIVIE 330 3/N 100073, Mud Totally, NQ tools,	INVV CO	Sirie		ORIENTATION . Vertical
WATER	LEVELS : 2.0	ft bgs	s on 6	/05/07 START : 6/5/2007 END	: 6/6/2	<u>200</u> 7	LOGGER : R. McComb	
				DISCONTINUITIES		П	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		(0	DESCRIPTION	\dashv	SYMBOLIC LOG		-
D'III	Z, Z, Z	_	FRACTURES PER FOOT	DESCRIPTION		ວ	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
APE	BEE	(%) Q		DEPTH, TYPE, ORIENTATION, ROUGHNESS,		뒪	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FFF	R880	ο	AC R F	PLANARITÝ, INFILLING MATERIAL AND		MB.	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
E S E	8 발문	ď	FH	THICKNESS, SURFACE STAINING, AND TIGHTNE	SS	ŝ	CHARACTERISTICS	BROFO, TEOT REODETO, ETO.
-97.8						\Box	137.03-137.2' - medium gray, (N5),	
-			4	140.4, 140.45, 140.62, 140.76, 141.02, 141. ⁻	1' 🕂	\dashv	very fine grained, strong HCI	-
-				 Bedding plane or mechanical break (6), 		┧	reaction, weak to medium strong (R2	-
			10	horizontal, smooth, planar, loose		П	to R3), few voids. No Recovery 137.2-140.0'	
1 7			10	141.25-141.6' - Fracture zone, various orientations, limestone gravel	- 1-	\dashv	Limestone	1
-	R21-NQ			141.7, 141.85, 142.0, 142.25, 143.0, 143.15,	+	╁	140.0-141.3' - yellowish gray, (5Y	1 -
I →	5 ft	31	2	143.2, 143.28' - Mechanical break or		\square	- 7/2), fine grained, strong HCI	-
	89%			fractures (8), horizontal to 60 deg, rough,	╌	+	reaction, very weak to weak (R1 to	_
			_	stepped, tight	_ h	╣	R2), fossils rare to absent;	
1 7			5		- 1	П	 "chalk-like" texture, cavity infilling or supported by interclasts in fine 	1 1
-			. 40	144.0-144.45' - Fracture zone, limestone	- +	\dashv	grained matrix, grains up to 3/16" in	R21: 6 minutes
] _			>10	gravels, orientations unknown		┦	- diameter and dark gray and white	TVE I. O IIIIIIULES
145	145.0		NR	g. 2. 5.6, 5.16.16.6.16 MINIOTHI		П	(N9) in color, voids <1%.	
-102.8				145.1' - Fracture, horizontal, smooth,	7	, 	141.3-144.5' - yellowish gray, (5Y	
-			10	undulating, loose	十	╛	 7/2), very fine grained, strong HCl reaction, weak to medium strong (R2 	-
-				145.2' - Fracture, 60 deg, smooth, stepped,		Ц	to R3), bioturbated with some	-
			>10	tight	}	\dashv	cavities >1" long and >1" deep, some	
			/10	145.6-145.88' - Fracture zone, 85-90 deg	- 1	╘	cavities infilled, some cavities lined	
-	R22-NQ			along outside 1/5th of core, truncated at 145.88', split at 157.7' by <5 deg fracture	- 1	Ц	with dark gray (N3) coatings, mottled	1
-	5 ft	0	1	145.93' - Fracture, horizontal, smooth,	- +	\dashv	texture with area of void-free	-
I _	58%			undulating, loose		╧	limestone and zones of limestone with up to 60%-70% voids,	
				146.05-146.45' - Fracture zone, vertical,		Ц	fossiliferous in casts/molds of	
1 7				rough, planar, tight, cross cut by horizontal	1-	H	pelecypods and gastropods.	1 7
-			NR	fracture at 146.15' which propagates halfway through core	/ Ł		No Recovery 144.5-145.0'	R22: 7 minutes
1 -				146.45-146.7' - Fracture zone	+	Ц	Limestone	- Transition
	150.0			146.7' - Fracture, <5 deg, rough, undulating,	上	\top	145.0-146.15' - yellowish gray, (5Y	
-107.8				loose	-T	П	7/2), very fine grained, strong HCl reaction, weak to medium strong (R2	
1 -				\ 146.85, 146.95, 147.05' - Bedding plane or	/1	ŀ	to R3), thinly laminated, fossils rare	1 -
-				mechanical break (3), horizontal to <5 deg,	/-	ŀ	to absent, some voids up to 1/16" or	-
I _				rough, undulating to stepped, loose	J .		less over 1%-3% of rock, cavities	
							rare (3/8"x3/8"), sharp contact with	
1 7					- 1	Ī	underlying limestone. 146.15-147.9' - yellowish gray, (5Y	1 7
-						ŀ	7/2), fine to medium grained, strong	-
-					- 4	ŀ	HCl reaction, weak (R2), very friable	-
					J		and loose (especially at 146.4' to	
					- 1		146.7'), with extremely weak (R0)	
-					- 1	ŀ	rock at 146.4'-146.7', trace fossils,	-
-						ŀ	voids generally less than 1/16" over 60%-70% producing a grainy texture.	-
]					\Box	Į	— No Recovery 147.9-150.0'	
							Bottom of Boring at 150.0 ft bgs on	
]					1	ľ	6/6/2007	1
-					\dashv	ŀ	-	-
] -						- [-	-
							_	
]					7	ſ		1
-					- 1	ŀ	-	-
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<u> </u>								
	ı							1



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-14

SHEET 1 OF 9

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724122.8 N, 458024.1 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

						y, auto nammer, Avvo rous,			ONIENTATION : Vertical
WATER	LEVELS	: 7.0 ft bo	JS UH 6/5/		TART : 6/5/2007	END: 6/6/2007 SOIL DESCRIPTION	LUGGE	1 : B.	Ellis, D. Thomas COMMENTS
ŞQ⊋	CAMPIE	INTERVA	1 (4)	STANDARD PENETRATION		JOIL DEJUNIF HUN		g	CONNINITATIO
ELO ON (SAMPLE			TEST RESULTS	SOIL NAME, U	USCS GROUP SYMBOL, C	OLOR.	IC L	DEPTH OF CASING, DRILLING RATE,
H B		RECOVE			MOISTURE CO	ONTENT, RELATIVE DENS	SITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY,	, SOIL STRUCTURE, MINE	RALOGY	SYMBOLIC LOG	INSTRUMENTATION
41.7	0.0			(14)	Topsoil		_	7/1/	
-		0.8	SS-1	1-1-4	0.0-0.3' - grayish b	black to black, (N2 to N1)	, moist,		-
-		0.0	33-1	(5)	organic fines and	and With Silt (SP-SM)	/ -	1	Start SPT at 08:15, 6/5/07
-	1.5				0.3-0.75' - yellowis	sh gray, (5Y 7/2), moist, l	oose, very	1	-
-					fine to fine grained	d, trace organics decreas	ing with	-	-
_					depth, 5% nonplas	stic fines, sand is silica			4
_							-		_
_							-		_
_							-		_
							-	1	_
5	5.0							<u> </u>	
36.7				0.4.0	Sandy Fat Clay (0	CH) n gray, (5GY 6/1), moist, r	medium /-		_
_		1.1	SS-2	3-4-6 (10)	stiff, medium to hi	igh plasticity, slow dilatan	cy, 25-30%		
	6.5			(10)	very fine to fine gr	rained silica sand		1	
					Silt (ML) 5.4-6.1' - dark vell	lowish orange, (10YR 6/6), wet, stiff,		
					nonplastic, very ra	apid dilatancy, moderate I	HCI /		Possible water table encountered at 7'
					material	ry fine grained sand, all ca	arbonate -		1
-					···atoria.				1
_							-		1
-							•		1
10	10.0						-		1
31.7	10.0				Sandy Silt (ML)			ш	7
-		1.3	SS-3	5-5-2		yellowish orange, (10YR 6 apid dilatancy, moderate I		1	-
-	11.5			(7)	reaction, 25-30%	fine to medium grained s	and, all	Ш	-
-	11.5				carbonate materia	al	/-		-
-							-	1	Driller's Remark: Lost circulation at 12'
-							=		Driller's Remark: Hard formation -
-							-		Driller's Remark: Chatter throughout run from 10-15'
-							-	1	Driller's Remark: Soft drilling at 12.5'
-							-	1	Driller's Remark: Circulation loss at 13', hard drilling
-							-	1	-
15 <u> </u>	15.0				Sandy Silt (ML)			\prod	4-inch casing set at 15'
		4.5	00.4	16-3-19	√15.0-15.5' - Same			Ш	- mon odding oot at 10
-		1.5	SS-4	(22)	Limestone Fragm	nents		H	-
-	16.5				¬ moderate HČI rea	sh orange, (10YR 7/4), mi action, coarse sand-size to	coarse /	H	-
-						one fragments, fossilifero		1	-
-							-	1	
-							-	1]
							-		_
							-	1	_
							-		
20									



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-14	SHEET	2	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724122.8 N, 458024.1 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS	: 7.0 ft bo	s on 6/5/	07	START: 6/5/2007	END: 6/6/2007	LOGGER	: B.	Ellis, D. Thomas
				STANDARD		SOIL DESCRIPTION		g	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				SYMBOLIC LOG	
H H H		RECOVE	RY (ft)		SOIL NAME, U	JSCS GROUP SYMBOL, COL ONTENT, RELATIVE DENSIT	LOR,	OLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTH EVA			#TYPE	6"-6"-6"	CONSISTENCY,	SOIL STRUCTURE, MINERA	ALOGY	MBC	INSTRUMENTATION
SU			,,,,,	(N)				Sγ	
21.7	20.0	1.4	SS-5	23-33-50/5.5 (83/11.5")	Limestone Fragm 20.0-21.4' - Same	nents			Advanced 4-inch (HW) casing to 20', decision made to begin rock coring
	21.5	1.4	33-3	(83/11.5")				Ш	decision made to begin rock coming
-					Begin Rock Corin	g at 21.0 ft bgs			
-	1				See the next shee	t for the rock core log	-		-
-	1						-		-
-	-						-		-
-	-						_		-
-	1						-		-
-							=		-
-	-						-		-
25 <u> </u>									
16.7							-		_
-							_		_
]								_
-									_
_	1						-		-
-	1						-		-
-	-						-		-
	1						-		-
30 <u> </u>									
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l _]								_
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35	1						-		-
35 6.7	1						_		
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1 -									_
1 _									_
40									



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-14

SHEET 3 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724122.8 N, 458024.1 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

			<u> </u>	HENT . CIVIE 330X 3/N 340233, Midd Totally, Fig tools, Fiv		.9	ORIENTATION : Vertical
WATER	LEVELS: 7.0	ft bg	s on 6	/5/07 START : 6/5/2007 END : 6/	/6/200 ⁻	LOGGER : B. Ellis, D. Thomas	
				DISCONTINUITIES	П	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)				SYMBOLIC LOG	232001	33
U ₹ Z	ŽA∑ NZ		FRACTURES PER FOOT	DESCRIPTION] [ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
프랑은	S H 변	(%) Q	150	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ובֻׂו	MINERALOGY, TEXTURE,	FLUID LOSS CORING RATE AND
₽₽¥	# <u>P</u>		D.Y.	PLANARITY, INFILLING MATERIAL AND	JB(WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
		S. O.	F.F.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	5	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
БОЛШ		ш.	44	0.1.0.0.1.01.5	0,		0 10 1010101
1	21.0		,	21.0-21.3' - Fracture zone, fine to coarse	\vdash	Limestone	Cavities at 21.6', 21.9',
-			4	grained subangular gravel	17	- 21.0-21.3' - grayish orange, (10YR	22.6'
-				21.3' - Fracture, 10 deg, rough, planar		_ 7/4), mild to moderate HCl reaction	1 -
l _			1		Щ	21.3-23.0' - dusky yellow, (5Y 6/4), mild to moderate HCl reaction, weak	
1 -			' '		\mathbb{H}	to medium strong (R2 to R3), voids	1
-	R1-HQ		3	23.0' - Fracture, 10 deg, rough, stepped,	╂┴┤	(<1/16") over 25% of rock surface,	1 -
I _	5 ft	35	J	loose	\perp	numerous elongate to platy	
1	48%	33		23.0-23.1' - Fracture zone		cavities/molds from 1/4" up to 3/4"	
-	1070			20.0 20.1 1140(416 2016	Ш	long, trace inorganic inclusions	1 -
l _					┵	- 23.0-23.4' - grayish orange, (10YR	<u> </u>
25			NR		\vdash	7/4), strong HCl reaction, very weak	
16.7				-	1	(R1), voids (1/16") over 20% of rock	R1: Run time not reported
-					\Box	 surface, numerous fossil 	-
1	26.0				Ш	cavities/molds 1" in diameter or	
1 -					1	larger	1 1
-			1		₽	No Recovery 23.4-26.0'	1 -
				26.7' - Fracture or mechanical break,	┟┼┤	Limestone	Cavity at 28.65'
1 -				horizontal, smooth, planar		26.0-26.7' - dusky yellow, (5Y 6/4),	1 1
-			1		╁┷	fine grained, strong HCl reaction,	1 -
I _				27.7' - Fracture, 35 deg, rough, undulating,	┵	very weak (R1)	
1	R2-HQ			(almost smooth)	Н	26.7-29.2' - dusky yellow to medium yellowish brown, (5Y 6/4 to 10YR	
-	5 ft	40	2	28.0' - Fracture, horizontal, rough, undulating	+	5/4), fine grained, moderate HCl	1 1
l _	64%			28.6' - Fracture or mechanical break,		reaction, weak to medium strong (R2	_
1			_1_	horizontal, smooth, planar	ш	to R3), voids (1/16") over 5-25% of	
				29.05' - Fracture, 30 deg, smooth, planar	1—1	rock surface, some 1/4" round	1 1
30			NR	_	╀┤	cavities	D0: 0it
11.7			INIX			No Recovery 29.2-31.0'	R2: 3 minutes
	31.0				Н	·	
I -	31.0				╂╨	_ Limestone	1 -
l -			1		┸	- 31.0-33.1' - moderate yellowish	-
1			·			brown, (10YR 5/4), fine grained,	
I -				31.9' - Fracture, 10 deg, smooth, planar	ш	moderate HCl reaction, weak to	1 1
l -			2	32.2' - Fracture, 45 deg, smooth, undulating	+	 strong (R2 to R4), voids (1/16") over 	-
1				32.7' - Fracture, vertical, rough, undulating	\vdash	10% of rock surface, few elongate	
-	R3-HQ			33.0-33.85' - Fracture zone, fine- to	111	cavities up to 1/4", transitions from	1 7
-	5 ft	40	3	coarse-grained gravel		 strong to weak rock with depth, 	-
Ι _	84%				Щ	accompanied by increase to voids	
1 -				33.9' - Fracture, 70 deg, rough, undulating	H	over 20% of rock surface	1
1 -			2	34.2' - Fracture, 10 deg, rough, planar	╂╨┤	- 33.1-33.6' - Same as 31.0-33.1' lower	-
35				34.8' - Fracture, 80 deg, rough, undulating –	-67	portion except weak (R2)	I
6.7			_0_	5		33.6-35.2' - Same as 31.0-33.1' upper portion except strong (R4),	R3: 3 minutes
1 -	000		NR		14	10% voids	1 1
-	36.0				+	No Recovery 35.2-36.0'	-
			ا م		Н	Limestone	
1 -			2	36.4' - Fracture, 60 deg, rough, undulating	\Box	36.0-36.8' - moderate yellowish	1
-			-	36.8, 37.1' - Fractures (2), horizontal,	+	brown, (10YR 5/4), fine grained,	-
I _			2	smooth, planar	┸┼	moderate HCl reaction, medium	Coulities at 27 OL 20 OL
1			-	37.45' - Fracture, 70 deg, rough, undulating	H	strong (R3), voids (1/16") over	Cavities at 37.2', 38.0'
-	R4-HQ			38.0' - Fracture, 10 deg, smooth, undulating	┲╜	10-20% of rock surface, few elongate	-
l -	5 ft	45	2	50.0 - Fracture, To deg, smooth, undulating	\blacksquare	_ cavities up to 1/4"	
	74%	.0	_	00.0.00.01		36.8-37.4' - Same as 36.0-36.8'	
1 -	,			38.8, 39.3' - Fractures (2), horizontal,	14	except extremely weak to weak (R0	1 1
1 -			1	smooth, planar	╆┼	_ to R2)	-
40					\vdash	37.4-38.8' - Same as 36.0-36.8'	
1.7				_	Ш	except medium strong (R3)	R4: 2 minutes
-			NR		+	_ 38.8-39.3' - Same as 36.8-37.4'	
	41.0				ш		
1							

APPENDIX 2BB-512 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-14

SHEET 4 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724122.8 N, 458024.1 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

DISCONTINUITIES DESCRIPTION DESCRIPTION DESCRIPTION DEPTH. TYPE. ORIENTATION. ROUGHNESS. PLANARITY. INFILLING MATERIAL AND THICKNESS. SURFACE STAINING, AND TIGHTNESS. PLANARITY. INFILLING MATERIAL AND THICKNESS. SURFACE STAINING, AND TIGHTNESS. 141.0-41.3' - Fracture zone 41.0-41.3' - Fracture zone 41.0-41.3' - Fracture zone, 20 deg, rough, planar, angular gravel (1/2 to 1 1/2") 41.6' - Fracture zone, 20 deg, rough, planar, fracture terminales at 41 6 and 41.85', open 41.7' - Fracture zone, 20 deg, rough, planar, fracture terminales at 41 6 and 41.85', open 41.0-42.3' - Fracture zone, 20 deg, rough, planar, fracture terminales at 41 6 and 41.85', open 41.0-42.3' - Fracture zone, 20 deg, rough, planar, fracture terminales at 41 6 and 41.85', open 453.3' 46.0 ROCKTYPE, COLOR, MIMERALOGY, TEXTURE, WEARTHERING, HARDNESS, CHARACTERISTICS SIZE AND SIZE AND THE FILLID LOSS CORN SMOOTHNESS, CHARACTERISTICS PLANARITY, INFILLING MATERIAL AND CHARACTERISTICS THICKNESS, SURFACE STAINING, AND TIGHTNESS ROCKTYPE, COLOR, MIMERALOGY, TEXTURE, WEARTHERING, HARDNESS, CHARACTERISTICS SIZE AND SMOOTHNESS, CORN SMOOTHNESS, CHARACTERISTICS SIZE AND SMOOTHNESS, CHARACTERISTICS SIZE AND SMOOTHNESS, CHARACTERISTICS SIZE AND SMOOTHNESS, CHARACTERISTICS SIZE AND SMOOTHNESS, CHARACTERISTICS SIZE AND SMOOTHNESS, CHARACTERISTICS SIZE AND SMOOTHNESS, CHARACTERISTICS SIZE AND SMOOTHNESS, CHARACTERISTICS SIZE AND SMOOTHNESS, CHARACTERISTICS SIZE AND SMOOTHNESS, CHARACTERISTICS SIZE AND SMOOTHNESS, CHARACTERISTICS SIZE AND AND SMOOTHNESS, CHARACTERISTICS SIZE AND AND SMOOTHNESS, CHARACTERISTICS SIZE AND AND SMOOTHNESS, CHARACTERISTICS SIZE AND AND SMOOTHNESS, CHARACTERISTICS SIZE AND AND SMOOTHNESS, CHARACTERISTICS SIZE AND AND SMOOTHNESS, CHARACTERISTICS SIZE AND AND SMOOTHNESS, CHARACTERISTICS SON RECOVERY 33,74.0' Limestone 41.0-41.2' Fracture terminales and a 41.6' and 41.8' or moderate HCI reaction, weak (R2), voids (10° O' O' O' O' O' O' O' O' O' O' O' O' O'	OF CASING, IG RATE AND AVING ROD
## 1.0-41.3" - Fracture zone ## 1.0-41.3" - Fracture zone, 5 deg, rough, planar, angular gravel (1/2 to 1 1/2") ## 1.6" - Fracture zone, 20 deg, rough, planar, fracture terminates at 41.6" and 41.85', open ## 1.7" - Fracture zone, 30 deg, rough, planar, fracture terminates at 41.6" and 41.85', open ## 1.8" - Fracture zone, 30 deg, rough, planar, fracture terminates at 41.6" and 41.85', open ## 1.8" - Fracture zone, 30 deg, rough, planar, fracture terminates at 41.6" and 41.85', open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.9" - Fracture zone, 30 deg, rough, planar, open ## 1.0" - Via yeam, non-indurated zone bounded by weakly indurated rock ## 1.4" - Fracture zone, 30 deg, rough, undulating, open ## 1.4" - Fracture zone, 70 deg, rough, undulating, open ## 1.0" - Via yeam, non-indurated zone bounded by weakly indurated rock ## 1.4" - Fracture, 10 deg, smooth, planar ## 1.5" - Fracture, 10 deg, smooth, planar ## 1.5" - Fracture, 10 deg, smooth, undulating ## 1.5" - Fracture, 10 deg, smooth, undulating ## 1.5" - Fracture, 10 deg, smooth, undulating ## 1.5" - Fracture, 10 deg, rough, undulating ## 1.5" - F	IG RATE AND AVING ROD
## 1.0-41.3" - Fracture zone ## 1.0-41.3" - Fracture zone, 5 deg, rough, planar, angular gravel (1/2 to 1 1/2") ## 1.6" - Fracture zone, 20 deg, rough, planar, fracture terminates at 41.6" and 41.85', open ## 1.7" - Fracture zone, 30 deg, rough, planar, fracture terminates at 41.6" and 41.85', open ## 1.8" - Fracture zone, 30 deg, rough, planar, fracture terminates at 41.6" and 41.85', open ## 1.8" - Fracture zone, 30 deg, rough, planar, fracture terminates at 41.6" and 41.85', open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.9" - Fracture zone, 30 deg, rough, planar, open ## 1.0" - Via yeam, non-indurated zone bounded by weakly indurated rock ## 1.4" - Fracture zone, 30 deg, rough, undulating, open ## 1.4" - Fracture zone, 70 deg, rough, undulating, open ## 1.0" - Via yeam, non-indurated zone bounded by weakly indurated rock ## 1.4" - Fracture, 10 deg, smooth, planar ## 1.5" - Fracture, 10 deg, smooth, planar ## 1.5" - Fracture, 10 deg, smooth, undulating ## 1.5" - Fracture, 10 deg, smooth, undulating ## 1.5" - Fracture, 10 deg, smooth, undulating ## 1.5" - Fracture, 10 deg, rough, undulating ## 1.5" - F	IG RATE AND AVING ROD
## 1.0-41.3" - Fracture zone ## 1.0-41.3" - Fracture zone, 5 deg, rough, planar, angular gravel (1/2 to 1 1/2") ## 1.6" - Fracture zone, 20 deg, rough, planar, fracture terminates at 41.6" and 41.85', open ## 1.7" - Fracture zone, 30 deg, rough, planar, fracture terminates at 41.6" and 41.85', open ## 1.8" - Fracture zone, 30 deg, rough, planar, fracture terminates at 41.6" and 41.85', open ## 1.8" - Fracture zone, 30 deg, rough, planar, fracture terminates at 41.6" and 41.85', open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.9" - Fracture zone, 30 deg, rough, planar, open ## 1.0" - Via yeam, non-indurated zone bounded by weakly indurated rock ## 1.4" - Fracture zone, 30 deg, rough, undulating, open ## 1.4" - Fracture zone, 70 deg, rough, undulating, open ## 1.0" - Via yeam, non-indurated zone bounded by weakly indurated rock ## 1.4" - Fracture, 10 deg, smooth, planar ## 1.5" - Fracture, 10 deg, smooth, planar ## 1.5" - Fracture, 10 deg, smooth, undulating ## 1.5" - Fracture, 10 deg, smooth, undulating ## 1.5" - Fracture, 10 deg, smooth, undulating ## 1.5" - Fracture, 10 deg, rough, undulating ## 1.5" - F	SULTS, ETC.
## 1.0-41.3" - Fracture zone ## 1.0-41.3" - Fracture zone, 5 deg, rough, planar, angular gravel (1/2 to 1 1/2") ## 1.6" - Fracture zone, 20 deg, rough, planar, fracture terminates at 41.6" and 41.85', open ## 1.7" - Fracture zone, 30 deg, rough, planar, fracture terminates at 41.6" and 41.85', open ## 1.8" - Fracture zone, 30 deg, rough, planar, fracture terminates at 41.6" and 41.85', open ## 1.8" - Fracture zone, 30 deg, rough, planar, fracture terminates at 41.6" and 41.85', open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.8" - Fracture zone, 30 deg, rough, planar, open ## 1.9" - Fracture zone, 30 deg, rough, planar, open ## 1.0" - Via yeam, non-indurated zone bounded by weakly indurated rock ## 1.4" - Fracture zone, 30 deg, rough, undulating, open ## 1.4" - Fracture zone, 70 deg, rough, undulating, open ## 1.0" - Via yeam, non-indurated zone bounded by weakly indurated rock ## 1.4" - Fracture, 10 deg, smooth, planar ## 1.5" - Fracture, 10 deg, smooth, planar ## 1.5" - Fracture, 10 deg, smooth, undulating ## 1.5" - Fracture, 10 deg, smooth, undulating ## 1.5" - Fracture, 10 deg, smooth, undulating ## 1.5" - Fracture, 10 deg, rough, undulating ## 1.5" - F	
Al.3" - Fracture zone, 5 deg, rough, planar, angular gravel (1/2 to 1 1/2") Value of the standard process of the standard	_
angular gravel (1/2 to 1 1/2") 4	
41.7 - Fracture zone, 70 deg, rough, planar, fracture terminates at 41.6' and 41.85', open 42.3-42.7' - Clay seam, non-indurated zone bounded by weakly indurated rock 42.9-43.15' - Clay seam, non-indurated zone bounded by weakly indurated rock 43.4-43.15' - Clay seam, non-indurated zone bounded by weakly indurated rock 43.9 - Fractures (2), horizontal, rough, undulating, open to tight 47.15' - Fracture, 10 deg, mooth, planar 47.3' - Fracture, 15 deg, rough, undulating 48.65' - Fracture, 70 deg, rough, undulating 48.65' - Fracture, 70 deg, rough, undulating 49.6' - Fracture, 70 deg, rough, undulating 49.6' - Fracture, 70 deg, rough, undulating 49.6' - Fracture, 15 deg, nooth, planar 47.3' - Same as 46.0-49.9' except very weak (R1) 49.6' - Fracture, 10 deg, mooth, undulating 49.6' - Fracture, 70 deg, rough, undulating 49.6' - Fracture, 80.4 - 49.6' - Fracture,	
R5-HQ 5 ft 62%	_
45 - 3.3 - 3	_
stepped, fracture with some fragmentation, open 42.3-42.7' - Clay seam, non-indurated zone bounded by weakly indurated rock 43.4.3.9' - Fractures (2), horizontal, rough, undulating, open to tight 47.15' - Fracture, 10 deg, rough, undulating, open to tight 48.65' - Fracture, 15 deg, rough, undulating 48.65' - Fracture, 10 deg, rough, undulating 49.6' - Fracture, 10 deg, rough, undulating 40.4' - Fracture, 10 deg, rough, undulating 41.4' - Fracture, 10 deg, rough, undulating 42.4' - Fracture, 10 deg, rough, undulating 43.4' - Fracture, 10 deg, rough, undulating 44.6' - Fracture, 10 deg, rough, undulating 45.1' - Fracture, 10 deg, rough, undulating 46.4' - Fracture, 10 deg, rough, undulating 47.4' - Fracture, 10 deg, rough, undulating 48.65' - Fracture, 10 deg, rough, undulating 49.6' - Fracture, 10 deg, rough, undulating 49.6' - Fracture, 10 deg, rough, undulating 40.4' - Fracture, 10 deg, rough, undulating 41.4' - S-ame as 41.0-42.2' 42.2-43.4' - S-ame as 41.0-42.2' 46.0' - Tomestore 46.0' - Tomestore 46.0' - Tomestore 46.0' - Tomestore 46.0' - Tomestore 46.0' - Tomestore 46.0' - Tomestore 46.0' - Tomestore 46.0' - Tomestore 46.0' - Tomestore 46.0' - Tomestore 46.0' - Tomestore 46.0' - Tomest	_
42.3-42.7' - Clay seam, non-indurated zone bounded by weakly indurated rock 42.9-43.15' - Clay seam, non-indurated zone bounded by weakly indurated rock 42.9-43.15' - Clay seam, non-indurated zone bounded by weakly indurated rock 43.4.4.39' - Fractures (2), horizontal, rough, undulating, open 1	_
bounded by weakly indurated rock 42.9-43.15' - Clay seam, non-indurated zone bounded by weakly indurated rock 42.9-43.15' - Clay seam, non-indurated zone bounded by weakly indurated rock 43.4, 43.9' - Fractures (2), horizontal, rough, undulating, open 46.0 1	
bounded by weakly indurated rock 43.4, 43.9' - Fractures (2), horizontal, rough, undulating, open 46.4' - Fracture, 10 deg, rough, undulating, open to tight 47.15' - Fracture, 10 deg, smooth, planar 47.3' - Fracture, 50 deg, smooth, planar 47.4' - Fracture, 15 deg, rough, undulating 1 48.65' - Fracture, 70 deg, rough, undulating 48.65' - Fracture, 50 deg, rough, undulating 49.6' - Fracture, 70 deg, rough, undulating 49.6' - Fracture, 50 deg, rough, undulating 49.6' - Fracture, 50 deg, rough, undulating 49.6' - Fracture, 49.6' - Same as 46.0-49.9' except wery weak (R1) 49.6' - Fracture, 49.6' - Same as 46.0-49.9' except wery weak (R1) 49.6' - Fracture, 49.6' - Same as 46.0-49.9' except wery weak (R1) 49.6' - Fracture, 49.6' - Same as 46.0-49.9' except wery weak (R1) 49.6' - Fracture, 49.6' - Same as 46.0-49.9' except wery weak (R1) 49.6' - Fracture, 49.6' - Same as 46.0-49.9' except wery weak (R1) 49.6' - Fracture, 49.6' - Same as 46.0-49.9' except wery weak (R1) 49.6' - Fracture, 50 deg, 50	
46.0 43.4 43.9' - Fractures (2), horizontal, rough, undulating, open 46.0 43.4 43.9' - Fracture, 10 deg, rough, undulating, open to tight 47.15' - Fracture, 10 deg, smooth, planar 47.3' - Fracture, 50 deg, smooth, planar 47.4' - Fracture, 15 deg, rough, undulating 50 -8.3 10 48.6' - Fracture, 10 deg, rough, undulating 48.65' - Fracture, 15 deg, rough, undulating 48.65' - Fracture, 15 deg, rough, undulating 49.6' - Fracture, 70 deg, rough, undulating 49.6' - Fracture, horizontal, smooth, undulating 49.6' - Fracture, horizontal, smooth, undulating 51.0 51.0 62 1	
undulating, open 46.4' - Fracture, 10 deg, rough, undulating, open to tight 47.15' - Fracture, 10 deg, smooth, planar 47.3' - Fracture, 50 deg, smooth, planar 47.4' - Fracture, 15 deg, rough, undulating 86-HQ 5 ft 78% 48.65' - Fracture, 70 deg, rough, undulating 48.65' - Fracture, horizontal, smooth, undulating 48.64 - 47.45' - Same as 46.0-49.9' except very weak (R1) 49.6' - Fracture, horizontal, smooth, undulating 48.64 - 47.45' - Same as 46.0-49.9' except very weak (R1) 49.6' - Fracture, horizontal, smooth, undulating 48.64 - 47.45' - Same as 46.0-49.9' except very weak (R1) 49.6' - Fracture, horizontal, smooth, undulating 51.0' - 1/4-inch infilling, strong HCl reaction 51.0' - 1/4-inch infilling, strong HCl reaction 51.0' - 1/4-inch infilling, strong HCl reaction 52.3, 52.55, 52.7' - Fractures (3), horizontal, smooth, planar, open 51.0-52.3' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, medium strong (R3 to R4), voids (1/16") over 10% of rock surface, trace voids up to 1/5", trace organic inclusions 53.2' - Fracture, 10 deg, smooth, planar 53.8, 53.9' - Fracture or fractures (2), 10 deg, rough planar cases 51.0-52 3' and strong to strong (R3 to R4), voids (1/16") over 10% of rock surface, trace voids up to 1/5", trace organic inclusions	-
A6.4 - Fracture, 10 deg, smooth, planar 47.3' - Fracture, 50 deg, smooth, planar 47.4' - Fracture, 15 deg, rough, undulating R6-HQ 5 ft 78% 62 1 A8.65' - Fracture, 70 deg, rough, undulating 48.65' - Fracture, 70 deg, rough, undulating 48.65' - Fracture, 70 deg, rough, undulating 48.64' - Same as 46.0-49.9' except very weak (R1) 49.6' - Fracture, horizontal, smooth, undulating 49.6' - Fracture, horizontal, smooth, undulating 49.6' - Fracture, horizontal, smooth, undulating 51.0' - 1/4-inch infilling, strong HCI reaction 60 51.0' - 1/4-inch infilling, strong HCI reaction 75.2 same as 46.0-49.9' except weak (R1) 49.4-49.9' - Same as 46.0-49.9' except medium strong (R3) No Recovery 49.9-51.0' Limestone 51.0-52.3' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCI reaction, very weak to medium strong (R3) 48.6-49.4' - Same as 46.0-49.9' except very weak (R1) 49.4-49.9' - Same as 46.0-49.9' except medium strong (R3) No Recovery 49.9-51.0' Limestone 51.0-52.3' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCI reaction (R3) No Recovery 49.9-51.0' Limestone 51.0-52.3' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCI reaction (R3) 48.6-49.4' - Same as 46.0-49.9' except wery weak (R1) 49.4-49.9' - Same as 46.0-49.9' except medium strong (R3) No Recovery 49.9-51.0' Limestone 51.0-52.3' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCI reaction, very weak to medium strong (R3) 48.6-49.4' - Same as 46.0-49.9' except weight and to moderate HCI reaction (R3) 48.6-49.4' - Same as 46.0-49.9' except very weak (R1) 49.4-49.9' - Same as 46.0-49.9' except weight and to moderate HCI reaction (R3) 48.6-49.4' - Same as 46.0-49.9' except very weak (R1) 49.4-49.9' - Same as 46.0-49.9' except very weak (R1) 49.4-49.9' - Same as 46.0-49.9' except very weak (R1) 49.4-49.9' - Same as 46.0-49.9' except very weak (R1) 49.4-49.9' - Same as 46.0-49.9' except very weak (R1) 49.4-49.9' - Same as 46.0-49.9' except very weak (R1) 49.4-49.9' - Same a	-
47.15' - Fracture, 10 deg, smooth, planar 47.3' - Fracture, 50 deg, smooth, planar 47.4' - Fracture, 15 deg, rough, undulating 48.65' - Fracture, 70 deg, rough, undulating 48.65' - Fracture, 70 deg, rough, undulating 49.6' - Fracture, horizontal, smooth, undulating NR 51.0 R7-HQ 5 ft 86% 787 4 788 47.15' - Fracture, 10 deg, smooth, planar 47.4' - Fracture, 15 deg, rough, undulating 47.4' - Fracture, 70 deg, rough, undulating 48.65' - Fracture, 70 deg, rough, undulating 48.65' - Fracture, horizontal, smooth, undulating 48.64-47.45' - Same as 46.0-49.9' except medium strong (R3) 48.6-49.4' - Same as 46.0-49.9' except medium strong (R3) No Recovery 49.9-51.0' Limestone 51.0-52.3' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, medium strong (R3) No Recovery 49.9-51.0' Limestone 51.0-52.3' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, medium strong (R3) No Recovery 49.9-51.0' Limestone 51.0-52.3' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, medium strong (R3) No Recovery 49.9-51.0' Limestone 51.0-52.3' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, medium strong of strong (R3 to R4), voids (1/16") over 10% of rock surface, trace voids up to 1/5", trace organic inclusions 53.8, 53.9' - Fracture, vertical, rough, planar 53.8, 53.9' - Fracture or fractures (2), 10 deg, rough planar 52.3-52 8' - Same as 51.0-52 3' except medium strong (R1 to R3), voids (1/16") over 10% of rock surface, trace voids up to 1/5", trace organic inclusions 53.8, 53.9' - Fracture or fractures (2), 10 deg, rough planar 52.3-52 8' - Same as 51.0-52 3' except medium strong (R1 to R3), voids (1/16") over 10% of rock surface, trace voids up to 1/5", trace organic inclusions	-
47.3' - Fracture, 50 deg, smooth, planar 47.4' - Fracture, 15 deg, rough, undulating 48.65' - Fracture, 70 deg, rough, undulating 49.6' - Fracture, horizontal, smooth, undulating 1 49.6' - Fracture, horizontal, smooth, undulating NR 51.0 51.0 48.65' - Fracture, horizontal, smooth, undulating 49.6' - Fracture, horizontal, smooth, undulating 51.0 51.0 51.0 51.0 51.0 51.0 52.3, 52.55, 52.7' - Fractures (3), horizontal, smooth, planar, open 53.3' - Fracture, vertical, rough, planar 53.3' - Fracture, 10 deg, smooth, planar 53.8, 53.9' - Fracture or fractures (2), 10 deg, rough, undulating 62 1 48.65' - Fracture, 70 deg, rough, undulating 48.65' - Same as 46.0-49.9' except wedium strong (R3) 48.6-49.4' - Same as 46.0-49.9' except wedium strong (R3) No Recovery 49.9-51.0' Limestone 51.0-52.3' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, medium strong (R3) No Recovery 49.9-51.0' Limestone 51.0-52.3' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, medium strong (R3) No Recovery 49.9-51.0' Limestone 51.0-52.3' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, medium strong (R3) No Recovery 49.9-51.0' Limestone 51.0-52.3' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, very weak (R1) 48.65' - Fracture, 70 deg, rough, undulating 65.2 minutes 65.2 minutes 66.2 minutes 66.3 minutes 66.4 minutes 66.4 minutes 66.4 minutes 66.4 minutes 66.4 minutes 66.4 minutes 66.4 minutes 66.2 minutes 66.4 minutes 66.4 minutes 66.4 minutes 66.4 minut	-
47.4' - Fracture, 15 deg, rough, undulating 47.4' - Fracture, 15 deg, rough, undulating 48.65' - Fracture, 70 deg, rough, undulating 48.65' - Fracture, 70 deg, rough, undulating 48.65' - Fracture, 70 deg, rough, undulating 48.65' - Fracture, 70 deg, rough, undulating 49.6' - Fracture, horizontal, smooth, undulating NR 51.0 86' Sit	-
48.65' - Fracture, 70 deg, rough, undulating 46.4-47.45' - Same as 46.0-49.9' except very weak (R1) 47.45-48.6' - Same as 46.0-49.9' except medium strong (R3) 48.6-49.4' - Same as 46.0-49.9' except very weak (R1) 47.45-48.6' - Same as 46.0-49.9' except medium strong (R3) 48.6-49.4' - Same as 46.0-49.9' except very weak (R1) 49.4-49.9' - Same as 46.0-49.9' except medium strong (R3) No Recovery 49.9-51.0' Limestone 51.0-52.3' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCI reaction, medium strong to strong (R3 to R4), voids (1/16") over 10% of rock surface, trace voids up to 1/5", trace organic inclusions 52.3528' - Same as 51.0-523'	_
except very weak (R1) 47.45-48.6' - Same as 46.0-49.9' except medium strong (R3) 48.6-49.4' - Same as 46.0-49.9' except wery weak (R1) 47.45-48.6' - Same as 46.0-49.9' except wery weak (R1) 47.45-48.6' - Same as 46.0-49.9' except wery weak (R1) 47.45-48.6' - Same as 46.0-49.9' except wery weak (R1) 47.45-48.6' - Same as 46.0-49.9' except medium strong (R3) No Recovery 49.9-51.0' Limestone 51.0-52.3' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, medium strong to strong (R3 to R4), voids (1/16") over 10% of rock surface, trace voids up to 1/5", trace organic inclusions 52.35.8 53.9' - Fracture or fractures (2), 10 deg, rough planar coon. 52.3528' - Same as 51.0-523'	-
49.6' - Fracture, horizontal, smooth, undulating 49.6' - Fracture, horizontal, smooth, undulating 49.6' - Fracture, horizontal, smooth, undulating 51.0 51.0 49.6' - Fracture, horizontal, smooth, undulating 51.0 51.0 51.0' - 1/4-inch infilling, strong HCl reaction 60 51.0' - 1/4-inch infilling, strong HCl reaction 70 60 87-HQ 51.0' - 1/4-inch infilling, strong HCl reaction 71 87-HQ 51.0' - 1/4-inch infilling, strong HCl reaction 87-HQ 51.0' - 1/4-inch infilling, strong HCl reaction 88-8 70 88-8 71 88-8 72 88-8 88-8 73 88-8 88-8 75 88-8 88-8 75 88-8 88-8 75 88-8 88-8 75 88-8 88-8 75 88-8 88-8 75 88-8 88-8 75 88-8 88-8 75 88-8 88-8 75 88-8 88-8 75 88-8 88-8 75	-
-8.3 NR Undulating HCI reaction A8.6-49.4' - Same as 46.0-49.9' except very weak (R1) 49.4-49.9' - Same as 46.0-49.9' except medium strong (R3) No Recovery 49.9-51.0' Limestone 51.0-52.3' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCI reaction, medium strong (R3 to R4), voids (1/16") over 10% of rock surface, trace voids up to 1/5", trace organic inclusions 52.3-52.8' - Same as 51.0-52.3'	-
NR 51.0 NR 51.0 String by Respect to the strength of the s	
51.0' - 1/4-inch infilling, strong HCl reaction 51.0' - 1/4-inch infilling, strong HCl reaction 51.0' - 1/4-inch infilling, strong HCl reaction 62.3, 52.55, 52.7' - Fractures (3), horizontal, smooth, planar, open 63.2' - Fracture, vertical, rough, planar song, trace voids up to 1/5", trace organic inclusions 63.3' - Fracture or fractures (2), 10 deg, song to the planar song, trace voids up to 1/5", trace organic inclusions 63.52.52.53.9' - Fracture or fractures (2), 10 deg, song to the planar song, trace voids up to 1/5", trace organic inclusions 63.52.52.8' - Same as 51.0-52.3'	-
R7-HQ 5 ft 86% R7-HQ 6 ft 86% R7-HQ 6 ft 86%	-
51.0-52.3' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, medium strong to strong (R3 to R4), voids (1/16") over 10% of rock surface, trace voids up to 1/5", trace organic inclusions 53.8, 53.9' - Fracture or fractures (2), 10 deg, rough planar strong to strong (R3 to R4), voids (1/16") over 10% of rock surface, trace voids up to 1/5", trace organic inclusions 53.8, 53.9' - Fracture or fractures (2), 10 deg, rough planar strong to strong (R3 to R4), voids (1/16") over 10% of rock surface, trace voids up to 1/5", trace organic inclusions 52.3-52.8' - Same as 51.0-52.3'	-
R7-HQ 5 ft 86% 57 4 57 3.3' - Fracture, vertical, rough, planar 53.8' - Fracture, 10 deg, smooth, planar 53.8' - Fracture or fractures (2), 10 deg, rough, planar 53.8' - Same as 51.0-52 3'	-
R7-HQ 5 ft 86% 86% 87-HQ 5 ft 86% 4 Same as 51 0-52 3'	-
5 ft 86% 57 4 53.2' - Fracture, Vertical, rough, planar 53.3' - Fracture, 10 deg, smooth, planar 53.8, 53.9' - Fracture or fractures (2), 10 deg, inclusions 52.3-52.8' - Same as 51.0-52.3'	-
53.8, 53.9' - Fracture or fractures (2), 10 deg, inclusions	-
52 3-52 8' - Same as 51 0-52 3'	-
	-
55 except transition with depth from except transition with depth from tight except transition with depth from except transition with except transition with except transition with except transition with except	_
54.4' - Fracture, horizontal, rough, planar to 52.8-54.75' - Same as 51.0-52.3'	-
56.0 NR undulating 54.75-55.3' - Same as 52.3-52.8' except possibly grades to stronger	-
open rock at 55.3'	_
54.9, 55.2' - Fractures (2), horizontal, rough, planar, tight	_
56.0-60.0' - moderate yellowish	_
rough, undulating brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, medium	=
R8-HQ open strong to very weak (R3 to R1), voids	_
5 ft 80% 58.1' - Fracture, horizontal, rough, planar, open (1/16") over 25-30% of rock surface, some cavities up to 1/4", organic	-
58.5' - Fracture, 15 deg, rough, undulating inclusions; very similar to R7-HQ	_
3 58.8' - Fracture, 35 deg, smooth, undulating, tight to open	_
-18.3 No Recovery 60.0-61.0' R8: 2 minutes	
61.0 NR rock fragments	_
	-
	_

APPENDIX 2BB-513 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-14

SHEET 5 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724122.8 N, 458024.1 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

CORING	NETHOD A	ND E	JUIPIV	MENT: CME 550X S/N 340253, mud rotary, HQ tools, HV	Casil	ig	ORIENTATION : Vertical
WATER	LEVELS: 7.0	ft bg	s on 6	/5/07 START : 6/5/2007 END : 6/	6/2007	7 LOGGER : B. Ellis, D. Thomas	
				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표시한	ER'A	(%	FRACTURES PER FOOT		음	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H F A	R TO	Q D (%)	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
E.E.	SEC	a Q	'RA'	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ΣΨ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ПОП	274	<u> </u>	44		0)		
_			2	59.8' - Fracture, high angle fracture partially penetrating core	Ш	Limestone - 61.0-61.7' - moderate yellowish]
			-	61.4-61.6' - Fracture zone, horizontal,	ш	brown, (10YR 5/4), fine grained,	
				smooth, planar	Н	moderate to strong HCl reaction,	1
-			0		口	- very weak to extremely weak (R1 to	1
-	R9-HQ		_		Н	R0), voids (1/16") over 3% of rock surface, few cavities up to 1/4"	1 -
-	5 ft	75	1	62 45' Eractura barizantal rough planar		- 61.7-63.4' - Same as 61.0-61.7'	1 -
	92%			63.45' - Fracture, horizontal, rough, planar	ig	except medium strong to strong (R3]
				64.0-64.1' - Fracture zone	Н	to R4), voids (1/16") over 5-10% of	
65			1	64.6' - Fracture, horizontal, smooth, planar,	Ш	 rock surface 63.4-64.3' - Same as 61.0-61.7'] 1
-23.3			_	open	+	64.3-65.4' - Same as 61.0-61.7'	R9: 3 minutes
-			2	65.35, 65.45' - Fractures (2), 10 deg, smooth,		 except weak to medium strong (R2 to 	-
_	66.0		NR	planar	₽₩	R3), voids (1/16") over 5% of rock	
			_F	66.1, 66.15, 66.35, 66.55' - Fractures (4),	Ш	surface 65.4-65.6' - dark yellowish orange,	
]			5	horizontal, smooth, planar, tight	\square	(10YR 6/6), moderate HCl reaction,] 1
-				66.6' - Fracture, horizontal, smooth, planar, open	╁┼┤	extremely weak (R0), voids and	1
-			2	'	Ш	_ cavities absent] -
-	_		<u> </u>	67.6' - Fracture, horizontal, smooth, planar, tight to open	\vdash	No Recovery 65.6-66.0' Limestone] -
	R10-HQ 5 ft	48	2	67.75' - Fracture, 75 deg, smooth, undulating	口	_ 66.0-66.6' - dark yellowish orange,]
	82%	70		68.2' - Fracture, 75 deg, rough, undulating	$\vdash \vdash$	(10YR 6/6), moderate HCl reaction,]
				68.5-69.1' - Fracture zone, vertical and	Ш	extremely weak to very weak (R0 to] 1
			4	horizontal, smooth, undulating, angular limestone rock fragments	\Box	R1), voids and cavities absent 66.6-70.1' - dark yellowish brown,	-
70 <u> </u>			0 /	69.1' - Fracture, 20 deg, rough, undulating	╀┤	(10YR 4/2), fine grained, moderate	R10: 3 minutes
-20.3			NR	69.3' - Fracture, 20 deg, smooth, undulating, .	Ш	HCl reaction, strong (R4), voids	N IO. 3 IIIIIIules
	71.0		INIC	infilled with sediment	H	(1/16") over 5% of rock surface,	
				69.75-70.1' - Fracture zone, vertical, rough, undulating, open		voids (1/8") over 5% of rock surface No Recovery 70.1-71.0']
-			>10	71.0-71.2' - Fracture zone, subrounded	14	Limestone] 1
-				fragments (up to 1 3/4")	団	71.0-72.9' - moderate yellowish	-
-			>10	71.25-71.35' - Fracture zone, horizontal,	+	brown to moderate olive brown,	-
				smooth, planar to undulating 72.1' - Fracture, horizontal, smooth, planar,	ᡛ᠊ᡰ	(10YR 5/4 to 5Y 4/4), fine grained, moderate HCl reaction, very weak to]
	R11-HQ			tight	Ш	weak (R1 to R2), voids (1/16") over	
	5 ft 80%	38	6	72.3-72.5' - Fracture zone, subangular	\mathbb{H}	10% of rock surface, few cavities up	Cavities at 73.9', 74.5'
-	0070			fragments up to 1/2"		- to 1/4"	1
-			2	72.5' - Fracture, 40 deg, rough, stepped 72.8' - Fracture, horizontal, rough, undulating	╀┤	72.9-73.5' - olive gray, (5Y 3/2), fine grained, moderate HCl reaction,] -
75				73.0' - Fracture, nonzontal, rough, undulating 73.0' - Fracture, 30 deg, rough, stepped —	Ш	— strong to very strong (R4 to R5),	B44: 0 minutes
-33.3			NR	73.0-73.2' - Fracture zone, angular fragments	\square	voids (1/16") over 3% of rock surface	R11: 3 minutes
	76.0		INIC	(up to 1/2")	Ш	73.5-75' - moderate yellowish brown,]
-				73.4' - Fracture, 10 deg, rough, undulating, open	Ш	 (10YR 5/4), fine grained, moderate to strong HCl reaction, strong (R4), 	1
-			0	74.1' - Fracture, 10 deg, smooth, planar, tight	+	voids (1/16") over 15% of rock	-
-				74.9' - Fracture, 50 deg, rough, stepped,		 surface, few cavities up to 1/4" 	-
_			1	open	Ш	No Recovery 75.0-76.0']
				77.6' - Fracture, horizontal, rough, planar		Limestone 76.0-77.55' - moderate yellowish	
	R12-HQ			78.0' - Fracture, 10 deg, rough, undulating		brown, (10YR 5/4), fine grained,] 1
-	5 ft	45	2		╁┼┤	moderate HCl reaction, very strong	-
-	88%			78.9' - Fracture, horizontal, smooth, planar	口	(R5), voids (1/16") over 5-10% of] -
-			3	79.15, 79.35, 79.65' - Fractures (3),	H	rock surface, few cavities from 1/4" up to 3/4", some cavity infilling] _
80			الله	horizontal, rough, planar, open at 79.15'	罝		
-38.3			7	80.15-80.4' - Fracture zone, subangular	Ш		R12: 3 minutes
-	01.0		NR	fragments (up to 2")	Ш	_	1
	81.0				仠		
							<u> </u>

APPENDIX 2BB-514 Rev. 7



PROJECT NUMBER:

33884.FL

B-14

SHEET 6 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724122.8 N, 458024.1 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

				IENT : CIVIE 330X 3/N 340233, ITIUU TOLALY, FIQ LOOIS, FI			
WATER	LEVELS: 7.0	ft bgs	s on 6	5/07 START : 6/5/2007 END : 6	6/2007	LOGGER : B. Ellis, D. Thomas	
> ~ ~				DISCONTINUITIES	ტ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표원인	E, A	(%	FRACTURES PER FOOT		음	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H A A	1 H 1 H 1 H 1 H 1 H 1 H 1 H 1 H 1 H 1 H	(%) Q	CT.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
989		S. O.	RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ПОП	0716	LE.	шп	,	0)		
'			1	81.1' - Fracture, horizontal, rough, undulating	Н	77.5-78.9' - yellowish gray, (5Y 8/1),	SC-1 collected at 81.2-
7			'			 very fine grained, strong HCl reaction, extremely weak (R0), with 	82.3'
-						very fine carbonate-derived sand and	1 1
_			0		╀┦	- silt	1 -
						78.9-80.4' - moderate yellowish]
'	R13-HQ					brown, (10YR 5/4), fine grained,	Cavities at 83.7', 84.0',
-	5 ft	78	0		Ш	 moderate HCl reaction, weak (R2), voids (1/16") over 25% of rock 	84.1', 84.4' (less than 1/4")
	84%			84.0' - Fracture, 40 deg, rough, stepped	-Ш	surface, some cavities 1/4"-1/2",	l ` `
			1	04.0 - Fracture, 40 deg, rough, stepped	+	- trace organic inclusions	-
85					Н	No Recovery 80.4-81.0'	
-43.3			1	85.0' - Fracture, 45 deg, rough, undulating	Ш	Limestone	R13: 3 minutes
-			NR		╂┼┦	 81.0-83.15' - dark yellowish orange to dusky yellow, (10YR 6/6 to 5Y 	
-	86.0				┸╢	6/4), fine grained, moderate to strong	-
-			2	86.3' - Fracture, 10 deg, rough, planar	Щ	HCl reaction, medium strong (R3),]
'			_	86.6' - Fracture, 10 deg, rough, stepped	Н	voids (1/16") over 15-20% of rock	
-				87.1-87.5' - Fracture zone, angular fragments	Ш	surface, few cavities up to 1/4"	1
-			>10	(3/4 to 2")	-	83.15-85.2' - moderate yellowish	1 -
				,	┦	brown, (10YR 5/4), fine grained, moderate HCl reaction, weak (R2),	1 -
'	R14-HQ	20	3	88.0' - Fracture, 30 deg, rough, undulating,		voids (1/16") over 25-30% of rock	
1	5 ft 90%	20	٦	tight 88.65' - Fracture, 40 deg, rough, undulating,	Ш	surface with cavities up to 3/4", some	1
-				open	+	cavities infilled with less strong, gray	1
-			>10	88.85' - Fracture, vertical, rough, undulating,	-	to brown, limestone	-
90				tight _	ш	No Recovery 85.2-86.0' Limestone	
-48.3			2	89.1' - Fracture, horizontal, rough, stepped,	Н	86.0-87.5' - dusky yellow, (5Y 6/4),	R14: 4 minutes
1 7	91.0		NR	open 89.2-89.4' - Fracture zone, angular fragments		fine grained, strong HCI reaction,	1 1
-	31.0			(1/2 to 1"), terminated by rough-planar	╁┼┤	extremely weak (R0), voids (1/16")	1 1
-			>10	horizontal fracture	$-\Box$	over up to 3% of rock surface	-
-				89.7' - Fracture, 10 deg, rough, undulating to	\square	87.5-88.7' - moderate yellowish brown, (10YR 5/4), strong HCl]
				stepped, tight to open 90.0' - Fracture, 80 deg, rough, undulating,	H	reaction, weak to medium strong (R2	Core barrel getting stuck in
-				tight to open	ш	to R3), voids (1/16"-1/8") over 20% of	borehole, some casing – withdrawn in order to
1 -	R15-HQ			90.3' - Fracture, horizontal, rough, planar,	╁┼┤	rock surface, few cavities 1/2"-3/4",	retrieve core barrel
-	5 ft	0		tight	┦┤	cavities mostly elongate	-
	18%		NR	91.0-91.6' - Fracture zone, angular to	Ш	88.7-90.5' - yellowish gray, (5Y 8/1), fine to very fine grained, strong HCI]
1 7			' '' \	subrounded fragments 1/2" to 2" 91.6' - Fracture, 30 deg, rough, undulating,	H	reaction, very weak to very strong	1
				91.6 - Fracture, 30 deg, rough, undulating, open	\Box	(R1 to R5), fossiliferous (less than	1
95 <u> </u>					-Ш	— 1/16"), rock strength gradually	R15: 18 minutes
					+	transitions from weak (R2) at	1715. To minutes
	96.0					88.7-89.1' to extremely weak (R0) at 89.1-89.7' to strong to very strong	
1 7			0		Щ	(R4 to R5) at 89.7-90.5'	1
-					+	No Recovery 90.5-91.0'	1
-						Limestone	-
-					┸	91.0-91.6' - moderate yellowish]
						brown to light olive gray, (10YR 5/4 to 5Y 5/2), angular to subangular	
-	R16-HQ				\Box	limestone rock fragments (1/2"-2"),	1
	5 ft	0	NR		₩	no fines	
-	4%				丗	91.6-91.9' - Same as 88.7-90.5'	-
						except yellowish gray, (5Y 8/1)	
100					Н	No Recovery 91.9-96.0'	1
-58.3				_	団		R16: 3 minutes
-					+	-	-
1	101.0				\vdash		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-14

SHEET 7 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724122.8 N, 458024.1 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

CORING	I WE I HOD AI	AD EC	אורוטב	MENT: CME 550X S/N 340253, mud rotary, HQ tools, HV	v casi	ng	ORIENTATION : Vertical
WATER	LEVELS: 7.0	ft bg	s on 6	/5/07 START : 6/5/2007 END : 6/	6/200	7 LOGGER : B. Ellis, D. Thomas	
	_			DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		(0	DESCRIPTION	SYMBOLIC LOG		
O A A	Z Z Z	_	FRACTURES PER FOOT	DESCRIPTION	<u></u>	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
A TIC	N. T. A	Q D (%)	[<u>₹</u> 8	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	9	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FRE	NG NG	C C	AC R	PLANARITY, INFILLING MATERIAL AND	MB.	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
E S E	8일뿐	ď	E H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	BROLO, TEOL REGOETO, ETC.
						Limestone	1
-			2	101.3' - Fracture or mechanical break, 30	╁	 96.0-96.2' - light olive gray, (5Y 5/2), 	1 -
_				deg, rough, stepped	╀	very fine grained, moderate to strong	-
			0	101.7' - Fracture, horizontal, smooth, planar, tight	厂	HCl reaction, very strong (R5), voids (1/16") over 5% of rock surface	SC-2 collected at 102.3-
			"	ight -	\vdash	No Recovery 96.2-101.0'	103.4'
-	R17-HQ			•	1	Limestone	1 1
-	5 ft	80	1	103.4' - Fracture, horizontal, rough,	ш	 101.0-105.8' - yellowish gray, (5Y 	-
l _	96%			undulating	┢	8/1), very fine grained, strong HCI	<u>_</u>
						reaction, extremely weak (R0) from 101.0-101.5', very weak (R1) from	
105			0		Ш	101.5-105.8', trace to 5% fine, gray	1
-63.3				-	+	speckles in matrix	R17: 3 minutes
			4	105.3, 105.4, 105.5, 105.65' - Fractures (4),	仁	-	-
	106.0		NR	horizontal - 20 deg, smooth, planar, open	Ш	- No Recovery 105.8-106.0'	
			igcup	106.1, 106.3' - Fractures (2), horizontal,		Limestone	1
-			2	smooth, planar, tight		106.0-111.0' - yellowish gray, (5Y	1
-			<u> </u>		₩	 8/1), very fine grained, strong HCl 	-
_			1	107.1' - Fracture, horizontal, smooth,	\vdash	reaction, very weak to extremely	
			l '	undulating, open		weak (R1 to R0), very small fossil fragments	
	R18-HQ				╨	- iraginents	1
-	5 ft	78	1	108.3' - Fracture, 10 deg, smooth, planar,	T	-	I -
_	100%			tight 108.65, 109.2' - Fracture, horizontal, smooth,		_	-
_			2	undulating, tight	╨	_	
110			-	a.radidarig, agric			
-68.3				109.9' - Fracture, 10 deg, smooth, undulating, —	1—	-	R18: 5 minutes
-			5	open 110.0, 110.05, 110.2, 110.35' - Fractures (4),	╫	-	Drilling ends at 16:30 on
-	111.0			horizontal, smooth, undulating	厂	444.0.445.71	6/5/07
			>10	110.6' - Fracture or mechanical break,	\vdash	111.0-115.7' - yellowish gray, (5Y - 8/1), fine to medium grained, strong	Core tends to break along
			-10	horizontal, smooth, planar	\vdash	HCl reaction, very weak to weak (R1	bedding planes, very
-				111.0-111.2' - Fracture zone, subrounded	ш	to R2), voids (1/16") over 3% of rock	uniform lithology throughout core
-			2	fragments 1/2" to 2" 111.2-111.4, 111.9, 112.3, 112.95' -	\vdash	 surface, few cavities up to 1/4", 	Start drilling on 6/6/07 at
_				Fractures (5), horizontal, smooth, planar to		increase in voids to 10% with some	08:30
	R19-HQ		1	undulating, tight		cavities up to 1/2" below 115.3'	
1 7	5 ft 94%	85	1	113.3, 114.4' - Fractures (2), horizontal,	\vdash		1
-	01/0			smooth, undulating		-	1 1
-			2		╀	-	-
115_				114.9' - Fracture, 5 deg, rough, undulating		_	I
-73.3			0	114.9 - Fracture, 5 deg, rough, undulating			R19: 2 minutes
-	116.0		NR	•	1—	No Dogovory 445 7 446 0	1 1
-	116.0		INK	-		No Recovery 115.7-116.0'	-
-			1	116.25' - Fracture, horizontal, rough,		- 116.0-118.5' - yellowish gray, (5Y	SC-3 collected at 116.3-
				undulating	\vdash	8/1), fine to medium grained, strong	117.5'
						HCl reaction, very weak (R1), voids	1
-			2	117.4, 117.6' - Fractures (2), 5 deg, rough,		- (1/16") over 3% of rock surface,	1 -
-	D00 110		-	stepped	╀	_ bioturbated	-
_	R20-HQ 5 ft	67	2	118.3, 118.6' - Fractures (2), horizontal,	\Box		
	94%	O1	_	rough, undulating		118.5-119.8' - Same as 116.0-118.5'	Cavities at 117.2', 120.2';
-					1-	 except yellowish gray to very pale orange, (5Y 8/1 to 10YR 8/2), fine 	sample tends to break - along bedding planes when _
-			4	119.3' - Fracture, 30 deg, rough, planar, tight	仜	grained limestone with some textural	handled, rock in core
120				119.5' - Fracture, 80 deg, rough, undulating,		— and color variations	uniform throughout —
-78.3			2	fracture extends from 119.3-119.75'	\vdash	119.8-120.7' - Same as 116.0-118.5'	R20: Run time not
	121.0		NR		Ш	No Recovery 120.7-121.0'	recorded
			1417		1	140 NGCOVELY 120.7-121.0	
					1		

APPENDIX 2BB-516 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-14

SHEET 8 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724122.8 N, 458024.1 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS: 7.0) ft bgs	s on 6	/5/07 START : 6/5/2007 END : 6/	6/200	7 LOGGER : B. Ellis, D. Thomas	
≥∩≎	(%)			DISCONTINUITIES	စ္ခ	LITHOLOGY	COMMENTS
ELO, II ANI	AND 3Y (%		ZES T	DESCRIPTION	CLO	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH BI FACE	E RU 3TH, OVEF	(%) _Q	STUF FOO	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQI	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
				119.55, 119.75' - Fractures (2), horizontal,	仜	Limestone	Fossiliferous inclusions at
			2	smooth to rough, planar to undulating, tight to open	世	- 121.0-126.0' - yellowish gray to very pale orange, (5Y 8/1 to 10YR 8/2),	122.6', cavity at 123.65' - (1"), cavities at 125.1' and
-			0	120.4, 120.6, 121.3, 121.4' - Fractures (4), horizontal, smooth, planar	Ш	fine to medium grained, strong HCl reaction, very weak (R1), voids	125.8' (1/4"-1/2"), partial white infilling of cavities
			0	Horizontal, Smooth, planai	Ь	(1/16") over 3-5% of rock surface,	could also be actual fossil
_	R21-HQ 5 ft	80	4	123.1' - Fracture, horizontal, smooth, planar to undulating, open	\vdash	few cavities (1/4"-1/2"), some cavities infilled with white calcareous	
-	100%			123.25' - Fracture, horizontal, smooth,	╁	limestone, some textural and color variations similar to 118.5-119.8'	-
_			2	stepped, open 123.35, 123.45' - Fractures (2), horizontal,	F	from 121.35-122.0', fossiliferous,	-
125 <u>-</u> -83.3				smooth, planar to undulating, open	Ħ	inclusions at 122.6'	R21: 3 minutes
-			1	124.5, 124.6' - Fractures (2), horizontal, smooth, planar	Ħ	-	-
-	126.0			125.5' - Fracture, horizontal, smooth, planar, tight	Ħ	126.0-131.0' - yellowish gray to very	Large bivalve shells at
-			6	126.1' - Fracture, horizontal, smooth, planar,	Ħ	pale orange, (5Y 8/1 to 10YR 8/2), fine to medium grained, strong HCl	127.4', 127.5', 126.7'
-				open 126.2' - Fracture, 30 deg, smooth, planar,	世	reaction, very weak (R1), voids	
-			1	open 126.75' - Fracture, horizontal, smooth, planar,	世	- (1/16") over 3% of rock surface, few cavities up to 1/4" from 126.0-127.5',	1
_	R22-HQ		0	open	Н	voids (1/16") over 30% of rock surface, many shallow cavities	1
	5 ft 100%	85	0	127.8' - Fracture, horizontal, rough, undulating, tight	$oxed{\bot}$	(1/4"-1/2"), fossiliferous, elongate]
			6	129.1-129.6' - Fracture zone or bedding	F	molds and casts (1/2"-3/4") from - 127.5-129.15']
130_				plane, smooth, planar, some ridging	厂	<u></u>	D00 D 11
-88.3			2	130.0, 130.85' - Fractures (2), horizontal, smooth, planar	厂	1	R22: Run time not recorded –
-	131.0				厂	131.0-135.7' - Same as 126.0-131.0	SC-4 collected at 130.1- 131.0'
-			3	131.2, 131.5, 131.6' - Fracture zone (3), horizontal, rough, undulating	士	except voids (1/16") over 30% of	-
-				nonzonal, rough, anadialing	士	rock surface from 131.0-131.8'; thin laminae with bedding planes from	-
-			3	132.5' - Fracture, 5 deg, smooth, undulating	仜	- 132.6-133.3'; thicker brown laminae (1/16"-1") from 134.7-135.1'	-
-	R23-HQ			132.9, 132.95, 133.1, 133.9, 134.5, 134.7, 134.8' - Fractures (7), horizontal, smooth,	\vdash		
-	5 ft 94%	47	2	planar	Ь	Ī	1
			3		\vdash	[1
135_			J	_	F]
-93.3			2	135.2, 135.35' - Fractures (2), horizontal,	厈] -	R23: 3 minutes
-	136.0		NR	smooth, undulating	F	No Recovery 135.7-136.0']
-			4	136.1' - Fracture, 80 deg, rough, planar 136.25-136.4' - Fracture zone, irregular	H	Limestone 136.0-139.6' - yellowish gray to very	-
-				subrounded fragments up to 2-1/2", bounded	Ħ	pale orange, (5Y 8/1 to 10YR 8/2), fine to medium grained, strong HCl	-
-			2	by horizontal, smooth planar fractures 136.95' - Fracture, 80 deg, smooth, planar,	片	reaction, very weak (R1), brown	-
-	R24-HQ			tight 137.1' - Fracture, horizontal, smooth,	世	laminations from 137.3-137.8'	-
-	5 ft 92%	47	2	undulating, tight	L	ŀ	-
-	5∠ /0			137.9' - Fracture, horizontal, smooth, planar, tight	尸	f	
140			5	138.25, 138.8' - Fractures (2), horizontal, smooth, planar	F	 	Cavities at 139.55', 139.5',
-98.3			2	139.1' - Fracture, horizontal, rough, planar,	厂		139.9', 140.0', 140.1', 140.2', 140.5', 140.6' (up to
	141.0		NR	open to tight	Ш		1")



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	R-14	SHEET	a	OF	a	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724122.8 N, 458024.1 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

CORING	NETHOD A	ND EC	עורוטג	IENT: CME 550X S/N 340253, mud rotary, HQ tools, HV	Casi	ng	ORIENTATION : Vertical
WATER	LEVELS: 7.0	ft bgs	s on 6	/5/07 START : 6/5/2007 END : 6/6	3/200	7 LOGGER : B. Ellis, D. Thomas	
				DISCONTINUITIES	(2)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		m	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE OOLOD	
	N. 4. V.	(9	JR.	BESONII NON	일	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
E NE	E E E E	(%) Q	F.S.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOL	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
P.S.E.	R E C	Ø	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
Δош	OIR	ď	шФ		S		
l _			1	139.3' - Fracture, horizontal, rough to smooth, planar to undulating, open -	\vdash	139.6-140.6' - yellowish gray to - grayish orange, (5Y 8/1 to 10YR 7/4),	R24: 4 minutes Cavities at 141.0', 141.35', -
			'	139.45' - Fracture, 50 deg, rough, undulating	ш	fine grained, strong HCl reaction,	141.4', 141.75', 142.1',
-				139.7' - Fracture, 40 deg, rough, undulating	Н	strong (R4), voids (1/16") over 3% of	142.7', 143.1'
-			>10	139.9' - Fracture, vertical, rough, planar	世	- rock surface, numerous deep	-
-	DOE LIO			140.1' - Fracture, 70 deg, rough, undulating 140.25' - Fracture, 50 deg, rough, undulating	₩	cavities (1/2"-3/4") fully penetrating core	-
l -	R25-HQ 5 ft	48	>10	141.6' - Fracture, 30 deg, rough, undulating		- No Recovery 140.6-141.0'	_
	78%			to stepped, tight		Limestone	SC-5 collected at 143.8-
				142.3-142.5, 142.8-142.9, 143.2-143.3' -	\vdash	141.0-144.9' - yellowish gray to	144.8'
145			0	Fracture zone (3), subangular fragments (up to 1 1/2"), bounded by 10 deg, rough, planar	口	 dusky yellow, (5Y 7/2 to 5Y 6/4), fine grained, strong HCl reaction, strong 	-
-103.3				fractures	╁	(R4), voids (1/16") over 5-10% of	R25: Run time not
-			NR	143.5' - Fracture, horizontal, smooth,		 rock surface, many elongate cavities 	recorded -
I -	146.0			undulating	₽	(1/4"x1/2") with some infilling from]
			1	143.9' - Fracture, horizontal, rough, undulating	口	141.0-143.4; voids (1/16") over 0-5% of rock surface, few to no cavities	
I -				146.3' - Fracture, 45 deg, smooth, planar	\vdash	from 143.4-144.9']
-				-	╁	No Recovery 144.9-146.0'	1
-			0	-	厂	Limestone 146.0-149.2' - dark yellowish orange,	-
-				-	╁	(10YR 6/6), fine to medium grained,	-
l -	R26-HQ 5 ft	75	1	148.35, 149.15, 149.2' - Fractures (3),		strong HCl reaction, weak (R2),	_
	98%	7.0	'	horizontal, smooth, planar	\vdash	voids (1/16") over 30% of rock	
-					ш	surface, some fine laminations 149.2-150.9' - moderate olive brown,	1
150			4	149.4' - Fracture, 80 deg, smooth, undulating	\vdash	(5Y 4/4), fine to very fine grained,	1
150_ -108.3				149.6' - Fracture, horizontal, smooth, planar 150.0' - Fracture, 80 deg, rough, undulating		moderate HCl reaction, strong to	R26: 4 minutes
-			4	150.0 - Fracture, 80 deg, rough, undulating	₩	very strong (R4 to R5), voids (1/16")	- 1120. 4 minutes
l -	151.0		NR.	150.55' - Fracture, horizontal, rough,	上	over 3% of rock surface, rare cavities (up to 1/4"), trace organic inclusions	
			/INIC	\undulating	1	No Recovery 150.9-151.0'	
-				_	1	Bottom of Boring at 151.0 ft bgs on	1
-				-	1	- 6/6/2007	1
-				-	┨	-	-
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-15

SHEET 1 OF 9

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724222.8 N, 458094.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLIN	G METH	OD AND	EQUIPM	ENT : CME 55 S/I	N 316625, mud rotary, auto hammer, AWJ rods, 2-15/16" tri-cone b	oit	ORIENTATION : Vertical
WATER	LEVELS	: 4.0 ft bo	gs on 5/1	5/07	TART : 5/15/2007 END : 5/17/2007 LOGGER	R : T.	Stewart
				STANDARD	SOIL DESCRIPTION	U	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		SYMBOLIC LOG	
BEI CE.		RECOVE	ERY (ft)	120111200210	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	13	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTH RFA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	MB	INSTRUMENTATION
SU				(N)		ŝ	
42.3	0.0				Silty Sand (SM) 0.0-1.0' - moderate yellowish brown, (10YR 5/4),		Sand is silica
		1.0	SS-1	1-1-1 (2)	moist, very loose, very fine to fine grained, 15% fines,		
	1.5			()	15% nonplastic fines, organics and rootlets, decreasing with depth	l	
					decreasing with depth		
						1]
					_	1]
					_	1]
					_	1	1
					_	1	Water level approximately 4.0' below ground
5	5.0				_	1	surface -
37.3					Clayey Sand (SC)		
		1.1	SS-2	3-4-5 (9)	5.0-6.1' - greenish gray, (5GY 6/1), wet, loose, very fine to fine grained, medium to high plasticity, trace		
	6.5			(0)	very fine grain black particles, trace rootlets, 35-40%	1///	1
-					\plastic fines / -	1	1
-					_	1	1
-					_	1	1
-					_	1	1
-					-	1	1
-					-	1	1
10	10.0				-	1	1
32.3					Silt And Limestone Fragments (ML)	Ш	1 7
-		1.0	SS-3	23-9-7 (16)	10.0-11.0' - moderate yellow, (5Y 7/6), wet, stiff, nonplastic, very rapid dilatancy, moderate HCl	1111	Driller's Remark: Complete circulation loss at
-	11.5			(10)	\bigcap reaction, interbedded with 1/8" thick limestone lenses \bigcap	Г	10.5' below ground surface -
-					\and 1" limestone fragments / -	1	1
-					_	1	1
-					_	1	1
-					-	1	1
-					-	1	1
-					-	1	1
15	15.0				-	1	1
27.3	15.0 15.2	0.2	SS-4	50/2.5	Silt And Limestone Fragments (ML)	ऻ	1 7
-				(50/2.5")	\15.0-15.2' - Same as 10.0-11.0'	1	1
-					-	1	1
-					-	1	1
-					-	1	1
-					-	1	1
-					-	1	1
-					-	1	
-					-	1	Driller's Remark: Will install 4" HW casing to
20					-	1	19.0' below ground surface
20_						t	
						L	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-15	SHEET	2	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724222.8 N, 458094.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

					N 310025, IIIUU 101a					ORIENTATION : Vertical
WATER	LEVELS	: 4.0 ft bo	gs on 5/1	b/U <i>f</i> S	START : 5/15/2007		: 5/17/2007	LOGGE	:K:T	. Stewart
< D =				STANDARD		SUIL DES	CRIPTION		- 9	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAM	IE LISCS CDA	OUP SYMBOL, CO		SYMBOLICLOG	DEPTH OF CASING, DRILLING RATE,
ACE ATIO		RECOVE	RY (ft)				RELATIVE DENSI		ğ	DRILLING FLUID LOSS, TESTS, AND
FER			#TYPE	6"-6"-6"	CONSISTEN	ICY, SOIL STE	RUCTURE, MINEF	RALOGY	Į ž	INSTRUMENTATION
				(N)	0711 0 1 4				(V)	1
22.3	20.0			10-32-50/4	20 0-21 0' - mo	a Limestone oderate vellov	Fragments (SM w, (5Y 7/6), wet,) verv		_
_		1.0	SS-5	(82/10")	dense, fine to	coarse graine	ed, nonplastic, m	oderate	Ш	_
	21.3				HCl reaction, 1	5-20% nonp	lastic fines, 20%	fine to		
					very fine sand-	sizea iimesia sized white r	one, all carbonate particles, trace br	e, trace	1	1
-					green particles	3			1	1
-									1	-
-									+	-
-									+	-
-									-	-
-									1	_
25	25.0								1	
17.3		0.8	SS-6	25-50/4.5	Silty Sand And 25.0-25.8' - Sa	d Limestone ime as 20 0-1	Fragments (SM 21.0' except mod) erate HCI		
	25.9	0.0	000	(75/10.5")	reaction, 50%	silt and 50%	limestone	ciale rici	╨	<u> -</u>
									1	1
-									1	1
-									1	1
-									1	-
-									+	-
-									+	-
-									-	-
-									1	_
30	30.0								1	
12.3	30.3	0.2	SS-7	50/3.5 (50/3.5")	Limestone Fra		rse sand-sized a	nd fine	士	1
				(30/3.3)	\gravel-sized, p					
									1	
-									1	1
-									1	1
-									1	-
-									+	-
-									-	-
-									-	-
-									-	_
35	35.0 35.2		00.5		L				\perp	<u> </u>
7.3	JJ.2	0.0	SS-8	50/2 (50/2")	No Recovery	35.0-35.2'			1	Driller's Remark: Will install 4" HW casing down to 35.0' below ground surface -
				(00/2)						down to 35.0 below ground surface
]
									1	1
-									1	1
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-									1	-
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-									+	-
-									1	-
40									4	



PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	B-15	SHEET	3	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724222.8 N, 458094.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

						y, auto nammer, Avvu rous			ORIENTATION : Vertical
WATER	LEVELS	: 4.0 ft bo	gs on 5/1	5/U7 S	START : 5/15/2007	END : 5/17/2007	LOGGE	₹∶⊺. T	
				STANDARD		SOIL DESCRIPTION		l S	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SON PIVE	E, USCS GROUP SYMBOL	COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
ACE AT STATE		RECOVE	RY (ft)			E, USCS GROUP STIMBUL E CONTENT, RELATIVE DE		Ö	DRILLING FLUID LOSS, TESTS, AND
JRF.			#TYPE	6"-6"-6"		CY, SOIL STRUCTURE, MI		¥.	INSTRUMENTATION
				(N)	0:14.14541 0 1	(8.81.)		Ś	
2.3	40.0	0.8	SS-9	44-50/5	Silt With Sand 40 0-40 8' - ligh	i (ML) nt olive brown, (5Y 5/6), w	et hard fine	4	_
	40.9			(94/11")	─ to coarse grain. ─ to coarse grain.	ed, 20-30% sand, nonpla	ıstic, rapid Γ	╨	-
					∖ dilatancy, mild l ∖carbonate	HCl reaction, 5-10% orga	anics, all	ı	
					Carbonate			1]
-								1	1
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45	45.0	0.4	00.40	50/0.5					_
-2.7	45.3	0.1	SS-10	50/3.5 (50/3.5")	Limestone Fra	i gments oderate olive brown, (5Y 4	$\frac{1}{4}$), mild to	Γ	
_				(00/0.0)	\moderate HCl r	reaction, 10% fine grain,	black particles		
					∖in rock matrix, p	poor recovery, highly foss	siliferous	ı	
								1]
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50	50.0 50.2		00.44	50/0				_	
-7.7	00.2	0.0	SS-11	50/2 (50/2")	No Recovery 5	00.0-50.2			1
_				(00.2)				1	_
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55	55.0	0.4	00.40	50/4					
-12.7	55.3	U.1	SS-12	50/4 (50/4")	Limestone Fra 55.0-55.1' - me	i gments edium olive brown, (5Y 4/4	4). medium	4	
				()	grained, mild to	moderate HCl reaction,	trace medium	1	
					grain-sized blac (casts, molds u	ck particles, moderately f	ossiliferous		
1 7					licasis, moius u	ip iO 0/O)		1]
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-15	SHEET	4	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724222.8 N, 458094.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

						ry, auto nammer, Avv rous,			ORIENTATION: Vertical
WATER	LEVELS	: 4.0 ft b	gs on 5/1	5/07 S	START : 5/15/2007	END : 5/17/2007	LOGGE	R : T.	
<02				STANDARD		SOIL DESCRIPTION		چ ا	COMMENTS
N A E	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	0011 11414	E 11000 ODOLID 0\/\	001.00	13	DEDTIL OF CACINIC DRILLING DATE
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE	ERY (ft)		SOIL NAM MOISTURE	E, USCS GROUP SYMBOL, CONTENT, RELATIVE DE	NSITY OR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
FYF/			#TYPE	6"-6"-6"	CONSISTEN	CY, SOIL STRUCTURE, MIN	NERALOGY	₩	INSTRUMENTATION
SC				(N)				Ś	
-17.7	60.0	0.7	SS-13	45-50/3.5	Silty Sand And	d Limestone Fragments (SM)		Driller's Remark: Will install 4" HW casing
	60.8	0.7	00 10	(95/9.5")	00.0-60.7 - 1110	oderate olive brown, (5Y 4)	4), wel, very nes low	111	down to 61.0' below ground surface
-					plasticity, mild	coarse grained, 20-25% fir to moderate HCl reaction,	40% fine	1	-
-					\gravel-sized lin	nestone, poorly fossiliferou	us	1	-
-					Begin Rock Co	oring at 61.0 ft bgs heet for the rock core log		┨	-
-					See the next si	neet for the rock core log		-	-
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PROJECT NUMBER:

33884.FL

BORING NUMBER:

B-15 SHEET 5 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724222.8 N, 458094.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

00111110	J INIETTIOD 7 II	TD E	2011 11	MENT . CIVIE 33 3/N 3 10023, Midd Totally, NQ tools, HVV C	aonig		ORIENTATION : Vertical
WATER	LEVELS: 4.0	ft bg	s on 5	/15/07 START : 5/15/2007 END : 5/	17/20	D7 LOGGER : T. Stewart	
				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
HH H	N. 4. 5.	(%)	FRACTURES PER FOOT	DECORAL MOR	익	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
E E E	A TES	(%) _Q	F.S.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOL	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
989		Ø	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ž	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
Оνш		œ	ш а.	THIORNESS, SON AGE STAINING, AND HOTTNESS	Ś		
1	61.0				Н	Limestone	
-	1		3	61.35' - Mechanical break	$1 \Box$	 61.0-63.7' - moderate olive brown to light olive gray, (5Y 4/4 to 5Y 5/2), 	1
-	1			61.75, 61.9, 61.95' - Bedding plane (3),		moderate to strong HCl reaction,	-
-			2	horizontal, rough, undulating, <1/16" gap, possible mechanical break	₽₩	- medium strong (R3), 15% voids	-
l _]			possible mesmanical break	Ш	<1/16", infilled cavities with dark gray	
	R1-NQ		2	63.0, 63.4' - Bedding plane (2), 5 deg and 10		material (N3)	
-	5 ft	35		deg, rough, undulating, open up to 3/16",	₩		
-	54%			fracture is through infilled cavity, possible mechanical break	Ш	No Recovery 63.7-66.0'	-
l -				-	\vdash	_	_
65			NR		Н		
-22.7]				Ш		R1: 16 minutes
I -				-	H	-	-
-	66.0			-		Limestone	-
I -			2	66.1' - Bedding plane, horizontal, rough,	Ш	Limestone - 66.0-69.7' - Same as 61.0-63.7']
			-	undulating, open 1/16" 66.55, 68.75, 69.0' - Bedding plane (3),	Н	except olive gray, (5Y 3/2), trace	
Ι -]			horizontal, rough, undulating, tight, possible	\square	fossil casts, weak rock interval from	1
1 -			2	mechanical break	Ш	- 69.0-69.7'	1
-	. DO NO			67.15, 67.9' - Bedding plane (2), 5 deg and	H	_	SC-1 collected at 67.9-
l _	R2-NQ 5 ft	53	2	10 deg, rough, undulating, tight, possible			68.75'
1	74%	00	-	mechanical break 68.75, 69.0' - Bedding plane (2), horizontal,	Н		
-	1		3	rough, undulating, tight	\Box	=	1
l	1			69.25' - Fracture, 10 deg and 15 deg, rough,	1	=	1
70 <u> </u>				undulating, tight	₽	No Recovery 69.7-71.0'	Driller's Remark: Last 14"
-21.1]		NR	69.55, 69.65' - Fracture (2), horizontal and 5	ш	_	of run was very soft R2: 16 minutes
1	71.0			deg, tight, fractures are in weak rock interval	Н		R2. 10 minutes
1 -					Н	No Recovery 71.0-72.9'	Assumed core loss from
-	1			-	╓	-	top 71.0-72.9'
-	.		NR	-	H	_	-
l _]			_		_	
1					ш		
-	R3-NQ			72.9-73.35' - Fracture zone, subangular and	П	Limestone	1
-	5 ft	38	>10	rounded fragments up to 1-3/8" in size 73.35-74.1' - Joint, vertical		_ 72.9-76.0' - moderate olive brown	-
-	62%			· -	₽₩	grading at 74.7' to light olive brown, (5Y 4/4 grading to 5Y 5/6), strong	-
Ι.]		1	74.1' - Fracture, horizontal, rough, undulating,	Ш	_ HCl reaction, medium strong to weak]
75				open 1/16", broken across infilled void, black stain	$\vdash \vdash$	(R3 to R2), 15% voids <1/16" on	
-32.7	1				111	surface in creasing to 30% from 74.7'	R3: 17 minutes
-			3	75.3, 75.5, 75.7' - Fractures (3), 10 deg and	Ш	with depth, poorly fossiliferous (casts), trace unfilled cavities to	-
-	76.0			15 deg, rough, undulating, tight, possible mechanical break	\vdash	- 3/8"x3/16" elongated, bioturbated	-
Ι.]		2	76.1' - Bedding plane, horizontal, smooth,	口	areas 3% irregularly shaped cavities]
			_	stepped, tight, possible mechanical break	Щ	>1", trace dark gray infill fines	
1 -	1			76.9' - Fracture, 5 deg and 10 deg, rough,	1 + 1	- 76.0-81.0' - yellowish gray to light	SC-2 collected at 76.9-
-			0	undulating, open 1/16"		olive brown, (5Y 8/1 to 5Y 5/6), fine grained, moderate to strong HCI	78.05'
1 -			_		Н	- reaction, weak to medium strong (R2	-
I _	R4-NQ 5 ft	84	3	78.05' - Fractures, 15 deg and 20 deg, rough,	Ы	to R3), 30-35% voids <1/16", poorly	
1	100%	04		undulating, tight, possible mechanical break 78.45' - Fracture, horizontal, rough,	口	fossiliferous (casts), 3-5% dark gray	1
-	/۱			undulating, tight to 1/2" open	₽₩	 fine to medium grained particles 	1 -1
-			2	78.7' - Fracture, horizontal, rough, undulating,	Ш	_	-
80				up to 3/4" open	\Box	_	1
-37.7]		4	79.4, 79.5' - Bedding plane (2), horizontal,	┟┼┤	_	R4: 11 minutes
	81.0		1	rough, undulating, open 1/8", possible mechanical break	Ш	-	1
	01.0			modiumour broak	П		
1							

APPENDIX 2BB-523 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-15

SHEET 6 OF 9

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724222.8 N, 458094.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

00.1		TO L	2011 11	MENT . CIVIE 33 3/N 3 10023, Mud Totally, NQ 10015, HW C	aonig		ORIENTATION . Vertical
WATER	LEVELS: 4.0	ft bg	s on 5	/15/07 START : 5/15/2007 END : 5/	17/20	D7 LOGGER : T. Stewart	
				DISCONTINUITIES	П	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		(0	DESCRIPTION	SYMBOLIC LOG		
ON A N	R,A,N	~	FRACTURES PER FOOT	DESCRIPTION	_ □	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
ASE	JS FE	(%) Q		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	፬	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
F F F J	NG S	οD	AC R F	PLANARITY, INFILLING MATERIAL AND	Æ	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	855	ď	뜐뿝	THICKNESS, SURFACE STAINING, AND TIGHTNESS	ŝ	CHARACTERISTICS	Bitor o, reor neodero, ero.
				80.2' - Fracture, horizontal, rough, undulating,		Limestone	
-			0	tight, possible mechanical break	╁	- 81.0-86.0' - light olive brown, (5Y	1 -
-					-	6/6), strong HCl reaction, weak (R2),	-
l _			3	82.15, 82.5' - Bedding plane (2), horizontal,	ш	10-15% mottled yellowish gray (5Y - 8/1) with olive gray (5Y 5/2),	_
			"	rough, undulating, open 7/16", dry, fine	\vdash	moderately fossiliferous	
-	R5-NQ			laminations 82.8' - Bedding plane, horizontal, rough,		(casts/molds), carbonate fines	1
-	5 ft	88	0	undulating, tight, possible mechanical break	╨	 (irregularly shaped fines possible 	1
-	100%			and all all ingressions of the angle of the	┢┯	bioturbation), trace organic lenses to	
			2	04.05L Dadding plans baringertal group		3/8" thick at 82.15' and 82.5', fossils to 9/16" predominately horizontally	
85			-	84.35' - Bedding plane, horizontal, rough, undulating, tight, in very weak rock, possible	Ш	oriented and rice shaped with	1
-42.7				mechanical break	╁	corrugated patterns	R5: 13 minutes
-			0	84.6' - Bedding plane, horizontal, fracture in		=	-
I _	86.0			bioturbated zone, possible mechanical break	$oldsymbol{oldsymbol{eta}}$	_	
				86.05, 86.2, 86.35, 86.45, 86.5, 86.7' -	Н	86.0-86.35' - Same as 81.0-86.0'	
-			6	Bedding plane (6), 0 deg to 5 deg, rough,		- 86.35-90.7' - white to yellowish gray	1
-				undulating, 1/16" gap, possible mechanical break	₩	with medium dark gray and moderate yellow, (5Y 8/1 with N4 and	-
l -			0	bleak	┢	- 5Y 7/6), very fine grained, strong HCl	_
						reaction, strong (R4), very	
-	R6-NQ			88.1, 88.5' - Fracture (2), horizontal, rough,	╨	fossiliferous (casts, microforams),	1
-	5 ft	54	2	undulating, tight, possible mechanical break	\Box	- trace spherical voids <1/16",	1
-	94%				├	bioturbated mottling 30-35% of surface with 15-20% voids <1/16"	-
l _			3	89.1' - Bedding plane, horizontal	╨	Surface with 15-20 % voids < 1/10	
90				89.4' - Bedding plane, horizontal, possible mechanical break —			
-47.7				89.55' - Fracture, vertical, rough, undulating,	1—		R6: 21 minutes
-			2	gray staining, tight, with bisecting mechanical	╀	-	1
-	91.0		NR	breaks	\blacksquare	No Recovery 90.7-91.0'	-
l _			4	90.0' - Fracture, horizontal, rough, undulating,	\vdash	Limestone - 91.0-95.9' - yellowish gray with dark	
			-	1/8" open 90.4' - Fracture, horizontal, rough, undulating,		gray and white, (5Y 7/2 with N3 and	
-				tight	ш	N9), strong HCl reaction, weak (R2),	1
-			3	91.4, 91.5, 91.7, 91.95, 92.15, 92.4' -	+	 very fossiliferous (casts, molds, 	-
-				Fractures (6), horizontal, rough, undulating,		shells) fossils to 7/8", 94.0-95.9'	-
l _	R7-NQ	60	3	tight, possible mechanical break	Н	apparent bedding and horizontal	
-	5 ft 98%	60	٦	92.95, 93.25, 93.5' - Fractures (3), 5 deg to 10 deg, rough, undulating, tight, possible	\vdash	 fossil alignment 	1
-	0070			mechanical break	亡	_	1
-			2	93.75' - Fracture, 30 deg, rough, undulating,	₩	_	-
95				tight		_	I
-52.7				94.4, 94.6, 95.2, 95.6' - Fractures (4), 0 deg			R7: 10 minutes
1 -	96.0		2	to 5 deg, rough, undulating, tight, possible mechanical break	┰		1
-	30.0			medianica break	世	No Recovery 95.9-96.0'	-
-			1			_ Limestone	-
l _				96.6' - Fracture, 45 deg, rough, undulating,	\vdash	96.0-101.0' - Same as 91.0-95.9'	
				tight		except medium-sized white (N9) and dark gray (N3) grains	SC-3 collected at 98.65-
-			1		1—	_ dank gray (140) grains	99.6'
-	R8-NQ			97.95' - Fracture, horizontal, rough,		F	-
-	5 ft	95	2	undulating, open 3/4"	П	-	-
	100%			98.2' - Fracture, 55 deg, rough, undulating,	\vdash		
1 -				tight			1
1 400			1	98.5' - Mechanical break 98.65' - Bedding plane, horizontal, rough,	仜	-	1
100_ -57.7				undulating, tight, possible mechanical break	+	_	R8: 9 minutes
-37.7			1	99.6' - Bedding plane, horizontal, rough,		_	No. 9 Hilliutes
	101.0			undulating, tight, possible mechanical break	Ш		
	1						•

APPENDIX 2BB-524 Rev. 7



PROJECT NUMBER: BORING NUMBER: 338884.FL B-15 SHEET 7 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724222.8 N, 458094.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING	METHOD A	ND EC	QUIPN	IENT : CME 55 S/N 316625, mud rotary, NQ tools, HW ca	asing		ORIENTATION : Vertical
WATER	LEVELS : 4.0	ft bg	s on 5/	/15/07 START: 5/15/2007 END: 5/1	17/20	07 LOGGER : T. Stewart	
≥0₽	(%			DISCONTINUITIES	ပ္ထ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - 105 -62.7	R9-NQ 5 ft 100% 106.0	84	2 3 2 1	100.5' - Bedding plane, horizontal, rough, undulating, tight, possible mechanical break 101.1' - Bedding plane, horizontal, rough, undulating, tight, possible mechanical break 101.9' - Fracture, 25 deg to 30 deg, rough, undulating, tight 102.2, 102.8' - Fracture (2), horizontal, rough, undulating, tight, possible mechanical break 102.4' - Fracture, 70 deg to 80 deg, rough, undulating, 3-7% black stain, tight 103.2, 103.5' - Fracture (2), 10 deg to 15 deg, rough, undulating, tight 104.1' - Fracture, 30 deg, rough, undulating, tight, possible mechanical break 105.0' - Fracture, horizontal, rough, undulating tight, possible mechanical break 105.0' - Fracture, horizontal, rough, undulating tight, possible mechanical break 105.0' - Fracture, horizontal, rough, undulating tight, possible mechanical break 105.0' - Fracture, horizontal, rough, undulating tight, possible mechanical break 105.0' - Fracture, horizontal, rough, undulating tight possible mechanical break 105.0' - Fracture, horizontal, rough, undulating tight possible mechanical break 105.0' - Fracture, horizontal, rough, undulating tight possible mechanical break 105.0' - Fracture, horizontal, rough, undulating tight possible mechanical break 105.0' - Fracture, horizontal, rough, undulating tight possible mechanical break 105.0' - Fracture, horizontal, rough, undulating tight possible mechanical break 105.0' - Fracture, horizontal, rough, undulating tight possible mechanical break 105.0' - Fracture, horizontal, rough, undulating tight possible mechanical break 105.0' - Fracture, horizontal, rough, undulating tight possible mechanical break 105.0' - Fracture, horizontal, rough, undulating tight possible mechanical break 105.0' - Fracture, horizontal, rough, undulating tight possible mechanical break 105.0' - Fracture, horizontal, rough, undulating tight possible mechanical break 105.0' - Fracture, horizontal, rough, undulating tight possible mechanical break 105.0' - Fracture, horizontal, rough, undulating tight possible mechanical break 105.0' - Fracture, h		Limestone 101.0-106.0' - yellowish gray with medium gray, (5Y 7/2 with N9), fine to medium grained, strong HCl reaction, very weak to weak (R1 to R2), very fossiliferous (microforams, casts, molds >1/8") decreasing abundance with depth, white rounded elongated grains 25-35% increasing with depth, 5-10% medium gray grains, voids <1/16" 30-40% of surface from 101.0-103.2'	R9: 9 minutes
- - - - - 110	R10-NQ 5 ft 100%	65	3 4 3	undulating, tight, possible mechanical break 106.15, 106.4, 106.9' - Bedding plane or mechanical break (3), horizontal, rough, planar, <1/16" gap 107.0, 107.15' - Bedding plane or mechanical break (2), horizontal, rough, undulating, 10-15% black staining 107.2' - Bedding plane or mechanical break, horizontal, rough, undulating, tight 107.8, 108.1, 108.4' - Mechanical break or bedding plane (3), 0 deg to 5 deg, smooth, planar, tight		106.0-111.0' - yellowish gray with medium gray, (5Y 7/2 with N5), fine to medium grained, strong HCl reaction, very weak to weak (R1 to R2), very fossiliferous (predominantly microforams and molds), 3-5% medium gray grains, voids <1/16" 10-15% of surface, 1/4" bedded accumulation of fossils at 109.1'	- - - - -
-67.7 -	111.0		2	109.1' - Bedding plane, horizontal, bedded fossil casts and molds 110.5' - Bedding plane, horizontal, rough, undulating, tight, hard mineral surface -			R10: 8 minutes
- - -	R11-NQ 5 ft 70%	28	5 4	110.8' - Fracture, 55 deg to 60 deg, rough, undulating, tight 111.2' - Fracture or mechanical break, horizontal, rough, undulating, tight 111.7, 112.0' - Bedding plane (2), 5 deg to 10 deg, rough, undulating, tight 112.2, 112.3' - Bedding plane or mechanical break (2), 7 deg to 10 deg, rough, undulating, 1/8" open		111.0-114.5' - yellowish gray, (5Y - 7/2), medium grained, strong HCI reaction, very weak (R1), very fossiliferous (microforams, shells, molds) fossils >75% of rock to 1/16" trace to 1"	- - - -
- 115 -72.7 -	116.0		2 NR	112.5' - Bedding plane or mechanical break, horizontal, rough, undulating, tight 112.85, 113.0, 113.2' - Bedding plane or mechanical break (3), 5 deg to 10 deg, rough, undulating, fossil casts/molds on fracture surface		No Recovery 114.5-116.0' Limestone	R11: 9 minutes -
- - - -	R12-NQ 5 ft 100%	46	2 >10	113.5' - Mechanical break, rough, undulating, tight 113.95' - Fracture, 70 deg, rough, undulating, tight 114.1, 114.2' - Fracture or mechanical break (2), horizontal, rough, undulating, tight 116.15, 116.75, 116.9, 117.2, 117.3' - Fracture or mechanical break (5), 0 deg to 5 deg, rough, undulating, tight 118.0' - Fracture or mechanical break,		- 116.0-121.0' - Same as 111.0-114.5' - - - -	- - - - -
120 -77.7 -	121.0		3	horizontal, tight, in friable rock 118.3, 118.6' - Fracture, vertical, rough, undulating, tight 118.85-119.1' - Fracture zone		- 	R12: 11 minutes
					<u> </u>	<u> </u>	l

APPENDIX 2BB-525 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-15

SHEET 8 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724222.8 N, 458094.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

00.1		ND LC	ZOII IV	IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW c	asiriy		ORIENTATION : Vertical
WATER	LEVELS: 4.0	ft bgs	s on 5	/15/07 START : 5/15/2007 END : 5/	17/20	D7 LOGGER : T. Stewart	
≥ດລ	, ©			DISCONTINUITIES	၂ ပွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	034	œ	ᇤᇟ		Ś		
	R13-NQ 5 ft 86%	61	2 3 3	119.35' - Fracture or mechanical break, 5 deg to 10 deg, rough, undulating, tight 119.8' - Bedding plane, horizontal, smooth, undulating, tight 120.2, 120.35, 120.55' - Mechanical break or bedding plane (3), horizontal, rough, planar, tight 121.1' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/8" open 121.6' - discontinuity, nonplanar, undulating, tight, black staining on surface 122.05, 122.7, 123.05, 123.4, 123.9, 124.6,		Limestone 121.0-125.3' - yellowish gray, (5Y 8/1), strong HCl reaction, very weak (R1), voids <1/16" on 15-20% of surface, very fossiliferous (casts, microforams), trace black laminations possible organics, 5-7% medium dark gray grains (angular-subangular), 121.6-121.7', very strong HCl reaction, finely laminated slightly coarser grained infill with undulating bedding planes	- - - - -
125 -82.7 -	126.0		1 NR	122.05, 122.7, 125.05, 125.5, 125.5, 124.0, 124.9, 125.2' - Bedding plane or mechanical break (8), horizontal, rough, undulating, tight, fractures through cavities at 125.2' and 123.05'		to 10 deg, possible trace fine quartz sand No Recovery 125.3-126.0'	R13: 10 minutes
- - -			7 6	124.0' - Bedding plane or mechanical break, horizontal, rough, undulating, 3/16" gap 126.05-130.85' - Bedding plane (16), rough, planar, <1/16" gap		Limestone 126.0-131.0' - yellow gray with medium dark gray and pale yellowish orange, (5Y 8/1 with N4 and 10YR 8/6), very fine to medium	- - -
- - -	R14-NQ 5 ft 100%	41	2	127.7, 128.05' - Mechanical break or bedding plane (2), horizontal, rough, undulating, 1/8" gap at 127.7', tight at 128.05' 128.2, 129.3' - Bedding plane or mechanical break (2), 5 deg to 10 deg, rough, undulating,		grained, strong HCl reaction, very weak (R1), thin bedding, grain size alternates 127.5-129.0' medium to coarse grained, very fossiliferous	- - -
130 -87.7 -	131.0		5	tight 129.55' - Bedding plane, horizontal, rough, undulating, tight		- -	R14: Run time not recorded
- - - -			0	132.0' - Bedding plane, 20 deg, rough, undulating, tight 132.45' - Fracture or mechanical break,		131.0-135.8' - yellowish gray with light olive gray, olive gray and medium dark gray, (5Y 8/1 with 5Y 4/1, 5Y 6/1 and N4), fine to medium grained, strong HCl reaction, laminated bedding, very fossiliferous	SC-4 collected at 131.0- 132.0'
- - 135	R15-NQ 5 ft 96%	88	0	horizontal, rough, undulating 132.95' - Bedding plane or mechanical break, 10 deg to 15 deg, rough, undulating, tight 134.35' - Bedding plane, 5 deg, rough, undulating, 1/32" silt and/or clay sized		(microforams, shells, casts/molds), - fossils to 5/8"x3/16", voids <1/16" 15-20% of surface, 3-5% cavities to 3/4"x1/2" from 134.5-135.3' infilled, - mineralization subhorizontally aligned, 1" scour and fill structure at	- - -
-92.7 - -	136.0		1 NR	infilling, open 1/16" 134.4' - Fracture, undulating, tight 134.9' - Bedding plane or mechanical break, horizontal, rough, undulating, tight		134.4' - - No Recovery 135.8-136.0'	R15: 12 minutes -
- - -			3	135.45' - Bedding plane or mechanical break, horizontal, rough, undulating, tight, 3/4" hard medium gray infilled cavity on surface 136.25, 136.4' - Bedding plane or mechanical		Limestone 136.0-136.5' - yellowish gray, (5Y 4/4), medium grained, strong HCl reaction, very weak (R1), thin bedding, 136.0-136.25' rounded clast	- - -
- - -	R16-NQ 5 ft 96%	62	2	break, horizontal, rough, planar, 1/16" open 136.5' - Bedding plane or mechanical break, horizontal, rough, undulating, 1" open, through cavity/ bioturbated pockets 137.2' - Bedding plane or mechanical break,		to 1/4" with thin halo on edges, clasts strong rock (R4), strongly suggests possible fluvial deposition	- -
- 140_ -97.7 -			3	horizontal, rough, undulating, tight, fracture in bioturbated cavity 137.65' - Bedding plane or mechanical break, 20 deg, rough, undulating, tight		- -	R16: 18 minutes -
	141.0						



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-15	SHEET	9	OF	9	

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724222.8 N, 458094.3 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

00.110			<u> </u>	1211 . CIVIL 33 3/14 3 10023, Midd Totally, 144 tools, 1144 C	<u>aon i</u>	9		ONENTATION: Vertical
WATER	LEVELS: 4.0	ft bgs	s on 5		17/20	007		
200	(3)			DISCONTINUITIES	ڻ ا	L	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG		ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	038	œ			Ś	╀		
145102.7	R17-NG 5 ft 94% 146.0	70	11. 3	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS 137.8' - Bedding plane or mechanical break, horizontal, rough, undulating, tight, fracture through bioturbated cavity 138.1' - Bedding plane or mechanical break, horizontal, rough, undulating, tight to 1" open 138.7' - Fracture zone, 2" wide with 1/2" to 1-1/2" fragments 139.1' - Fracture or mechanical break, horizontal, rough, undulating, tight organics on 50% of surface 139.7' - Bedding plane or mechanical break, horizontal, rough, undulating, tight 139.8' - Bedding plane or mechanical break, 20 deg, rough, undulating 140.3' - Bedding plane, rough, stepped, tight to 1/16" open, parting along wavy lamination 141.8-145.55' - Bedding plane or mechanical break (6), horizontal, rough, planar, tight 142.0' - Fracture, 70 deg to 80 deg, rough, undulating, tight 142.25' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/2"-1-3/8" open 144.8' - Fracture, 60 deg, rough, undulating, tight 146.1' - Bedding plane or mechanical break, horizontal, rough, undulating, <1/16" open 148.3' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/16" open 148.65' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/16" open 149.2-149.8' - Bedding plane or mechanical break, horizontal, rough, undulating, 1/16" open 150.1' - Fracture or mechanical break, horizontal, rough, planar, tight 150.6' - Bedding plane or mechanical break, horizontal, rough, planar, tight 150.6' - Bedding plane or mechanical break, horizontal, rough, undulating, tight	SAMBO			SMOOTHNESS, CAVING ROD
						L		ı



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-16

SHEET 1 OF 9

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723050.3 N, 457812.4 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

					N 252545, Illiud Totalry, auto Hamiliner, AWS Tous, 4-776 Th-cone bit ORIENTATION : Vertical	_
WATER	LEVELS	: 1.6 ft b	gs on 6/1	4/07 S	START : 4/23/2007	_
>00				STANDARD	SOIL DESCRIPTION 0 COMMENTS	Ц
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	- 1
표원인		RECOVE	RY (ft)	12011200210	SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE,	- 1
H Ä Ä			<u> </u>	011 011 011	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SINSTRUMENTATION	- 1
925			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRONG TORE, WINNELVALOUT	- 1
42.6	0.0			(1.1)	Topsoil "Water level is based on Ground Water	┨
-	0.0			0-2-3	\\\0.0-0.2' - wood chips \qquad \qquad \ Monitoring at LNP site (FSAR Table	4
l _		1.0	SS-1	(5)	Poorly Graded Sand (SP) 2.4.12.08)"	4
1	1.5			. ,	\ 0.2-1.0' - medium light gray, (N6), moist, loose, fine /	- 1
-					grained, nonplastic, no HCl reaction, trace fine	1
-					organics, and rootlets, sand is silica	Н
-						4
l _]]	4
1					1 1	- 1
-					1 1 1	1
-					1	1
-					1 1	Н
5	5.0				Dearly Creded Cand (CD)	4
37.6				2.5.4	Poorly Graded Sand (SP) 5.0-6.2' - pale yellowish gray, (5Y 8/1), some mottling,	1
		1.2	SS-2	3-5-4 (9)	moist to wet, loose, fine grained, nonplastic, no HCl	١
-	6.5			(3)	reaction, trace organics and black mineral, trace	1
-	0.5				\pyrite nodules, sand is silica / -	┨
-						\exists
_						4
1					1 1	- 1
					1 1	7
-					1	1
-					1 1	Н
-						4
10	10.0					┙
32.6					Silty Sand (SM)	- 1
-		1.3	SS-3	0-1-2	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	1
-				(3)	silica	┨
-	11.5				Silty Sand With Gravel (SM) Driller's Remark: Hard material at 11.5'	\exists
_					10.2-11.3' - yellowish gray, (5Y 8/1), wet, very loose, helow ground surface	4
1					\ tine to coarse grained, strong HCl reaction, 15%	- 1
-					sand-sized carbonate material, 15% gravel-sized carbonate material, fossil fragments	1
-						1
-						+
-						4
1 -				1]	1
15	15.0					
27.6					Limestone Fragments	7
-		0.8	SS-4	11-15-11	│ \ 15.0-15.1' - mottled yellowish gray and dark yellowish │	\exists
-		0.0	55-4	(26)	orange, (5Y 7/2 and 10YR 6/6), dense, coarse gravel-sized limestone, strong HCI	+
-	16.5					4
I -					Silt With Sand (ML)	
					15.1-15.8' - grayish orange, (10YR 7/4), moist to wet,	١
-					very stiff, nonplastic, very rapid dilatancy, mild to moderate HCl reaction, 15-20% very fine sand,	1
-					carbonate materials	\exists
-					-	4
-]]	4
]	J
20]	1
		1				7
						_



PROJECT NUMBER:

338884.FL

B-16

SHEET 2 OF 9

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723050.3 N, 457812.4 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

WATER	LEVELS	: 1.6 ft bo	gs on 6/14	4/07 S	START : 4/23/2007 END : 4/25/2007 LOGGE	R:	A.	Erickson
				STANDARD	SOIL DESCRIPTION	Ι.	O	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COLL NAME TIGOG OBOUR OVARDOL COLOR		SYMBOLIC LOG	DEDTILOF CACINO DOULING DATE
H BE ACE ATIO		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		30LI	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
EPT CURF			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		SYME	INSTRUMENTATION
22.6	20.0			(11)	Silt With Sand (ML)	+	ij.	
-		1.2	SS-5	13-17-20	20.0-21.2' - Same as 15.1-15.8' except 25% very fine sand, fine gravel-sized limestone at top of sample	1		1
-	21.5			(37)	Sand, into graver sized infloctorio at top of sample	#	Ш	1
-						1		_
]		
_]		
-						1		_
-						4		_
-						+		_
25 <u> </u>	25.0			00 50/5	Sandy Silt (ML)	╁	П	Gray silica sand and white carbonate
-	25.9	0.9	SS-6	26-50/5 (76/11")	25.0-25.9' - gravish orange, (10YR 7/4), moist to wet,	\parallel		fragments in sample, assume slough from -
-	20.0				hard, fine to coarse grained, 30% fine to coarse sand-sized carbonate material, fine to coarse	7#	ш	upper material _
-					\gravel-sized limestone from 25.0'-25.4'	1		-
-						1		-
-						1]
-						1		_
]]
]]
30	30.0					1		_
12.6				3-36-13	Silt With Sand (ML) 30.0-30.9' - grayish orange, (10YR 7/4), moist to wet, hard, fine to coarse grained, mild to moderate HCl	\parallel		_
-		0.9	SS-7	(49)	hard, fine to coarse grained, mild to moderate HCl reaction, 25% fine sand-sized, trace medium to	┦	Ш	-
-	31.5				\coarse sand-sized, trace fine gravel-sized, all	+		-
-					carbonate materials	+		-
-						1		-
-						1		-
-						1		1
-						1]
35	35.0					1		
7.6				8-12-19	Silty Sand (SM) 35.0-36.3' - grayish orange, (10YR 7/4), moist to wet,			
-		1.3	SS-8	(31)	dense, fine to coarse grained, 46% fines, all			_
-	36.5				carbonate	#	. H.	-
-						+		-
-						+		-
-						+		-
-						+		-
-						1		-
40						1		1
						\dagger		
1		<u> </u>				1		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-16	SHEET	3	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723050.3 N, 457812.4 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

						ry, auto nammer, Avvj rods,			ORIENTATION : VEItical
WATER	LEVELS	: 1.6 ft b	gs on 6/1	4/07	START: 4/23/2007	END: 4/25/2007	LOGGER	: A.	
300				STANDARD		SOIL DESCRIPTION		ا ي	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				SYMBOLIC LOG	
BEI SPC		RECOVE	ERY (ft)	1	SOIL NAM	IE, USCS GROUP SYMBOL,	COLOR,	۲	DEPTH OF CASING, DRILLING RATE,
H Ä E				011 011 011	MOISTURE	E CONTENT, RELATIVE DEN ICY, SOIL STRUCTURE, MIN	NSTLY OR NERALOGY	BC BC	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			#TYPE	6"-6"-6" (N)	OONOIOTEN	IOT, GOIL OTTOOTOTIL, WIII	VEI VILOUT	SYN	INOTIONEINT/(TION
2.6	40.0				Silty Sand (SN	/ I)			
-		0.7	SS-9	43-50/6 (93/12")	40.0-40.7' - dai	rk vellowish orange to mod	derate -		-
-	41.0			(93/12)	yellowish brow	n, (10YR 6/6 to 10YR 5/4), coarse grained, mild HCl re	wet, very		_
I _					nonplastic fine	s, 10% gravel-sized, all ca	rhonate -		_
					(nonplastic fine)	5, 10 /0 graver 512ca, all ca	ibonate		
							_	1	_
-							-		-
-							-		-
-							-		Drillarda Danasador Hand mantarial at 40 El
I _							_		Driller's Remark: Hard material at 43.5' below ground surface
									below ground surface
45	45.0						-]
-2.4	49:9	0.0	SS-10	50/0.5	No Recovery 4	45.0-45.04'		H	
-				(50/0.5")					-
-					Regin Pock Co	oring at 46.0 ft bgs			
-					See the next sl	heet for the rock core log	_		_
I _							_		_
							_		_
-							-		-
-							-		-
-							-		-
I _							_		_
50_									_
-7.4									
-							-		_
-							-		-
-							-		-
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_							_		_
1 7				1			_		1
-							-		
-							-		-
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55				1					_
-12.4							_		
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60								\vdash	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-16

SHEET 4 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723050.3 N, 457812.4 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

CORING	NETHOD A	ND E	JUIPIV	IENT: CME 55 S/N 252345, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
WATER	LEVELS: 1.6	ft bg	s on 6	/14/07 START : 4/23/2007 END : 4/	25/20	D7 LOGGER : A. Erickson	
	_			DISCONTINUITIES	(0	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE COLOR	
HH	N, A, W	(9)	FRACTURES PER FOOT	BECOM HOW	익	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
FAA	RES	(%) 🛛	L S S	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
	N N N N N N N N N N N N N N N N N N N	Ø	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ×	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ООШ		œ	正凸	THICKNESS, SORI ACE STAINING, AND HOTTINESS	S		
	46.0			46.2' - 70 deg, smooth, undulating, up to 0.4"	\vdash	Limestone	
-	1		2	gap	T	 46.0-48.5' - yellowish gray, (5Y 7/2), fine grained, moderate to strong HCI 	-
l -				46.65' - Bedding plane, horizontal,		reaction, very weak to weak (R1 to	-
l -			0	undulating, bedding plane fracture, smooth to	₽	- R2), 25% surface void (1/16"), many	
l _				rough, tight up to 0.1" gap		cavities up to 9/16"x3/16",	SC-1 collected at 47.5- 48.4'
l	R1-NQ					moderately fossiliferous with fossil	40.4
-	5 ft 100%	95	1	48.5' - 20 deg, rough, undulating	₩	 molds 48.5-51.0' - Same as 46.0'-48.5' 	-
-	100%				仜	except 40% surface voids (1/16"),	-
_			0		\bot	- very many cavities up to 3/4"	_
50			•		\vdash	diameter, highly fossiliferous with	
-7.4						fossil molds, mostly oblong up to	R1: 8 minutes
-			0		1—	_ 9/16"x1/8"	-
-	51.0					51.0-53.55' - yellowish gray, (5Y 7/2),	-
-			4		$oldsymbol{\square}$	- fine to medium grained, strong HCl	-
			'		\vdash	reaction, extremely weak (R0), very	
I -				50.22, 54.05' - Mechanical break (10), 0 - 20		weakly cemented	
-			3	deg, rough, undulating, infilling, bedding	╁	-	-
-	DO NO			plane fracture probably mechanical break, all have infill due to soft nature of rock fracture	╂┲	-	-
l _	R2-NQ 5 ft	0	3	surfaces eroding, up to 0.04" gap due to rock		_	_
l	64%	Ü		surface eroding off/breaking	\vdash	53.55-53.7' - Same as 51.0'-53.55'	
-	1		>10			except 0-5% surface void up to 1/16",	
					╁	few cavities up to 9/16" diameter, poorly fossiliferous, trace black fine	-
55 <u> </u>			NR	_	╂╧	to medium grained material	D2: 2 minutes
-12.4			' ' ' '		ш	53.7-54.2' - Same as 51.0'-53.55'	R2: 3 minutes
l	56.0				\vdash	No Recovery 54.2-56.0'	
-	·			56.15, 56.7, 56.9, 57.0, 57.25, 57.5, 58.05,		Limestone	_
-			3	58.15, 58.2, 58.3, 59.5, 59.8' - Mechanical	╁	- 56.0-60.4' - yellowish gray, (5Y 7/8),	-
-				break (12), 10 deg, smooth, undulating, infilling, bedding plane fracture or mechanical	╂┬╴	strong HCl reaction, extremely weak (R0), up to 1/2" thick bands of	-
l _			3	breaks, smooth to rough, planer to		- recrystallization from 59.1-59.3' and	_
				undulating, tight to 3/4" thick gap, infill from	\vdash	60.1-60.4' were very weak rock,	
-	R3-NQ			eroding fracture surface due to soft quality of	1 -	weakly cemented, voids (<1/16") on	
-	5 ft	30	>10	rock	1	- surface, 0% from 56.0-58.6', 5-25%	-
-	88%		\vdash	58.1, 58.5' - very weakly cemented rock	╂┷┤	voids from 50.8-60.4', cavities (molds) up to 3/16"x3/8", black	-
l -			>10		口	lineations up to 1/8" from 60.0-60.4',	_
60			"			fine grained, trace medium grained	
-17.4			>10	59.9, 60.1' - Fractures, rock fragments zone,			R3: 5 minutes
-			NR	black staining at 60.1' fracture surface	仜	No Recovery 60.4-61.0'	-
-	61.0			61.0.61.6' Fracture 7000	+	Limestone	-
_			>10	61.0-61.6' - Fracture zone		Limestone - 61.0-62.4' - yellowish gray, (5Y 7/2),	_
			"	61.7' - Bedding plane or mechanical break,	\vdash	fine to medium grained, strong HCl	
-				horizontal, rough, undulating, undulating to		reaction, extremely weak (R0), small	
-			>10	stepped up to 1" gap		- voids (1/16") cover 25% of core	-
-	DANO		\vdash	62.15, 62.25, 62.4' - Bedding plane or mechanical break (3), horizontal, rough,	╂┷	surface, many cavities up to 3/8" diameter and 9/16"x3/8", some	-
-	R4-NQ 5 ft	8	>10	undulating, up to 3/4" gaps on some fractures	口	- cavities are fossil molds, black	_
	76%	-		62.6' - Fracture or mechanical break, 80 deg,	\vdash	material up to 3/8" and black	
Ι -			-10	rough, undulating, half of fracture/one side of	1	lineation up to 3/16" from 61.0-61.65'	
			>10	fracture's rock is missing	仜	- 62.4-64.8' - Same as 61.0'-62.4'	-
65 <u> </u>				62.8-63.2' - Fracture zone 64.2, 64.35' - Bedding plane or mechanical	_	except very weak (R1) No Recovery 64.8-66.0'	R4: 6 minutes —
			NR	break (2), horizontal, rough, undulating, up to		-	N4. 0 IIIIIIules
	66.0			1/2" gap	\coprod		
			_				



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-16	SHEET	5	OF	9	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723050.3 N, 457812.4 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

CORING	NIETHOD A	ND EC	JUIPIV	MENT: CME 55 S/N 252345, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
WATER	LEVELS: 1.6	ft bgs	s on 6	/14/07 START : 4/23/2007 END : 4/2	25/20	D7 LOGGER : A. Erickson	
≥ ∩ ⊕	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SCE	SHE	RQ	FR/ PEF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-			2	64.3' - Fractures, 80 deg, rough, undulating - 66.8' - Fractures (2), 70 deg, smooth,		Limestone - 66.0-68.9' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction,	-
-	DE NO		2	undulating, tight 1/16" gaps 67.12, 67.4' - Fractures (2), 5 deg, smooth, undulating, 1/2" gap on same surface at 67.4'		very weak to weak (R1 to R2)	-
-	R5-NQ 5 ft 96%	33	3	68.15' - Fracture, 5 deg, smooth, stepped, discontinuity fracture between hard and soft rock, large gap		- 68.9-70.8' - Same as 66.0'-68.9'	-
70 <u> </u>			5	68.3' - Fracture, 75 deg, rough, undulating, vertical fracture, tight 68.9' - Mechanical break 69.3, 70.8' - Mechanical break, due to rock		except dark yellow, (5Y 4/2), extremely weak (R0), 25% voids (<1/16") over core surface from 66.0-67.8' and 70.5-70.6', no surface	R5: 7 minutes
-	71.0		NR 3	softness 71.55, 71.85' - Fractures (2), horizontal and vertical, smooth, undulating, two horizontal		voids present due to softness of material, few cavities up to 5/16"x1/8", poorly fossiliferous	SC-2 collected at 71.2-
-			0	fractures, gaps up to 1/2" 71.7' - Fracture, vertical, rough, undulating, vertical fracture, gap up to 1/2"		70.2-70.8' - Same as 66.0'-68.9' No Recovery 70.8-71.0' Limestone 71.0-71.6' - Same as 66.0-68.9'	72.0'
-	R6-NQ 5 ft 97%	80	0	-		 except moderate olive brown, (5Y 4/4), fine grained, strong HCI reaction, extremely weak (R0) 	-
- 75	3.73		0	_		 71.6-75.85' - Same as 66.0'-68.9' except very weak to weak (R1 to R2), voids (<1/16") cover 15% of core surface (variable) with depth, many 	
-32. 4 -	76.0		0 NR			cavities up to 3/16" No Recovery 75.85-76.0'	R6: 11 minutes
-			0	76.4, 76.7, 77.0, 77.3, 77.4, 77.65, 77.8, 79.0, 80.0, 80.25' - Mechanical break (11), infilling, due to erosion of soft fracture surfaces		Limestone 76.0-76.6' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, very weak (R1), 15% surface	-
- -	R7-NQ 5 ft	34	0			fractures (<1/16"), few cavities up to - 2-3/4" 76.6-78.6' - Same as 76.0'-76.6'	
-	92%	5 T	0			except extremely weak (R0) 78.6-79.8' - Same as 76.0'-76.6' except weak (R2), 15-25% surface voids (<1/16"), cavities up to 1-3/8"	
-37.4 -	81.0		0 NR	80.15-80.45' - Fracture zone		— diameter, trace black organics material up to 2" in diameter 79.8-80.6' - Same as 76.0'-76.6'	R7: 9 minutes
- - -			0	81.2, 81.45, 81.72, 81.8, 82.75, 82.95, 83.4, 83.75, 83.8, 84.75, 85.5' - Mechanical break		 No Recovery 80.6-81.0' Limestone 81.0-81.8' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, 	
- -	R8-NQ		0	-		extremely weak to very weak (R0 to R1), 0-5% surface voids (<1/16") over core surface dependent on softness of rock, many shallow	-
- -	5 ft 92%	8	0			cavities up to 2" diameter 81.8-82.8' - Same as 81.0-81.8' except vellowish brown. (10YR 5/4)	-
85 -42.4			4 >10	84.35, 84.4, 84.5' - Fractures (3), horizontal, rough, undulating, horizontal fractures, up to 1/4"		- 82.8-85.6' - Same as 81.0-81.8' ´ 	R8: 7 minutes
	86.0		NR		\vdash	No Recovery 85.6-86.0'	
							L

APPENDIX 2BB-532 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-16	SHEET	6	OF	9	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723050.3 N, 457812.4 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

				TENT . CIVIE 33 3/N 232343, ITIUU TOLAIY, NQ LOOIS, HW C			ORIENTATION : Vertical
WATER	LEVELS : 1.6	ft bg	s on 6	/14/07 START : 4/23/2007 END : 4/	25/200	7 LOGGER : A. Erickson	
>	(6)			DISCONTINUITIES	ტ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
HH	H, A	(%	FRACTURES PER FOOT		┫ 일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H A A	GTE	(%) Q	FS	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
P.S.	ENS	a Q	RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
БОШ	0116	IL.	шш	<u> </u>	0)		
			>10	84.4' - Fracture, vertical, rough, undulating,	Н	Limestone	
			/10	bounded by horizontal fractures at 84.35-84.4', half of core, other fracture	Ш	 86.0-86.6' - moderate yellowish brown grading to yellowish gray, 	
-				surface not present	Н	(10YR 5/4 to 5Y 7/2), fine grained,	1 1
-			>10	84.95-85.2' - Fracture zone	Н	 strong HCl reaction, extremely weak 	1 -
_				86.0-87.05' - Fracture zone, rock CaCO3 silt		(R0), black carbon, organic material	
	R9-NQ		0	87.65-87.9' - Fracture zone	Н	from 86.0-86.15'	SC-3 collected at 88.0-
-	5 ft	30	U	88.5' - Mechanical break, to fit in box	Н	 86.6-87.9' - Same as 86.0'-86.6' except extremely weak (R0), 40% 	89.1'
-	57%			,	ш	surface voids (<1/16"), many cavities	-
I _						up to 9/16" diameter, trace black]
90			NR		Н	organic material up to 1/16"	
-47.4			INIX	_		87.9-88.85' - Same as 86.0'-86.6'	R9: 7 minutes
-					\Box	except very weak to weak (R1 to R2),	-
-	91.0				₽₩	25-40% surface voids (<1/16"), many cavities up to 9/16", few fossil molds	1
			٦	91.1' - Fracture, 75 deg, rough, undulating,		No Recovery 88.85-91.0'	
1 7			3	vertical fracture 1/8"	\square	Limestone	1
-				91.8' - Fracture, 60 deg, rough, undulating,	₩	91.0-95.3' - Same as 87.9'-88.85'	1
_			0	vertical fracture 91.9' - Fracture, 40 deg, rough, undulating,	Ш	 except yellowish gray to yellowish 	
				diagonal fracture		brown, (5Y 7/2 to 10YR 5/4)	
	R10-NQ			92.8' - Mechanical break, for hardness test	Н	_	
-	5 ft	75	2	93.5' - Fracture, 60 deg, diagonal fracture, up	Ш	_	1
-	100%			to 3/4" gap	\blacksquare	_	-
_			1	93.8' - Fracture, horizontal, rough, undulating,	Н	_	
95			'	horizontal fracture, fracture surfaces eroded,	Ш		
-52.4				up to 3/4" gap 94.1' - Mechanical break	1—1	94.95-95.25' - Same as 91.0'-95.3'	R10: 8 minutes
-			>10	94.25' - Fracture, 70 deg, rough, undulating,	Н	except 5% surface voids (<1/16"),	-
-	96.0			tight up to 1/4" gap	ш	few cavities up to 3/16" 95.3-96.0' - Same as 91.0'-95.3'	-
			3	94.7, 94.85' - Mechanical break	Н	except fine grained, extremely weak	
			٥	95.3-96.0' - Fracture zone	Н	(R0), 5% surface voids (<1/16"),	
_				96.4-96.6' - Fracture zone, 45 deg, rough, undulating, fracture on either side	ш	black organic material up to 3/8"	1
-			>10	92.0-97.45' - Fracture zone, horizontal and	+	96.0-97.7' - moderate yellowish	-
I _				50 deg, rough, undulating	Н	brown, (10YR 5/4), fine grained,	
	R11-NQ			3, 113, 111, 11		strong HCl reaction, weak (R2), 25% voids (<1/16") on core surface, many	
-	5 ft 34%	17			Н	cavities up to 3/8"x9/16", fossil	1
-	3470				HH	(molds), many fossil casts.	1
-			NR		ш	recrystallization present	-
100					\mathbb{H}	No Recovery 97.7-101.0'	
-57.4				_			R11: 5 minutes
-	404.0				Ш	-	1 1
-	101.0				H	Limostono	-
			2	101.15' - Fracture, 70 deg, rough, undulating,	\Box	- 101.0-102.6' - Same as 96.0'-97.7']
				vertical fracture, large gap	Ш	151.5 102.5 Game as 50.0-51.1	
				101.6' - Bedding plane, horizontal, rough, undulating, 1/8" gap	1 H	=	1 1
-			>10	101.95- 102.1' - Fracture zone, rough,		400 6 400 01	-
-				undulating, fracture on either side	₽₽	102.6-103.2' - Same as 96.0'-97.7' except extremely weak (R0), 20%	-
	R12-NQ	52	2	102.9' - Bedding plane, horizontal, rough,	Н	surface voids (<1/16"), many cavities	SC-4 collected at 103.2-
]	5 ft 60%	52	_	undulating, up to 1/4" gap	口	up to 5/16"	104.0'
-	5573			103.2' - 5 deg, rough, undulating	╁┼┤	103.2-104.0' - Same as 96.0'-97.7'	1 1
-					H	No Recovery 104.0-106.0'	-
105_			NR	_	口		
-62.4			1411		Н		R12: 8 minutes
	106.0				Ш	_	1
	106.0				\blacksquare		+



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-16

SHEET 7 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723050.3 N, 457812.4 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 1.6	ft bgs	on 6/	14/07 START: 4/23/2007 END: 4/	25/200	D7 LOGGER : A. Erickson	
≥ □ €	- ©			DISCONTINUITIES	၂ ၂	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
FH B	E R.L. STH, OVEI	D (%)	F.S.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SUR!	SOR RECEN	RQI	-RA(PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
- 07 -		_		400.01.5		Limestone	
-			3	106.2' - Fracture zone 106.5' - Fractures, horizontal, rough,	Н	 106.0-107.15' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine 	1
1 -				undulating, up to 1/4" gap	Ħ	grained, strong HCl reaction, very	1
1 -			4	106.75' - Mechanical break 107.1' - Fracture, horizontal, rough, stepped,	Ħ	 weak (R1), voids (<1/16") over 20-40% of surface, silt infill in void 	1 1
1 -	R13-NQ			up to 1/2" gap 107.3' - Fracture, 55 deg, rough, undulating,	Ш	spaces present, many cavities up to	1
	5 ft 96%	50	1	up to 1/4" gap	Н	 1-3/16"x3/4", many fossil molds 107.15-110.8' - Same as 	1
	3070			107.35' - Fracture, horizontal, rough, undulating	Н	106.0'-107.15' except weak (R2)	1
110			1	107.9' - Fracture, horizontal, smooth,	ш	_	1
-67.4			6	undulating, large gap with rock crush on part — of fracture	ш	_	R13: 13 minutes
	111.0		- 1	108.7' - Fracture, 80 deg, smooth, undulating,	Ш	<u>-</u>	1
†			NR.	half of fracture is rock crush 111.2' - Mechanical break	H	No Recovery 110.8-111.0' Limestone	1
1 1			2	111.4' - Fracture, 20 deg, rough, stepped,	Ħ	111.0-114.3' - Same as	1
1 1				gap up to 1.5" 111.65' - Mechanical break, 50 deg, smooth,	H	- 107.15'-110.8'	1
			5	undulating, tight	Ш	-	1
	R14-NQ		4	112.35' - Fracture, 80 deg, rough, undulating, black, half of fracture surface/side missing,	Н		1
	5 ft 66%	25	1	little black staining 112.35, 112.75' - Fractures, 20 deg, rough,	Н	_	1
			1	undulating, gaps up to 3/4" thick with rock	Ш]
115				fragments 112.8' - Fracture, 70 deg, rough, undulating, —	Ш	No Recovery 114.3-116.0'	
-72.4			NR	half of fracture is rock fragments	Ш	_	R14: 7 minutes
	116.0			112.95' - 60 deg, smooth, undulating, up to 1/2" gap	Н		
			>10	113.7' - Fracture, 30 deg, smooth, undulating,	H	Limestone - 116.0-118.4' - moderate yellowish	SC-5 collected at 116.0- 117.2'
				tight 114' - Fracture, 80 deg, rough, undulating, -	Ħ	brown, (10YR 5/4), fine grained,	
-			>10	fracture 113.5-114.3', half fracture is rock fragments	Ħ	strong HCl reaction, very weak to weak (R1 to R2), voids (<1/16") over	
4	D45 NO			116.0-116.3' - Fracture zone	H	15% of core surface, many small cavities up to 3/8"x1/16"	-
-	R15-NQ 5 ft	25	2	117.3' - Mechanical break 117.45-117.9' - Fracture zone	Н	No Recovery 118.4-121.0'	-
-	48%			118.05' - Fracture, horizontal, smooth,	₽	-	-
-			NR	undulating, tight up to 1/8" gap 118.25' - 10 deg, rough, undulating	П	_	-
120 -77.4			INIX	_	Ш	<u> </u>	R15: 6 minutes
				-	団	-	-
+	121.0			-	団	Limestone	-
1 +			1	121 65 122 6! Frontier	\Box	- 121.0-124.1' - Same as 116.0'-118.4'	
				121.65, 122.6' - Fracture, rough, stepped, half of fracture is not present	A	except many cavities up to 3/8" diameter or 9/16"x3/16", few fossil	-
-			>10	121.9' - Fracture, vertical and 5 deg, rough, stepped, fracture pair runs	Ħ	 molds with recrystalized surfaces 	-
	R16-NQ			from121.65-122.6', half of fracture is crushed	Ħ	_	1
	5 ft 62%	40	2	or not present 122.1, 122.25' - Fracture zone	Ш	-	1
1 1	JZ /0		0	123.2' - Mechanical break, rough, stepped,	ᡛᡰ	No Recovery 124.1-126.0'	1
125				up to 1/2" gap 123.5' - Mechanical break, horizontal, rough,	円		1
-82.4			NR	stepped, tight up to 1/4" gap	囯		R16: 8 minutes
1 1	126.0			123.75' - Mechanical break, horizontal, rough, up to 3/4" gap	Ш	-	1
					П		

APPENDIX 2BB-534 Rev. 7



PROJECT NUMBER:

33884.FL

BORING NUMBER:

B-16

SHEET 8 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723050.3 N, 457812.4 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 1.6	ft bgs	on 6/	14/07 START : 4/23/2007 END : 4/	25/20	07 LOGGER : A. Erickson	
≥0 ≘	- (i)			DISCONTINUITIES	ဖွ	LITHOLOGY	COMMENTS
ELO N (#	Ä, AND ≪ (%		ZES T	DESCRIPTION	O'C	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ΟωШ	OIR	œ	щФ	126.0-126.3' - Fracture zone	S	Limestone	
-			>10	126.5' - Fracture, horizontal, rough,	片	 126.0-127.35' - moderate yellowish 	-
1 -			>10	undulating, up to 1/2" gaps	岸	brown, (10YR 5/4), fine grained, strong HCl reaction, extremely weak	1
1 -				126.85' - Mechanical break, 5 deg, rough, undulating, up to 1/2" gaps	世	 to very weak (R0 to R1), surface voids (<1/16") up to 15%, many 	-
1 1	R17-NQ			127.0-127.35' - Fracture zone	H	cavities up to 3/16"x3/8", little	1
1 1	5 ft 27%	0		-	世	 recrystallization No Recovery 127.35-131.0' 	1
	,,		NR	-	L		1
130				_	\vdash		
-87.4				_	\vdash		R17: 6 minutes
	131.0				\vdash]
			>10	131.0-132.3' - Fracture zone	Ħ	Limestone - 131.0-134.3' - Same as]
			>10		口	126.0'-127.35' except light olive gray, (5Y 5/2), very weak to weak (R1 to	-
			_10		仜	 R2), voids (<1/16") over 0-5% at 	-
-	R18-NQ			-	士	surface, few fossil molds, cavities up to 3/8"	-
1 -	5 ft	0		-	士	-	-
	26%		NR	-	\vdash	<u> </u>	-
135					F	- No Recovery 134.3-136.0'	
-92.4				-	F	-	R18: 9 minutes
1	136.0				F		1
			>10	136.35' - Fracture, 30 deg, rough, stepped,	厈	Limestone - 136.0-137.0' - yellowish gray to]
			. 10	up to 1/4" gap	F	dusky yellow, (5Y 7/2 to 5Y 6/4),]
			>10	136.5' - Fracture, 80 deg, rough, undulating, up to 1/8" gap	H	fine to medium grained, strong HCI reaction, extremely weak (R0), 25%	-
	R19-NQ			136.6-136.85' - Fracture zone 136.85, 137.0' - Fracture, vertical, smooth,	Ħ	surface voids (<1/16"), many cavities up to 1/4"x3/16", trace fossil casts	-
-	5 ft	15	>10	undulating, half of fracture missing	片	 137.0-138.5' - light olive gray, (5Y 	-
-	50%			137.0-137.46' - Fracture zone 137.9' - Fracture, vertical, smooth,	Ħ	5/2), fine grained, strong HCl reaction, weak (R2), 5% surface	-
140			NR	undulating, 1/4" gap 138.0-138.1' - Fracture zone	世	 voids (<1/16"), many cavities up to 3/8"x9/16", moderately fossiliferous 	
-97.4				138.2, 138.35' - Mechanical break, horizontal	世	with molds and casts	R19: 8 minutes
	141.0			·	╚	 No Recovery 138.5-141.0' 	1
	-		>10	141.25-141.6' - Fracture zone	\mathbb{H}	Limestone	1
			-10	141.85, 141.95, 142.05' - Mechanical break	尸	- 141.0-141.3' - yellowish gray, (5Y 7/2), fine grained, strong HCl]
			>10	(3), horizontal and 15 deg, rough, undulating,	\Box	reaction, weak (R2), 15% surface voids (<1/16"), many cavities and]
	D00 1::			tight up to 1/4" gap 141.9' - Fracture, 80 deg, rough, undulating,	厂	molds`up to 3/16"x3/8"	
	R20-NQ 5 ft	7	_1_	black, rock fragments on one half of fracture 142.0-142.25' - Fracture zone	厂	141.3-143.35' - Same as - 141.0'-141.3' except extremely weak	-
	47%			142.25, 142.4, 142.55, 142.8, 142.95' -	仜	to very weak (R0 to R1) No Recovery 143.35-146.0'	-
<u>, . </u>			NR	Bedding plane (5), rough, undulating, up to 1/2" gap	士		-
145 -102.4				<u> </u>	世	-	R20: 8 minutes
-	146.0			-	世	-	
	170.0				T	_	

Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-16	SHEET	9	OF	9	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723050.3 N, 457812.4 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 1.6	ft bgs	s on 6/	/14/07 START : 4/23/2007 END : 4/	25/20	07 LOGGER : A. Erickson	
₹0₽	(%			DISCONTINUITIES] g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH B FACE	E RU GTH, OVE	R Q D (%)	CTUF	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP SUR ELE	COR	R	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
					厂	Limestone	
			0		ፗ	- 146.0-148.0' - yellowish gray, (5Y 7/2), fine to medium grained, strong]
_			1	147.2' - Fracture, 10 deg and 40 deg, rough,	上	HCl reaction, extremely weak to weak (R0 to R2), 5-15% surface	
_	DO4 NO			undulating, up to 1" gap	上	voids (<1/16"), many cavities up to 3/16"	_
-	R21-NQ 5 ft	50	>10	148.0, 148.12, 148.25, 148.4, 148.5, 148.6' - Fracture, 5 deg, rough, undulating	扛	- 148.0-148.3' - Same as 146.0'-148.0'	-
-	100%			148.75' - Mechanical break, rough, undulating, 1/8"-1/4" gaps	士	except 25% surface voids (<1/16"), many cavities up to 3/16"x3/8"	-
150			>10	148.9' - Fracture, 70 deg, rough, undulating,	世	148.3-151.0' - Same as 146.0'-148.0'	-
-107.4				gray/black 	士	 	R21: 9 minutes
-	151.0		>10	149.5' - Fracture, horizontal and vertical, rough, undulating, tight to 1/2" gap	士	Ī	-
				149.65-150.5' - Fracture zone		Bottom of Boring at 151.0 ft bgs on 4/25/2007	
_					1	- 4/23/2007	
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-17	SHEET	1	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723177.4 N, 457948.0 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLIN	G METH	OD AND	EQUIPM	ENT : CME 55 S/	N 316625, mud rotary, auto hammer, AWJ rods, 3-7	7/8" tri-cone bit		ORIENTATION : Vertical
WATER	LEVELS	: 2.5 ft b	gs on 3/2	8/07	START : 3/28/2007 END : 4/4/2007	LOGGER	: A.	Teal, R. McComb
				STANDARD	SOIL DESCRIPTION		(5)	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	AL (ft)	PENETRATION TEST RESULTS			SYMBOLIC LOG	
NE A		RECOVI		IEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, CO	OLOR,	S	DEPTH OF CASING, DRILLING RATE,
A F E E		RECOVI			MOISTURE CONTENT, RELATIVE DENS		IBO	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
P. C. P.			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINEI	RALUGT	SYN	INSTRUVIENTATION
42.2	0.0			(14)	Topsoil		11/	
-	0.0		00.4	0-1-2	0.0-0.3' - brownish black, (5YR 2/1)	/-		Drilling with 3-7/8" tri-cone bit
-		0.3	SS-1	(3)				-
l -	1.5					_		_
l _						_		_
_						_		Driller's Remark: Water encountered at
-						_		approximately 2.5' below ground surface
-						_		-
-						-		-
-						-		-
5								
37.2						_		l.,
_						_		Medium to heavy chatter at 5.5-6.0'
Ι -	6.5							
-					Clayey Sand (SC)			_
-		0.6	SS-2	2-2-1	6.5-7.1' - light olive gray, (5Y 6/1), wet, very very fine to fine silica sand, 40% medium to	loose, =	////	-
-		0.0	00 =	(3)	\plastic fines, trace roots	7 - Juligii		-
-	8.0				(Passas			-
-						_		-
_						_		_
l _						_		_
10								
32.2								Moderate chatter at approximately 10'
-						_		-
-						_		-
-						-		-
-						-		-
-						-		-
_	13.0						<u> </u>	
					Limestone Fragments 13.0-13.3' - moderate yellowish brown to gra	avieh /	₩	1
Ι -		0.8	SS-3	5-5-3 (8)	☐ \orange, (10YR 5/4 to 10YR 7/4), strong HC	I reaction	Ш	
Ι -	14.5			(0)	Silt (ML)]
15					13.3-13.8' - grayish yellow, (5Y 8/4), wet, m	edium stiff,		·
27.2					nonplastic, rapid dilatancy, strong HCl reactivery fine sand-sized, carbonate	1011, 10%		-
-								-
-						-		-
-						_		_
l _						_		_
						_]
I -						-		-
-						-		-
-						-		-
-	19.5		-					-
20							Ш	
1		<u> </u>		I				l



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-17	SHEET	2	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723177.4 N, 457948.0 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

WATER	LEVELS	: 2.5 ft bo	gs on 3/28	3/07	START : 3/28/2007 END : 4/4/2007 LOGGER : A. Teal, R. McComb
300				STANDARD	SOIL DESCRIPTION g COMMENTS
N N N	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
TH BE		RECOVE			MOISTENANCE, GOOD STRUCTURE DANIETY OR DRILLING FRUINCE, STRUCTURE CONTENT, RELATIVE DENSITY OR DRILLING FRUINCE, STRUCTURE DANIETY OR DRIVER DANIETY OR DRI
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
22.2		1.2	SS-4	12-11-6 (17)	Silt (ML) 19.5-20.7' - yellowish gray, (5Y 7/2), wet, very stiff,
-	21.0			(17)	\[\bigcup nonplastic, very rapid dilatancy, moderate to strong
-					\HCl reaction, 10% very fine to medium sand-sized,
-	-				
-	-				-
-	-				-
-	-				-
-	1				-
25]				_]
17.2					_
-	26.0				Silt With Sand (ML)
-	-	0.4	SS-5	10-3-2	↑ 26.0-26.4' - yellowish gray, (5Y 7/2), wet, medium stiff,
-	07.5	0.4	33-3	(5)	nonplastic, rapid dilatancy, moderate HCl reaction, 20% very fine to medium sand-sized, coarse
-	27.5				gravel-sized limestone fragments, all carbonate ————————————————————————————————————
-	1				-
-	1				1
]
30 12.2					
12.2	-				-
-	-				-
-	1				
-	32.5				-
				17-18-50/4	Sandy Silt (ML) 32.5-33.75' - dark yellowish orange, (10YR 6/6), moist
-		1.3	SS-6	(68/10")	to wet, hard, nonplastic, rapid dilatancy, mild to
-	33.8				moderate HCl reaction, 25-30% fine to coarse sand-sized, all carbonate
	-				Begin Rock Coring at 34.5 ft bgs
35 7.2	-				See the next sheet for the rock core log
-	-				-
-	1				†
-	1				1
]
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40	1				
40_					+ +



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-17 SHEET 3 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723177.4 N, 457948.0 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.5	ft bg	s on 3	/28/07 START : 3/28/2007 END : 4/4	/2007	7 LOGGER : A. Teal, R. McComb	
≥0≥	(9)			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE	E RU STH, SVEF	(%) _Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30Li	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
LEV.	SORE	ROD	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ΥME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	34.5	IL.	0		0)	Limestone	Begin rock coring 3/28/07
35 7.2	R1-NQ				Ħ	— 34.5-34.7' - light olive gray, (5Y 5/2),	at 16:14 at depth of 34.5' —
"	2 ft	0	NR	-	Ш	fine grained, medium strong (R3), moderate HCl reaction on	Driller's Remark: Hard material, loud chatter
-	10%			-	Н	 scratched/pulverized sample, no to 	R1: 18 minutes -
-	36.5			-	Ш	very mild HCl reaction on fresh surface, 10-15% coverage of voids	-
-			6	36.65' - Fracture, 50 deg, rough, undulating, _ fairly tight	Ш	 1/16" or less on matrix, some 	-
-				36.7' - Fracture, 10 deg, rough, undulating, -		casts/molds (poorly fossiliferous) No Recovery 34.7-36.5'	Very hard material, set _ casing to 37.5'
-			3	tight 36.75' - Fracture, 60 deg, rough, planar, tight	Н	- Limestone	casing to 37.5
-	R2-NQ			36.8' - Fracture, 75 deg, rough, undulating, -	H	36.5-40.5' - pale yellowish brown, (10YR 6/2), fine to medium grained,	-
-	5 ft	40	4	open 37.0' - Fracture, 10 deg, rough, undulating,	Ħ	 very weak to weak (R1 to R2), mild 	-
-	80%			tight -	H	HCL reaction on clean surface, moderate to fast HCl reaction on	-
40 2.2			2	37.4' - Mechanical break 37.7, 37.9, 38.4, 38.6, 38.8' - Fractures (5),	Н	pulverized sample, 10-15% coverage	-
				10-45 deg, rough, undulating, open	Ш	of voids 1/16" or less, cavities are elongate and ovate with some up to	R2: Run time not recorded
-			NR	38.8-39' - crushed section, possibly due to drilling	Ш	_ 3/4" x 3/8", fossiliferous (casts and	-
-	41.5			39.2, 39.65, 40.25' - Fractures (3), 20-40 deg, _	Ш	molds) No Recovery 40.5-46.5'	-
-				rough, undulating, open	Н	_	-
-				-	H	_	-
-				-	H	_	-
-	R3-NQ			-	Ш	_	-
-	5 ft	0	NR	-	Н	_	-
	0%			-	H	_	-
45 -2.8					Ш		-
-				-	Ш	_	R3: 2 minutes
-				-		_	-
-	46.5			- 40 CEL Frankura 40 dag rayah atannad	Н	_ Limestone	-
-			4	46.65' - Fracture, 40 deg, rough, stepped, tight	Ħ	- 46.5-49.35' - pale yellowish brown,	-
-				46.82' - Fracture, <5 deg, rough, undulating, -	H	(10YR 6/2), fine grained, mild HCl reaction, very weak (R1), 15-20%	-
-			3	tight 46.92' - Fracture, <5 deg, rough, stepped,	Ш	 coverage of voids 1/16" or less, 5-10% organic material appears as 	-
-	R4-NQ			tight – 47.12' - Fracture, 10 deg, rough, stepped,	Ш	thin black lines up to 1/32" thick,	-
-	5 ft 57%	0	3	tight	Ш	 trace fossil casts/molds, cavities (generally subspherical 3/8" in 	-
<u> </u>	3170			47.6' - Fracture, <5 deg, rough, stepped, – open	Ш	diameter) over 1-2%	-
-7.8				47.92' - Fracture, <5 deg, rough, undulating,	Ш	— No Recovery 49.35-51.5'	-
-			NR	tight _ 48.4, 48.58' - Fractures (2), 10 deg, rough,	H	<u></u>	R4: 2 minutes
-	51.5			stepped, open	H	<u></u>	
-	51.5			48.72' - Fracture, <5 deg, rough, stepped, _ tight	H	_	
-			2	48.9' - Fracture, <5 deg, rough, stepped,	Ш	_	-
-				open _ 51.6' - Fracture, 10 deg, rough, undulating,	Ю	<u></u>	-
-			3	open, 50% coverage for clay infilling	Ш	_	-
-	R5-NQ			52.1, 53.2, 53.3' - Fractures (3), 20-50 deg, _ rough, undulating, open	Ш	<u></u>	-
-	5 ft 95%	85	0	53.6' - Fracture, <5 deg, rough, undulating,	Ы	<u></u>	-
	9370			open	П		-
L							



PROJECT NUMBER:

338884.FL

B-17

SHEET 4 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723177.4 N, 457948.0 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

COMM	NETHOD A	ND EC	JUIPIV	IENT : CME 55 S/N 316625, mud rotary, NQ tools, HW o	casing		ORIENTATION : Vertical
WATER	LEVELS: 2.5	ft bgs	s on 3	28/07 START: 3/28/2007 END: 4/	4/200	7 LOGGER : A. Teal, R. McComb	
				DISCONTINUITIES	(0	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
200	822	₾	뜐핊	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	5.10. 0, 120. 11202. 0, 2.0.
55_ -12.8 -	56.5		0 1 NR	55.7' - Fracture, 60 deg, rough, planar, very tight		Limestone 51.5-56.25' - pale yellowish brown, (10YR 6/2), fine grained, mild HCl reaction, alternating zones of (R0) extremely weak rock material especially from 54.0-55.5' to (R3)	R5: 2 minutes
- - - -	R6-NQ 5 ft 100%	85	0 2	57.8' - Fracture, vertical, rough, planar, 15% coverage black staining, fracture trace from 57.0-58.35' 58.3' - Fracture, 60 deg, rough, undulating, very tight 59.0' - Fracture, 10 deg, smooth, stepped,		medium strong rock, 10-15% coverage of voids 1/16" or less, cavities common up to 1" x 3", poorly fossiliferous (casts and molds), occasional thin black organic laminae No Recovery 56.25-56.5' Limestone 56.5-61.5' - pale yellowish brown, (10YR 6/2), fine grained, very weak	SC-1 collected at 59.0-59.9'
60 -17.8 - -	61.5		1	tight – 59.9' - Fracture, 15 deg, smooth, undulating, tight – 61.3' - Fracture, 20 deg, rough, undulating,		to weak (R1 to R2), 10-15% coverage of voids 1/16" or less, few cavities, HCl reaction changes with hardness (harder material less reactive), sparsely fossiliferous casts and molds, occasional thin black	Note: Core box indicates special core collected from 60.0-60.9', it also appears that up to 0.5 of core is missing from box R6: 4 minutes
-	R7-NQ		1	open 62.1' - Fracture, 10 deg, rough, undulating, open 63.2' - Fracture, 10 deg, smooth, undulating, tight		organic laminae 61.5-62.3' - pale yellowish brown, (10YR 6/2), fine grained, mild HCl reaction, very weak (R1), 20-30% coverage of voids 1/16" or less on surface, cavities over 5-10% surface	- - - -
-55_ -22.8 -	5 ft 98%	87	2 2	63.55, 64.1' - Fractures (2), 20 deg, rough, undulating, tight 64.45, 65.0' - Fractures (2), 10-25 deg, smooth, undulating, tight 65.2' - Fracture, 15 deg, rough, undulating, black carbonaceous coating over 30% of surface, open 65.8' - Fracture, 25 deg, rough, undulating,		up to 3/8" in diameter, irregularly shaped, some cavities up to 3/8"-3/4" in length, trace cavity infilling, trace fossil molds/casts 62.3-63.15' - Same as 61.5-62.3' except absent to rare cavities, <5% coverage of small (<1/16") voids 63.15-65.35' - Same as 61.5-62.3'	R7: 3 minutes
- - - - - 70_	R8-NQ 5 ft 100%	100	1 1 7	open 66.2' - Fracture, 85 deg, rough, planar, very tight, incipient "hair line" fracture from 65.85-66.4' 67.4' - Fracture, horizontal, smooth, planar, very tight 67.9' - Fracture, 5 deg, smooth, undulating, tight 68.65, 69.9' - Fractures (2), 15-20 deg, rough, undulating, tight		except interval at 65.05-65.25' which is very fine grained (chalk like), very weak (R1), with mild HCl reaction and <1% voids/cavities, incipient fracture traces from 65.05 to 66.4 65.35-66.4' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine grained, mild HCl reaction, weak (R2), some very thin, black carbonaceous/organic laminae, trace coverage of voids 1/16" or less on	- - - - -
-27.8 - - - -	71.5		2	70.7, 71.2' - Fractures (2), 50 deg, rough, planar, tight		surface, becoming more common (up to 10%) with depth, cavities generally <3/8" in diameter No Recovery 66.4-66.5' Limestone 66.5-67.4' - Same as 65.35-66.4' except strong HCI reaction,	R8: 5 minutes
-	R9-NQ 5 ft 90%	83	1	72.5-72.6' - solution cavity 72.75' - Fracture, 15 deg, smooth, undulating, open 72.76-72.8' - limestone fragments 73.25' - Fracture, 20 deg, rough, undulating, open		interbedding of light olive gray, very fine grained material that is harder than matrix, thin beds up to 1/2" thick, some cavity infilling, possible bioturbation	-



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-17 SHEET 5 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723177.4 N, 457948.0 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION: Vertical

COMMC	INLITIODA	ND L	VIIIOX	MENT: CME 55 S/N 316625, mud rotary, NQ tools, HW o	Jasiriy		ORIENTATION : Vertical
WATER	LEVELS: 2.5	ft bg	s on 3	/28/07 START : 3/28/2007 END : 4.	4/200	7 LOGGER : A. Teal, R. McComb	
				DISCONTINUITIES	Т	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)			 	SYMBOLIC LOG		
N A N	Z'A'∑	_	ES ⊢	DESCRIPTION		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
	8 1	Q D (%)	158	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	٦į	MINERALOGY, TEXTURE,	FLUID LOSS, CORING RATE AND
Ļ∜.	유민성		25.	PLANARITY, INFILLING MATERIAL AND	Ιĕ	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
		S. O	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	₹	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
2072	014			70 0 74 01	+ "	Limontono	
75			1	73.6, 74.8' - Fractures (2), 5-10 deg, smooth,	\vdash	Limestone — 67.4-69.4' - grayish orange, (10YR	
-32.8			'	undulating, open –		7/4), very fine grained, extremely	
-					1	weak to very weak (R0 to R1), trace	R9: 6 minutes
-			0		╨	 voids and cavities but increasing 	-
	76.5		NR		\vdash	below 69.0', thinly laminated with	Chan drilling for day
-				76.5-77.9' - Fracture zone, limestone		wispy, black, carbonaceous material	Stop drilling for day, – 3/29/07 at 10:29
-			>10	fragments from gravel to cobble sized	╨	 at top of interval, fossils rare to 	Resume drilling 4/3/07 at
l _					ᅪ	absent	09:54 –
						69.4-71.5' - Same as 65.35-66.4'	30.0 .
-			>10		仜	 except coverage of voids/cavities 10-15% 	1 1
-				78.2, 78.45, 78.6' - Fractures (3), 20-30 deg,	╁	71.5-72.5' - Same as 67.4-71.5'	-
	R10-NQ		ا مدا	rough, undulating, open	\vdash	- except rounded to irregularly shaped	
1 7	5 ft 62%	10	>10	79.1-79.6' - Fracture zone, limestone	\top	limestone clasts in a dark yellowish	1
-	02/0		<u> </u>	fragments from gravel to cobble size	亡	brown (10YR 4/2) limestone matrix,	-
80					\bot	very fine grained, 50-60% coverage	_
-37.8			l		\vdash	of voids 1/16" or less	
-			NR		1	72.5-75.0' - pale yellowish brown with	R10: 3 minutes
-					一二	yellowish gray mottling, (10YR 6/2	1 -
	81.5				ᅪ	and 5Y 7/2), fine grained, mild HCl	
				81.5-82.0' - Fracture zone, limestone	\vdash	reaction, very weak to weak (R1 to	
-			>10	9	+	R2), trace fossils, some irregularly shaped limestone (clast-like)	1 1
-				82.2' - Fracture, vertical, rough, planar, tight		features with 1-3% coverage of voids	1 -
			4	(incipient)	Н	_ 1/16" or less on surface, remainder	
1 7			1	82.4, 82.95' - Fractures (2), 15 deg, rough,	┰	of limestone essentially void free,	1 1
-	l R11-NQ			undulating, tight		occasionally thinly laminated with	1 -
I _	5 ft	68	1	83.6' - Fracture, 10 deg, rough, undulating,	\Box	_ trace black organic material]
	84%	00	'	open	\vdash	75.0-76.0' - yellowish gray, (5Y 7/2),	
					╀┷	fine grained, mild HCl reaction, very	1 1
85 <u> </u>			0	_	╼	weak (R1), 1-2% coverage of voids	-
-42.0						1/16" or less, occasionally thinly laminated with white, discontinuous	
			1	85.6' - Fracture, 30 deg, rough, undulating,	\vdash	limestone, some intraclasts/cavity	R11: 5 minutes
-			NR	open	+	infilling, core surface	1 1
-	86.5			· ·		- irregular/indented	1 -
				86.6' - Fracture, vertical, rough, planar, open	ш	No Recovery 76.0-76.5'	SC-2 collected at 86.7-
]			2	86.7' - Fracture, 25 deg, rough, undulating,	1—	Limestone	87.65'
-			—	open	╂┷	76.5-79.6' - mild HCl reaction, very] -
			1	87.7' - Fracture, 10 deg, rough, undulating,	工	weak (R1), highly fossiliferous,]
				tight		50-60% coverage of voids 1/16" or]
-	R12-NQ				╁┼	 less (highly variable through sample), 	1
-	5 ft	60	1	00.01 5	∤ ⊤	many cavities up to 3/8", 10-15%	-
	84%			89.0' - Fracture, 60 deg, rough, undulating,		coverage of black organics, elongated cavity 1" wide by 1.5" long	
90				tight	Ш	by 0.5" deep at 78.2-78.35' infilled	1
-47.8			>10	89.75-90.7' - Fracture zone, limestone	╂┯	with dark yellowish brown material in	⊢
				fragments from graver to copple size, some		a radiating horizontal pattern, non]
				black carbonaceous coating on partings		calcareous, trace charcoal gray	R12: 7 minutes
-			NR		1-	material at 79.0-79.5'	1
-	91.5			04 5 02 7! Eractura years recent atoms -1 to	╀	No Recovery 79.6-81.5'	-
			>10	91.5-92.7' - Fracture zone, rough, stepped to undulating, various angles, tight to open	┰	Limestone	
			- 10	andulating, various angles, tight to open		81.5-83.4' - yellowish gray mottled,	1
-					╁┸	L (5Y 7/2 and 5Y 8/1), fine grained, mild HCl reaction, very weak to weak	-
-			4		╁┯	(R1 to R2), 35-40% coverage of	-
			*	93.15' - Fracture, 70 deg, rough, undulating,		voids 1/16" or less on surface,	
-	R13-NQ			tight	\swarrow	cavities up to 1 3/16"- 1 9/16" by	1 1
-	5 ft	6	6	93.3' - Fracture, horizontal, rough, undulating,	- ☆	= 3/8"-3/4" (especially near base of	
	90%			1/16" open	╨	interval), trace fossils (casts/molds)	
						. , , , , , , , , , , , , , , , , , , ,	
					_		

APPENDIX 2BB-541 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-17

SHEET 6 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723177.4 N, 457948.0 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

CORING	INLITIODA	AD EC	אורוט	IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW o	asing		ORIENTATION : Vertical
WATER	LEVELS : 2.5	ft bas	s on 3	/28/07 START : 3/28/2007 END : 4/	4/200	7 LOGGER : A. Teal, R. McComb	
				DISCONTINUITIES	Т	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)			 	9	EIIIIOEGGI	COMMENTO
N S S	ŽAŽ NS Z		FRACTURES PER FOOT	DESCRIPTION] [ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
표일은	S. H.	Q D (%)	50	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC	MINERALOGY, TEXTURE,	FLUID LOSS, CORING RATE AND
₽₽¥	# <u>P</u>	۵	P. F.	PLANARITY, INFILLING MATERIAL AND	Μĕ	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
		S.	5.77	THICKNESS, SURFACE STAINING, AND TIGHTNESS	₹	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	014			00.551.5.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4.4	- °		
95			3	93.55' - Fracture, horizontal, rough, undulating, brown clay coating over 20-30%, —	\vdash	Limestone 83.4-83.7' - grayish orange, (10YR	
-52.8			١٦	open		7/4), fine grained, mild HCl reaction,	
1 -				93.8' - Fracture, horizontal, smooth, planar,		very weak (R1), thinly laminated,	R13: 7 minutes
-			1	tight, (clay contact)	┵	- black carbonaceous laminae present,	R. McComb logged -
	96.5		NR	93.97' - Fracture, horizontal, smooth, planar,	Н	some voids (<1%) at top of interval,	discontinuities for R13
1 7				horizontal, tight		friable	
-			>10	94.25, 94.37 - Fractures (2), horizontal,	-Ш	- 83.7-85.7' - Same as 81.5-83.4'	-
				rough, undulating, 1 3/16"-1 9/16" open	┵	except circular to subcircular cavities	
				94.50-94.60' - Fracture zone, rough, multiple	\vdash	common (3/8" or less in diameter),	
-			4	orientation	+	- some cavity infilling	-
-				94.9' - Fracture, horizontal, rough, undulating,		No Recovery 85.7-86.5'	
	R14-NQ		10	up to 1/16" open 95.25' - Fracture, 0-70 deg, rough,	\vdash	Limestone 86.5-90.7' - Same as 81.3-83.4'	SC-3 collected at 98.7-
1	5 ft 70%	42	10	undulating, open	┰	except voids and cavities up to 10%	99.6'
-	7 0 70		<u> </u>	95.5' - Fracture zone, 80 deg, rough, planar	亡	coverage from 87.65-89.0' increasing	-
100_			5	to undulating, several en echelon fracture _	oxdot	to 20-30% coverage below 89.0',	
-57.8				planes	-	black carbonaceous coating on	
-			NID	96.0' - Fracture, 50 deg, rough, undulating	╨	bedding plane at 90.5'	R14: 6 minutes
1 4			NR	96.5-97.0' - Fracture zone, low to high angle,	┸	No Recovery 90.7-91.5'	
	101.5			rough, stepped to undulating, tight to open		Limestone	Driller's Remark: Lost
1 7				97.4-97.7' - Fracture zone, high angle, criss	╨	91.5-92.0' - Same as 81.5-83.4'	circulation at about 101.0' -
I -			10	cross fractures intersecting at 45 degrees,	╁	92.0-93.0' - yellowish gray, (5Y 8/1),	-
				rough, planar, tight		very fine grained, strong HCI	
				97.85' - Fracture, 40 deg, rough, stepped,		reaction, medium strong (R3),	
-			>10	tight	╁	moderately fossiliferous, trace	-
_				98.0' - Fracture, 15 deg, rough, undulating, open	╨	coverage of voids 1/16" or less on surface, trace cavities	_
	R15-NQ		0	98.1' - Fracture, 45 deg, rough, planar, tight	\vdash	93.0-93.6' - yellowish gray, (5Y 7/2),	
1 1	5 ft	20		98.7' - Fracture, 20 deg, rough, undulating,		fine grained, very weak (R1), cavities	Driller's Remark: Regained
-	46%			open	╨	numerous at contact of overlying	circulation at about 104.0'
105				99.6-100.1' - Fracture zone, various angles,	\vdash	interval, 1-2% coverage of voids	
-62.8			NR	rough, stepped to undulating, tight to open	\vdash	1/16" or less on surface	
1 -				101.6' - Fracture, 10 deg, smooth, undulating,		Lignite	R15: 4 minutes
-				open, possible mechanical break		93.6-94.1' - no HCl reaction, laminar	- Trio: 4 minutes
	106.5			101.7' - Fracture, 15 deg, smooth, undulating,	\vdash	bedding	
1				open	┰	Limestone	1
-			>10	102.3-103.2' - Fracture zone, predominately horizontal to <5 deg, stepped to undulating,		94.1-95.2' - medium grained, mild	-
				open, coarse gravel size rock fragments	ш	HCl reaction, extremely weak to very	
				106.5-107.2' - Fracture zone, predominately	\vdash	weak (R0 to R1)	
-			1	horizontal to <5 deg, stepped to undulating,	╁	 95.2-96.0' - yellowish gray, (5Y 7/2), moderate HCl reaction, very weak to 	1
-	B 40 1:0		<u> </u>	open, coarse gravel size rock fragments	$-\Box$	weak (R1 to R2), thinly laminated	-
	R16-NQ		4	107.2, 107.35' - Fractures (2), <5 deg, rough,	<u> </u>	weak (11 to 12), thinly laminated with white HCl reactive limestone.	
1 7	5 ft 90%	40	1	stepped, open	╨	fossiliferous (molds/casts), 10-15%	1
-	30 /0		\vdash	107.43, 107.57' - Fractures (2), <5 deg,	+	coverage of voids on surface, trace	R16: 4 minutes
110			>10	rough, undulating, open		cavities (3/8" or less in diameter)	TATO. T TIMIULES
-67.8			' '	109.4 - Fracture, 30 deg, rough, undulating,	Ш	No Recovery 96.0-96.5'	
-			>10	tight	╁	Limestone	1
4					╨	_ 96.5-100.0' - Same as 92.0-93.0'	
	111.5		NR	gravel size, angular to subangular		except becoming pale yellowish	
1				111.5-111.85' - Fracture zone, limestone	匸	brown (10YR 6/2) with depth,	1
-			>10	fragments from gravel to cobble size	╨	fossiliferous, with gastropods	-
				112.0' - Fracture, 50 deg, rough, planar, tight	┰	common (elongated spiral	
]				112.7-113.8' - Fractures (2), 30 deg, rough,	_	 individuals), intermittently interbedded with medium grained 	SC-4 collected at 112.7-
-			1	undulating, tight	仜	limestone with 15-20% coverage of	113.8'
1 4	_			andulating, tight	 	- 1/16" or less voids on surface	110.0
	R17-NQ				\vdash	No Recovery 100.0-101.5'	
]	5 ft 100%	78	1	·	1 -	_ ,	1
<u> </u>	10070				F		



PROJECT NUMBER:

338884.FL

B-17

SHEET 7 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723177.4 N, 457948.0 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

Rev. 7

CORING METHOD A	ND E	JUIPIV	IENT : CME 55 S/N 316625, mud rotary, NQ tools, HW c	asıng		ORIENTATION : Vertical
WATER LEVELS : 2.	5 ft bg	s on 3	/28/07 START : 3/28/2007 END : 4/-	4/200	7 LOGGER : A. Teal, R. McComb	
			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft) CORE RUN, LENGTH, AND RECOVERY (%)	D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
115	a a		THICKNESS, SURFACE STAINING, AND TIGHTNESS 114.75' - Fracture, 65 deg, rough, planar,	SY	CHARACTERISTICS Limestone	DROPS, TEST RESULTS, ETC.
-72.8		2	tight 115.4' - Fracture, 25 deg, rough, undulating, open	F	— 101.5-103.8' - pale yellowish brown, (10YR 6/2), fine grained, mild to moderate HCl reaction, weak to	R17: 4 minutes
116.5		3	115.6' - Fracture, 30 deg, rough, stepped, (bidirectional), open 116.0' - Fracture, 30 deg, rough, undulating,		medium strong (R2 to R3), 10-15% coverage of voids 1/16" or less on surface, cavities 3/8"-3/4" in length	
		2	open 116.25' - Fracture, vertical, smooth, planar, tight, secondary fracture at 90 degrees to		(elongated), fossiliferous (casts/molds) No Recovery 103.8-106.5' Limestone	-
R18-N0	 85	3	above fracture 117.5' - Fracture, 20 deg, rough, undulating, tight	H	106.5-111.0' - Same as 101.5-103.8' except very weak (R1), 20-25% coverage of small cavities, fewer	
_ 96% 120_		2	117.9' - Mechanical break 118.75' - Fracture, 10 deg, rough, undulating, tight, organic infilling (lignite)	E	fossils, very friable No Recovery 111.0-111.5' Limestone	
-77.8		2	119.1, 119.35' - Fractures (2), 10 deg and 15 deg, rough, undulating, tight 120.1' - Fracture, 10 deg, smooth, undulating,	Ħ	111.5-116.5' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, weak (R2), no apparent bedding,	R18: 3 minutes
121.5		NR >10	open 120.5' - Fracture, 20 deg, rough, undulating, tight 121.0' - Fracture, 30 deg, rough, undulating,	Ħ	15-25% coverage of voids 1/16" or less, many cavities up to 3/8", trace very fifteen grained lenses, less	
-		0	open 121.2' - Fracture, 10 deg, smooth, undulating, open open	Ė	fossiliferous 116.5-121.3' - Same as 111.5-116.5' except mild to moderate HCl reaction, except many cavities 1"-2",	
R19-N0 - 5 ft 91%	 67	2	121.5-121.7' - Fracture zone, horizontal, rough, planar to undulating, open 121.9' - Fracture, 40 deg, rough, planar, open	Ė	fossiliferous (molds and casts), intervals of very weak (R1) limestone with few voids/cavities with up to 1/8"	
125 -82.8		10	124.3' - Fracture, vertical, smooth, planar, tight		thick wavy laminations No Recovery 121.3-121.5' Limestone	_
126.5		2 NR	near vertical, rough, stepped to undulating, tight, several fracture planes 124.65-124.72' - Fracture zone, rough, planar, gravel size limestone fragments		121.5-126.05' - yellowish gray, (5Y 7/2), fine grained, medium strong to strong (R3 to R4), 15-20% coverage of voids 1/16" or less, few cavities to	R19: 6 minutes
_		1	bounded by horizontal open bedding planes 124.92' - Fracture, <5 deg, smooth, undulating, open		1/4", fossiliferous (molds/casts of echinoids/gastropods), intervals of dusky yellow green (5GY 5/2), very	
-		1	125.85' - Fracture, 60 deg, rough, undulating, extends from 125.7-126.05', tight, secondary fracture off main fracture also at high angles		fine grained limestone with strong HCl reaction at 121.7-122.3', 124.6-125.1' and 126.0-126.05'	
R20-N0 - 5 ft 95%	68	3	127.0' - Fracture, 75 deg, rough, undulating, tight, extends from 126.5-127.3' 128.1' - Fracture, 60 deg, smooth, planar,		No Recovery 126.05-126.5' Limestone - 126.5-131.25' - Same as	
130_ -87.8 -		4	tight 128.8' - Fracture, 15 deg, rough, undulating, open 129.0' - Fracture, 85 deg, rough, planar, silty		111.5-116.5' except weak to medium strong (R2 to R3), with medium strong to strong (R3 to R4) interval at 130.0-130.4'	R20: 5 minutes
131.5		2 NR	sand infilling 129.2' - Fracture, <5 deg, rough, undulating, open		No Recovery 131.25-131.5'	
-		0	129.9' - Fracture, 10 deg, rough, undulating, open 130.0, 130.2, 130.3' - Fractures (3), 20 deg,	Ė	131.5-133.2' - Same as 126.5-131.25'	
- R21-N0		>10	smooth, undulating, tight 130.6' - Fracture, 35 deg, rough, undulating, tight		- -	
5 ft 90%	48	2	130.85' - Fracture, 30 deg, rough, undulating, open	F		

APPENDIX 2BB-543



PROJECT NUMBER: BORING NUMBER: 338884.FL **B-17** SHEET 8 OF 9

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723177.4 N, 457948.0 E (NAD83)

DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler ELEVATION: 42.2 ft (NAVD88)

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 2.5 ft bgs on 3/28/07 START: 3/28/2007 END: 4/4/2007 LOGGER: A. Teal, R. McComb DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR. SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 132.8-133.2' - Fracture zone, 0-90 deg, rough Limestone 135 >10 to smooth, planar to undulating/stepped 133.2-135.25' - yellowish gray, (5Y -92 8 133.45, 133.75, 134.3' - Fractures (3), 15-20 7/2), fine to very fine grained, deg, smooth, planar, tight moderate to strong HCl reaction, R21: 4 minutes 0 weak to medium strong (R2 to R3), 1-2% coverage of voids 1/16" or less 134.3-135.2' - Fracture zone, 0-90 deg, rough NR to smooth, planar to undulating/stepped, 136.5 multiple high angle fracture planes on surface, fossil molds/casts trace 2 136.6' - Fracture, <5-90 deg, rough, stepped, to absent 135.25-136.0' - pale yellowish brown, open 137.3' - Fracture, 20 deg, smooth, planar, (10YR 6/2), fine grained, mild HCI very tight 137.85' - Fracture, 30 deg, rough, undulating, 4 reaction, very weak (R1), 3-5% coverage of voids 1/16" or less on surface, cavities (up to 3/8") common open R22-NQ 138.0' - Fracture, 70 deg, rough, undulating, No Recovery 136.0-136.5' 25 5 ft >10 62% tight Limestone 136.5-138.35' - yellowish gray, (5Y 138.37' - Fracture, <5 deg, rough, stepped, 140 7/2), moderate HCl reaction, weak tight -97.8 (R2), 10-15% coverage of voids 1/16" or less distributed unevenly 138.5' - Fracture, 0-60 deg, rough, stepped, NR tight R22: 12 minutes 138.8-139.0' - Fracture zone, 0-90 deg, across core surface, cavities common (3/8" or less), poorly smooth, stepped 141.5 fossiliferous (molds/casts) 138.35-138.8' - Same as 139.3' - Fracture, 0-70 deg, rough, stepped, >10 open SC-5 collected at 142.0-139.3-139.6' - Fracture zone, 0-90 deg, 135.25-136.0 142.85 138.8-139.0' - yellowish gray to light gray, (5Y 7/2 to N7), very fine smooth, stepped 141.5-142' - Fracture zone, 0-90 deg, rough, 10 stepped to undulating, open grained, moderate HCI reaction, medium strong (R3), trace coverage of voids 1/16" or less, 1 cavity (3/8"), 142.85' - Fracture, 20 deg, rough, undulating, R23-NO 5 ft 45 10 143.1, 143.25, 143.4' - Fractures (3), 60 deg, possible limestone intraclasts, fossils 82% smooth, planar, very tight absent 145 143.5' - Fracture, 60 deg, rough, stepped, 139.0-139.6' - yellowish gray, (5Y 2 -102.8 7/2), moderate to strong HCl bidirectional, open 143.6' - Fracture, 60 deg, rough, stepped, reaction, very weak to weak (R1 to R23: 12 minutes (bidirectional-partial removal of rock core R2), 3-5% coverage of voids 1/16" or NR interval), open 143.75' - Fracture, 20 deg, smooth, less on surface, cavities common up 146.5 to 3/8"-3/4" undulating, tight No Recovery 139.6-141.5' 0 143.95' - Fracture, 40 deg, smooth, planar, Limestone 141.5-143.7' - grayish yellow to pale open yellowish brown, (10YR 7/4 to 10YR 144.0-144.3' - Fracture zone, 0-50 deg, rough 3 to smooth, planar to stepped 6/2), very fine grained, mild to 144.85' - Fracture, <5 deg, rough, undulating, moderate HCI reaction, strong to R24-NQ very strong (R4 to R5) from open 3 5 ft 87 145.3' - Fracture, 30 deg, rough, undulating, 142.75-143.0', becoming less strong 100% below 143.0', 1-2% coverage of voids open 147.65' - Fracture, 60 deg, rough, planar, 1/16" or less, trace cavities (<3/16"), 150 2 fossils trace to absent -1078open 143.7-144.0' - variegated moderate 147.9' - Fracture, 50 deg, rough, undulating, yellowish brown to pale yellowish brown, (10YR 5/4 to 10YR 6/2), fine R24: 8 minutes open 2 148.0' - Fracture, horizontal, rough, planar, Drilling ended 16:04 on 151.5 to medium grained, mild to moderate tight 4/3/07 at 151.5' 148.5, 148.55, 149.45' - Fractures (3), 5-10 HCl reaction, very weak to weak (R1 deg, rough, undulating, tight to R2), thinly laminated, possible 149.8' - Fracture, 30 deg, smooth, undulating, intraclasts 1/16" in diameter (light tight gray), cavities/voids trace to absent, 150.0, 150.6' - Fractures (2), 15 deg and 30 fossils trace to absent, possible deg, rough, undulating, open 151.05' - Fracture, 20 deg, smooth, carbonaceous/organic material on thin laminae undulating, tight



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-17	SHEET	9	OF	9	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723177.4 N, 457948.0 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

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WATER	LEVELS : 2.5	ft bgs	s on 3/	/28/07 START : 3/28/2007 END : 4/4	/200	7 LOGGER : A. Teal, R. McComb	
17				DISCONTINUITIES	(5)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		m	÷	SYMBOLIC LOG		
Ä N N N N N N N N N N N N N N N N N N N	Z Z Z	_	FRACTURES PER FOOT	DESCRIPTION	<u></u>	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
APE	JS E B	(%) Q		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	걸	WEATHERING, HARDNESS.	FLUID LOSS, CORING RATE AND
무유의	NG SSSS	σD	AC R F	PLANARITÝ, INFILLING MATERIAL AND	MB	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
SSI	82	æ	유립	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	DIOLO, TEST NESOETS, ETC.
					Т	144.0-144.25' - Same as	
1 -				_		141.5-143.7' except very weak to	
						weak (R1 to R2)	_
						144.25-145.6' - Same as	
1 1				-	ı	135.25-136.0'	-
				_		No Recovery 145.6-146.5' Limestone	_
						- 146.5-151.5' - yellowish gray, (5Y	
1 7						7/2), mild HCl reaction, weak to	
1 -				-	1	medium strong (R2 to R3), 3-5%	-
1 -				_		 coverage of voids 1/16" or less on 	-
						surface, some cavities up to 1/8",	
1 7						poorly fossiliferous (molds/casts)	_
1 +				-	l	Bottom of Boring at 151.5 ft bgs on	-
1 -				-		4/3/2007	_
1 7							
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-18	SHEET	1	OF	8

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723259.1 N, 458027.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 2.4 ft b	gs on 4/22	2/07	FART : 4/19/2007 END : 4/23/2007 LOGGER : N. Jarzy	niecki
				STANDARD	SOIL DESCRIPTION	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEDTIL OF CACING DRIVING DATE
ACE ATIO		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
FEN			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	INSTRUMENTATION
<u>42.0</u>	0.0			(N)	1 1	49 Begin drilling, SPT sample, sand is
-	0.0	1.0	SS-1	1-1-1	0.0-1.0' - olive gray, (5Y 3/2), moist, very loose, very	
-		1.0	30-1	(2)	fine to fine silica sand, trace nonplastic fines, 20% organics decreasing with depth	-
-	1.5					-
-						-
-					11	-
-					11	-
-					1 1	-
-					1	-
5	5.0				1	-
37.0	0.0				Clayey Sand (SC)	-
-		1.2	SS-2	1-2-1	5.0-6.2' - pale blue to grayish blue, (5BP 7/2 to 5BP 5/2), mottling light olive brown (5y 5/6), wet, soft,	7
-	6.5			(3)	medium plasticity, no dilatancy, 66% fine silica sand	7
-					11	_
-					11	_
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l _] [
10	10.0					_
32.0				7-4-3	Limestone Fragments \[\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	_
-		0.8	SS-3	(7)	\reaction / \raction	_
-	11.5				Silt (ML) 10.4-10.8' - grayish yellow, (5Y 8/4), wet, firm,	_
-					nonplastic, rapid dilatancy, moderate to strong HCl	-
-					reaction, 10 % very fine to medium sand, carbonate	-
-						-
-						-
-					4 1	-
						-
15 27.0	15.0				Silt With Sand And Limestone Fragments (ML)	-
-		1.3	SS-4	26-29-36	15.0-16.3' - Same as 10.5-11.5' except 20% fine to - ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐ ☐	-
-	40.5	1.5	00-4	(65)	coarse sand-sized, 10-15% coarse sand-sized to fine gravel-sized limestone fragments at top of sample	-
-	16.5					-
-					11	-
-					11	-
-					11	-
-					1 1	-
-					11	7
20					11	7
					11	-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-18	SHEET	2	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723259.1 N, 458027.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

		: 2.4 ft bo			START : 4/19/2007 END : 4/23/2007 LOGGER : N. Jarzyniecki	
				STANDARD	SOIL DESCRIPTION O COMMENTS	
LOW AND (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		
H BE ACE ATIO		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, T	ESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	ION
22.0	20.0			(14)	Sandy Silt (ML)	
-		1.2	SS-5	31-14-12	20.0-21.2' - Same as 15.5-16.5' except grayish orange, (10Y 7/4), wet, very stiff, nonplastic, rapid	-
-	21.5			(26)	└ dilatancy, moderate HCl reaction, 35-40% fine to	-
-					\coarse sand	1
]]
]	
-						
-					_	_
-						-
25 17.0	25.0				Sandy Silt With Limestone Fragments (ML)	
-		1.0	SS-6	2-3-2	25.0-26.0' - Same as 20.5-21.5' except firm and -┃ ┃	-
-	26.5	1.0	33-0	(5)	20-25% fine gravel-sized limestone fragments	-
-	20.5				-	-
-					1	-
-					1	1
					1	Ī
]]
l _					<u> </u>	
30	30.0			50/5 5	0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1	
12.0	30.5	0.5	SS-7	50/5.5 (50/5.5")	Sandy Silt (ML) 30.0-30.5' - Same as 25.0-26.5' except hard, mild to 16:15 Adding 15 more feet o	t casing to 30.0"
-					\moderate HCl reaction, 10% fine gravel-sized / Begin Rock Coring at 31.0 ft bgs	_
-					See the next sheet for the rock core log	-
-					-	-
-					-	-
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]]
35					_]	
7.0					<u> </u>	_
_					_	_
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40						1
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PROJECT NUMBER: BORING NUMBER: 338884.FL **B-18** SHEET 3 OF 9

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723259.1 N, 458027.2 E (NAD83)

DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler ELEVATION: 42.0 ft (NAVD88)

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 2.4 ft bgs on 4/22/07 START: 4/19/2007 END: 4/23/2007 LOGGER: N. Jarzyniecki DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 16:57 Begin rock coring at 31.0 Limestone 1 31.0-36.0' - moderate yellow to light 31.0' below ground surface olive gray, (5Y 7/6 to 5Y 5/2), with mottling of the two colors from 31.9' - Bedding plane, 10 deg, rough, SC-broke during undulating, open 1/8" 32.8-35.4', very fine grained, moderate to strong HCl reaction, 4 movement 32.25' - Bedding plane, <5 deg, smooth, planar, tight weak to medium strong (R2 to R3), R1-NQ 32.5' - Mechanical break, 5 deg, rough, highly fossiliferous, fossil casts and 5 ft 80 4 undulating, highly fossiliferous molds, voids over 50-70% of surface 100% 32.6' - Bedding plane, 10 deg, smooth, up to 1/16", dissolution cavities up to 1/2"x2" on 10% of surface planar, highly fossiliferous, tight 0 32.9' - Mechanical break, 15 deg, rough, 35 undulating, highly fossiliferous, tight 7.0 R1: 10 minutes 33.1' - Bedding plane, 10 deg, smooth, 1 planar, highly fossiliferous, tight 33.5, 33.8' - Bedding plane (2), 30 deg, 36.0 $36.0\mbox{-}40.7\mbox{'}$ - dusky yellow to pale olive, (5Y 6/4 to 10Y 6/2), fine 17:07 Begin coring 36.0smooth, planar, tight 0 41.0' 33.75, 35.5' - Fractures (2), rough, grained, moderate to strong HCI undulating, tight, high angle fractures reaction, extremely weak (R0), fine 0 grained silts, fossiliferous, voids up to 1/16" on 20% of surface, dissolution zones up to 10% of R2-NO 0 surface up to 1/2"x1" from 36.0-37.1' 5 ft 0 dusky yellow to pale olive (5Y 6/4 to 94% 10Y 6/2), organic layers throughout 0 40 2.0 R2: 10 minutes 0 NR **No Recovery 40.7-41.0'** 41.0-42.5, 44.45-45.9' - Same as 36.0-40.7' except 42.5-44.45 light 410 17:17 Begin coring 41.0-0 46 0' olive gray to dusky yellow (5Y 5/2 to 5Y 6/4), highly fossiliferous, cavities 0 over 30% of surface, up to 1/16", SC-1 collected at 42.5medium gray infill (N5) over 20% of 43.3 surface, organics throughout, weak R3-NQ 5 ft 0 1 (R2) rock, moderate HCI reaction 43.4' - Bedding plane or mechanical break, 98% silt and/or clay sized infilling, silt infill, open 1" 0 45 -3 Õ R3: Run time not recorded 0 46.0 NR No Recovery 45.9-46.0' 17:27 Drilled 46.0-51.0' Limestone 1 46.0-51.0' - moderate yellowish brown, (10YR 5/4), fine to very fine 46.7' - Bedding plane, 10 deg, rough, undulating, tight grained, moderate to strong HCI 3 47.1, 47.2, 47.6' - Bedding plane (3), 10 deg, reaction, extremely weak to weak rough to smooth, undulating, tight (R0 to R2), voids up to 1/16" on R4-NO 10-20% of surface, trace organics on 2 5 ft 40 48.55, 48.9, 49.6' - Bedding plane (3), 10 surface 100% deg, rough, undulating, tight R4: Run time not recorded 2 47.4, 48.15, 48.5, 49.4, 50.0' - Mechanical 4/20/07 08:21 Retrieved 50 break (4) -8.0 49.45' - Bedding plane, 30 deg, rough, 08:27 Water level at 2.7' 0 undulating, tight below ground surface 51.0 50.0' - Mechanical break



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-18

SHEET 4 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723259.1 N, 458027.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

	INLITIODA	ND EC	ZUIFIV	IENT : CME 55 S/N 316625, mud rotary, NQ tools, HW o	asing		ORIENTATION : Vertical
WATER	LEVELS: 2.4	ft bgs	s on 4	/22/07 START : 4/19/2007 END : 4/	23/200	7 LOGGER : N. Jarzyniecki	
>00	<u> </u>			DISCONTINUITIES	U	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-			2	50.2' - Bedding plane, 10 deg, rough, undulating, open 1/4" 50.48' - Mechanical break		Limestone - 51.0-51.2, 51.7-52.8, 53.3-54.0, 54.9-55.15' - moderate yellowish	4/20/07 08:36 Driller's Remark: Core barrel locked
-	R5-NQ		1	50.5' - Fracture, 75 deg, smooth, undulating, tight 51.4' - Mechanical break 51.7' - Fracture, <5 deg, rough, undulating,		brown, (10YR 5/4), fine to very fine grained, moderate HCl reaction, weak (R2), fossiliferous, voids 1/16" over 10-20% of surface, trace	4/21/07 07:55 Core barrel unlocked-pulled out 08:14 Begin setting 6" casing
-	5 ft 92%	28	0	bedding plane fractures, open 1/4" 51.8, 52.6' - Fracture (2), 50-60 deg, rough, undulating, open 1/8"		organics 51.2-51.7, 52.8-53.3, 54.0-54.9, 55.15-55.6' - dusky yellow to pale	10:34 Water level 2.1' below ground surface 10:48 Cleared the hole
55 -13.0			0	53.8, 54.4, 51.4' - Mechanical break (3) —		 olive, (5Y 6/4 to 10Y 6/2), fine grained, moderate HCl reaction, extremely weak (R0), fossiliferous (casts), voids to 1/16" over 20% of 	11:24 Begin coring 51.0- 56.0' R5: 11 minutes
- -	56.0		NR 1			surface No Recovery 55.6-56.0' Limestone	13:12 Begin coring 56.0- 61.0'
-			0	56.9' - Fracture, 80 deg, tight, not completely broken through		56.0-56.4, 57.0-57.15, 57.55-58.5' - Same as 51.2-51.7' Limestone 56.4-57.0, 57.15-57.55, 58.5-59.3' -	13:24 Core catcher is not retrieved, washing loose material and going back in
- -	R6-NQ 5 ft 73%	27	0	58.3, 58.45, 56.5' - Mechanical break (3)		moderate yellowish brown, (10YR 5/4), very fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids to 1/8" over 40% of	with wireline
60 <u> </u>			0	-		surface, poorly fossiliferous, organic laminae throughout 59.03-59.65' - Same as 51.0-51.2'	R6: Run time not recorded
-	61.0		NR			No Recovery 59.7-61.0'	13:30 Begin coring 61.0-
- -			1	61.5' - Bedding plane, <5 deg, smooth, undulating, silt infill, open 5" 62.1, 64.9' - Fracture, 65 deg, rough, undulating, open 1/4"		- - -	66.0'
<u>-</u>	R7-NQ 5 ft 90%	46	0	62.25' - Fracture, 10 deg, rough, undulating, associated bedding plane fractures, open 1/4"	Ħ	- -	SC-2 collected at 62.65- 63.5'
-65_ -23.0			1	62.9' - Fracture, 65 deg, rough, undulating, open 1/4" 64.2, 62.65, 63.5' - Mechanical break (3)		- - —	
-23.U - -	66.0		2 NR	65.1, 65.25' - Bedding plane (2), <10 deg, rough, undulating, open 1/4"		No Recovery 65.5-66.0'	R7: Run time not recorded 13:45 Begin coring 66.0-
_			0	67.15, 69.55' - Mechanical break (2)		- 66.0-69.2' - dusky yellow, (5Y 6/4), fine grained, mild HCl reaction, extremely weak (R0), fossiliferous - (casts), fine grained with voids up to	71.0'
_ _ _	R8-NQ 5 ft	37	0			1/16" over 20% of surface	
- 70	100%		0			- -	
-28.0	71.0		1	_		-	R8: 14 minutes



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-18

SHEET 5 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723259.1 N, 458027.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

CORING	METHOD A	ND EC	JUIPN	MENT : CME 55 S/N 316625, mud rotary, NQ tools, HW o	casing		ORIENTATION : Vertical
WATER	LEVELS: 2.4	ft bgs	s on 4	/22/07 START : 4/19/2007 END : 4/	23/20	D7 LOGGER : N. Jarzyniecki	
> 0 0	(9)			DISCONTINUITIES	O	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
_			2	70.1' - Bedding plane, <5 deg, silt and/or clay sized infilling, open 1/2", dusky yellow (5Y 6/4) silt infill	H	69.2-71.0' - moderate yellowish brown, (10YR 5/4), fine to very fine grained, moderate HCl reaction,	14:46 Begin coring 71.0- 76.0' -
-			0	71.2, 71.7' - Fractures (2), <5 deg and 15 deg, rough, undulating, open 1/4"		weak (R2), laminated bedding, voids to 1/16" over 20% of surface, trace laminar bedding	-
-	R9-NQ 5 ft 84%	60	2	73.0' - Bedding plane, 5 deg, rough, undulating, open 1/4", tight 73.5, 74.9, 75.0' - Mechanical break (3)		Limestone 71.0-73.0' - dusky yellow to pale olive, (5Y 6/4 to 10Y 6/2), strong HCl	-
75			1	73.7, 74.0' - Bedding plane (2), 5 deg, rough, undulating, open 1/4", olive gray (5Y 3/2) clay infilling		reaction, weak (R2), voids to 1/16" over <10% of surface, fossiliferous (casts), dissolution along fractures,	-
-33. 0 -	76.0		0 NR			5% cover infill of medium gray (N5) 73.0-73.7' - dusky yellow, (5Y 6/4), fine grained, moderate HCI reaction,	R9: 5 minutes
-			0			extremely weak (R0), fossiliferous (casts), voids on 20% of surface to 1/16", mottling pale olive (10Y 6/2) 73.7-75.2' - dusky yellow to pale	14:51 Begin coring 76.0- 81.0' – SC-3 collected at 76-76.9' _
-	D40 NO		1	77.8, 78.9' - Bedding plane (2), 20 deg,	片	olive, (5Y 6/4 to 10Y 6/2), moderate HCl reaction, weak (R2), voids up to 1/16" over 30% of surface, clay infill	_
- -	R10-NQ 5 ft 96%	64	1	rough, undulating, silt zone open 1/4"		in some fractures No Recovery 75.2-76.0' Limestone	-
80 <u> </u>			1	79.6, 76.9, 80.0' - Mechanical break (3)	臣		R10: Run time not
-	81.0		1 NR	80.2' - Fracture, 20 deg, rough, undulating, silt and/or clay sized infilling, silt zone open 1/2"	Ħ	weak (R0), fossiliferous (casts), voids over 20-30% of surface to 1/16", mottled with light olive gray to	recorded - 14:58 Begin coring 81.0-
-			1	81.3' - Bedding plane, <5 deg, rough, undulating, open 1/4"		yellowish gray (5Y 5/2 to 5Y 7/2) 77.8-78.5, 79.5-79.9' - dusky yellow to pale olive, (5Y 6/4 to 10Y 6/2), weak (R2), voids up to 1/16" over	83.0'
_	R11-NQ		0	82.25, 83.0, 83.5' - Mechanical break (3)	\equiv	30% of surface 79.6-79.7' - moderate HCl reaction, clay infill	-
-	5 ft 90%	83	0	84.0' - Bedding plane, <5 deg, rough, undulating, open 1/4", associated with fossils		No Recovery 80.8-81.0' Limestone 81.0-85.5' - dusky yellow to yellowish	
85 -43.0 -			1	and dissolution zones 85.0' - Bedding plane, <15 deg, rough, undulating, open 1/4"		gray, (5Y 6/4 to 5Y 7/8), very fine to fine grained, mild to moderate HCI reaction, weak (R2), voids up to	R11: 12 minutes
- -	86.0		NR >10			1/16" on 35-40% of surface, fossiliferous (casts, molds), dissolution cavities 83.9-84.4'. Largest dissolution zone is up to	15:30 Begin coring 86.0- 91.0'
- -			3	undulating, intersecting fractures, open 87.1, 87.4' - Bedding plane, <5 deg, rough, undulating, open less than 1/4"		 1/2"x1", very weak (R1) to weak (R2) rock, low to moderate HCl reaction No Recovery 85.5-86.0' 	Driller's Remark: Slight circulation loss at 87.0'
-	R12-NQ 5 ft 34%	9		87.3' - Fracture, 75 deg, rough, undulating, tight		Limestone 86.0-87.7' - Same as 81.0-85.5' No Recovery 87.7-91.0'	-
90	J-70		NR			-	-
-48.0 _	91.0			_		-	R12: Run time not recorded -
				l			



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-18

SHEET 6 OF 9

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723259.1 N, 458027.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

WATER	LEVELS: 2.4	ft bgs	on 4/	22/07 START : 4/19/2007 END : 4/2	23/20	07 LOGGER : N. Jarzyniecki	
30₽	(%			DISCONTINUITIES	ا و	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE	E RU	(%) _Q	TION I	DEPTH, TYPE, ORIENTATION, ROUGHNESS,] j	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
I H	SORE	Ø	'ER I	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	χWΕ	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
пωш	078	œ	μΔ		S	Limestone	16:44 Begin coring 91.0-
-			1	-	F	 91.0-95.0' - grayish orange, (10YR 	96.0'
-				-	世	7/4), fine grained, moderate HCl reaction, weak (R2), moderately	16:59 Core drilled to 93.5', drillers remark that core
-			0	92.3' - Bedding plane, <10 deg, rough,	₽	 fossiliferous (casts), voids up to 1/8" 	barrel is stuck
-	D12 NO		-	undulating, open 1/4" 93.0-93.9' - Fracture zone or mechanical	Ш	over 30% of surface	17:11 Retrieve core sample 91.0-93.5'
-	R13-NQ 5 ft	50	>10	break, smooth to rough, undulating, open up	上	-	17:20 Set 4" casing -
-	80%		-	to 1/4", intersecting fractures	╁╴	-	4/22/07 09:38 Water level 2.4' below ground surface
-			>10	93.5-94.4' - Fracture zone or mechanical break, smooth to rough, undulating, open	F	_	09:52 Begin to set 3"
95 <u> </u>				1/4"	Ħ	_ Na Baarray 05 0 00 0	casing 11:18 Core barrel freed (3"
-55.0			NR	94.55' - Bedding plane, 15 deg, rough, undulating, open 1/4"	片	No Recovery 95.0-96.0'	casing to 85.0')
-	96.0			000000000000000000000000000000000000000	₽	<u>.</u>	13:40 NW casing pulled, setting HW casing to 90.0'
-			<10	96.0-96.2, 96.7-97.0' - Fracture zone (2), rough, undulating, open 1/4", intersecting	П	Limestone - 96.0-96.7' - dusky yellow to yellowish	15:28 4" casing set
-				fractures	口	gray, (5Y 6/4 to 5Y 7/2), very fine	15:49 Begin coring 93.5- 96.0'
-			1	-	上	grained, moderate HCl reaction, very weak to weak (R1 to R2), voids to	R13: 23 minutes
-				97.6, 98.6' - Bedding plane (2), 10 deg, rough, undulating, tight	╁	1/8" over 35-40% of surface	4/23/07 08:00 Begin coring 96.0-101.0'
-	R14-NQ 5 ft	17	4	97.7, 98.5' - Mechanical break (2)	F	96.7-97.15' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction,	-
_	58%		\dashv	98.2' - Bedding plane, 10 deg, rough, undulating, tight	H	extremely weak (R0), fossiliferous	_
_				98.25, 98.75' - Fracture (2), 50 deg, rough,	₽	(casts), voids to 1/16" over 20% of surface, mottled with light olive gray	_
100_			NR	undulating, with organics in vertical orientation	Ш	to yellowish gray (5Y 5/2 to 5Y 7/2)	
-58. 0 -				-	口	97.15-98.9' - dusky yellow matrix with yellowish gray infill, (5Y 6/4 with 5Y	R14: Run time not recorded
_	101.0			_	上	8/1), fine grained, moderate HCI reaction, weak to medium strong (R2	
_			1 I	_	┢	to R3), highly fossiliferous (casts),	08:09 Begin coring 101.0- 106.0'
_				101.7, 104.9' - Mechanical break (2)	F	voids to 1/16" over 30% of surface, dissolution cavities up to 1/4"x1/2",	_
_			0	101.9' - Bedding plane, 10 deg, rough, undulating, open 1/2"	Ľ	infill over 10-50% of surface (same	_
_				105.3, 102.4, 103.5, 104.2' - Mechanical	브	hardness matrix) No Recovery 98.9-101.0'	
_	R15-NQ 5 ft	97	1 I	break (4) 102.75' - Mechanical break	₽	_ Limestone	
_	98%	0.	·	103.8' - Bedding plane, 10 deg, rough,	Д	101.0-102.7' - dusky yellow with light olive gray infill, (5Y 6/4 with 5Y 5/2),	
-			0	undulating, tight	口	moderate HCl reaction, weak to]
105_				104.55' - Bedding plane, <5 deg, smooth, — undulating		medium strong (R2 to R3), highly fossiliferous (casts), voids to 1/16"	
-63.0			0	105.05' - Bedding plane, <5 deg, smooth,	F	over 30% of matrix and over 15% of	R15: Run time not recorded
-	106.0		NR.	undulating, very soft material, open 1/4" 105.2-105.8' - Fracture zone, smooth to	F	infill, dissolution cavities to 1/2"x3/4", infill over 10-20% of surface, fine	
_			0	rough, undulating, intersecting fractures,	片	_ grained	08:30 Begin coring 106.0- 111.0' -
_				most are high angle, open 1/8"	\vdash	102.7-105.9' - dusky yellow with yellowish gray infill, (5Y 6/4 with 5Y	
_			0	_	\vdash	8/1), strong HCl reaction, very weak	SC-4 collected at 106.0- 107.0'
_				_	口	to weak (R1 to R2), highly fossiliferous (casts), voids to 1/16"	
-	R16-NQ 5 ft	90	0	_	上	over 30% of surface, dissolution]
_	100%			_	\vdash	cavities to 1/4"x1/2", infill over 15-20% of surface, fine grained]
l -			0	_	厈	No Recovery 105.9-106.0']
110_					片		
-68.0			2	_	H	-	R16: Run time not recorded -
	111.0				$oxed{\Box}$		10001404
1		i l			•		



FRACTURES PER FOOT

0

0

1

>10

NR

6

0

70 0

1

0

NR

1

0

1

3

>10

>10

0

2

NR

40

RQD(%)

80 0

WATER LEVELS: 2.4 ft bgs on 4/22/07

CORE RUN, LENGTH, AND RECOVERY (%)

R17-NQ

5 ft

96%

R18-NO

5 ft

94%

R19-NQ

5 ft

100%

R20-NO

5 ft

72%

62 0

116.0

121 0

126.0

131.0

DEPTH BELOW SURFACE AND ELEVATION (ft)

115<u>-</u>

120

-78.0

125

-83 0

130

-88.0

PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-18

SHEET 7 OF 9

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723259.1 N, 458027.2 E (NAD83)

START: 4/19/2007

DESCRIPTION

DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND

THICKNESS, SURFACE STAINING, AND TIGHTNESS

110.4, 110.7' - Fracture (2), 50-60 deg,

116.0-116.2' - Fracture zone, smooth to

116.4' - Fracture, 80-85 deg, rough,

116.6' - Bedding plane, 10 deg, rough,

118.8, 120.15' - Mechanical break (2)

119.9' - Fracture, 80 deg, smooth, undulating,

121.4' - Fracture, 80 deg, rough, undulating,

123.5, 125.8, 124.8' - Mechanical break (3)

124.5' - Bedding plane, smooth, undulating,

125.85, 125.9' - Bedding plane (2), <5 deg,

126.0-126.4' - Fracture zone, intersecting

126.75, 127.3, 128.5, 128.7' - Mechanical

127.4-127.55' - Fracture zone, intersecting fractures, open 1/4", softer material 127.8, 127.95' - Fracture (2), 60 deg, rough

129.35' - Fracture, 60 deg, rough to smooth,

129.5' - Fracture, 60 deg, smooth, undulating

dissolution features along outer edges of

125.25' - Fracture, 85 deg, not open

116.3' - Fracture, 55 deg, rough, undulating,

rough, undulating, tight

rough, undulating

undulating, tight

open, end missing

open less than 1/8'

fracture open 1/4"

smooth, planar, tight

undulating, open 1/4"

break (4)

fractures, open 1/8", tight

to smooth, undulating, open 1/4'

undulating

tiaht

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

END: 4/23/2007

90

 $\underline{\circ}$

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

DISCONTINUITIES

ORIENTATION: Vertical LOGGER: N. Jarzyniecki LITHOLOGY COMMENTS ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS 08:40 Begin coring 111.0-Limestone 106.0-111.0' - dusky yellow, (5Y 6/4), fine grained, strong HCI reaction, extremely weak to weak (R0 to R2), voids to 1/16" over <20% of surface, highly fossiliferous, dissolution zones up to 1/2" diameter over < 5% of surface 111.0-115.8' - dusky yellow, (5Y 6/4), fine grained, strong HCl reaction, extremely weak to medium strong (R0 to R3), increasing in hardness with depth until 105.2' below ground R17: Run time not surface, voids to 1/16" over <20% of recorded No Recovery 115.8-116.0' 08:50 Begin drilling 116.0-Limestone 121.0' 116.0-120.7' - dusky yellow, (5Y 6/4), fine grained, strong HCl reaction, very weak to weak (R1 to R2), voids to 1/8" over <20% of surface, fossiliferous No Recovery 120.7-121.0' Limestone 121.0-124.5' - Same as 116.0-120.7' 124.5-126.0' - light olive brown 5/0 light olive gray, (5Y 5/6 with 5Y 5/2), very fine to fine grained, moderate to R18: Run time not strong HCI reaction, weak to medium recorded strong (R2 to R3), laminar features throughout and yellowish gray (5Y 7/2) infill over 15% of surface. Matrix 09:09 Begin drilling 121.0-126 0 is highly fossiliferous, dissolution features over 10% of surface up to 1/2"x1/2", voids over 35% of surface up to 1/16" and trace organics, infill is very fine, poorly fossiliferous and < 5% voids 126.0-126.4' - pale olive with light SC-5 collected at 123.5olive gray laminations, (10YR 6/2 124 45' with 5Y 5/2), very fine grained, mild HCl reaction, weak (R2), poorly fossiliferous, no voids R19: 10 minutes Limestone 126.4-129.6' - light olive brown, (5Y 5/6), same as limestone in 09:19 Begin drilling 136.0-116.0-120.7' except voids over 25% 131.0' of surface up to 1/16" and laminar feature at 127.15-127.0', no voids, poorly fossiliferous, weak (R2) to medium strong (R3) rock with exception of 127.2-127.4' which is strong (R4) rock, moderate to strong HCI reaction No Recovery 129.6-131.0'

R20: Run time not

recorded



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-18

SHEET 8 OF 9

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723259.1 N, 458027.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

WATER	LEVELS : 2.4	ft bgs	s on 4/	/22/07 START: 4/19/2007 END: 4/	23/20	07 LOGGER : N. Jarzyniecki	
≳ D ⊋	(%			DISCONTINUITIES		LITHOLOGY	COMMENTS
DN (F	ANC ANC RY (9		ZES T	DESCRIPTION		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-	024		>10	131.15, 132.1, 132.8' - Bedding plane (3), <5 deg, smooth, planar, open <1/8"		Limestone - 131.0-132.2' - pale yellowish brown,	09:34 Begin drilling 131.0- 136.0' -
-			4	131.4, 133.2, 134.0' - Mechanical break 131.7-132.0' - Fracture zone, smooth to rough, undulating, intersecting fractures,	崖	(10YR 6/2), fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3), voids to 1/8" over	-
-	R21-NQ 5 ft	10	3	open 1/4" 132.6' - Bedding plane, <5 deg, smooth,	H	20-25% of rock, fossil casts to 3/8"x3/4" over 5% of rock as casts (voids)	-
-	64%	10	1	planar, open 1/4" 133.45, 133.6' - Fracture zone (2), 60-70 deg, rough, undulating, open 1/4" on 133.45'	Ē	132.2-134.2' - grayish orange, (10YR 7/4), fine grained, moderate HCl reaction, weak to medium strong (R2	-
135 <u>-</u> -93.0			NR	133.6' - Fracture, 60-70 deg, rough, undulating, open 1/4" — 133.8' - Bedding plane, <5 deg, rough,	\vdash	to R3), voids to 1/16" over <10% of surface	R21: Run time not
-	136.0			undulating, tight 133.9' - Fracture, <5 deg, rough, undulating, tight	E	No Recovery 134.2-136.0' Limestone	recorded - 09:50 Begin drilling 136.0-
-			3	134.0' - Fractures, <5 deg, smooth, planar, open 1/4"	片	 136.0-139.7' - grayish orange, (10YR 7/4), fine to medium grained, moderate HCl reaction, weak (R2). 	141.0'
-			1	135.7' - Bedding plane, <30 deg, smooth, undulating, open 1/4" 136.0-136.3' - Bedding plane, <5 deg,	拝	 voids to 1/8" over 30-40% of surface, fossil casts (voids) to 5/16" diameter 	-
-	R22-NQ 5 ft 74%	53	1	smooth, planar, tight 136.5, 136.6' - Bedding plane (2), 10 deg, rough, undulating, open 1/4"		over 5% of surface -	-
_			0	137.5' - Fracture, 50 deg, smooth, undulating, tight	\vdash	_ _	
140 <u> </u>	141.0		NR	138.4' - Mechanical break 138.5, 137.9' - Mechanical break (2) 138.7' - Bedding plane, <30 deg, smooth, undulating, open 1/4"		No Recovery 139.7-141.0' -	R22: Run time not recorded -
-	141.0		>10	141.2-141.35' - Fracture zone, pieces to 2"x1", open 1/4"		Limestone - 141.0-143.7' - light olive gray mottled with yellowish gray, (5Y 6/1 mottled	10:06 Begin drilling 141.0- 146.0'
-			>10	142.3-142.49' - Fracture zone, pieces to 1"x1/2", open 1/4"		with 5Y 7/2), fine to medium grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids up	142.3'
_	R23-NQ 5 ft 84%	55	>10	142.9-143.05' - Fracture zone, pieces to 1-1/2"x1/2", open 1/4" 143.2' - Bedding plane or mechanical break,	F	to 1/16" over 10-25% of surface, - trace fossils up to 1/2"x1/4", cavities to 1"x1/2" over 5-20% of surface	
-	0476		1	20 deg, rough, undulating, organic dark stain, open 1", associated with cavities	Ħ	143.7-145.2' - olive gray, fine - grained, moderate HCl reaction,	
145_ -103.0 -			1 NR	143.7-143.95' - Fracture zone, pieces to 1"x1/2", open 1/4" 144.55' - Bedding plane, 50 deg, smooth,		medium strong (R3), trace voids to 1/8", trace fossils to 3/16"x1/16", dark 1/16" laminations (wavy) over 5-10%	R23: 34 minutes
- -	146.0		1	undulating, tight 145.0' - Fracture, <5 deg, smooth, undulating, open 1/2"	Ħ	of surface No Recovery 145.2-146.0' Limestone	10:40 Begin drilling 146.0- 151.0'
-			2	146.95' - Fracture, 20 deg, smooth, undulating, tight	Ħ	146.0-147.9' - grayish orange, (10YR 7/4), fine to medium grained, moderate HCl reaction, weak to	
-	R24-NQ 5 ft	33	2	147.65' - Bedding plane, 0-5 deg, smooth, planar, tight 147.9' - Bedding plane, smooth, undulating,	Ħ	medium strong (R2 to R3), voids to 1/8" over 0-40% of surface in interbedded nature interchanging	
-	56%	55		open 1/4" 148.3, 148.35' - Fractures (2), 50 deg,		every 3-1/8", trace fossil casts to 1/8"x9/16"	10:51 Finish drilling R24: Run time not
150 <u>-</u> -108.0			NR	smooth, undulating, tight, open 1/2" —		<u>-</u>	recorded Used 17 bags of quick cement for abandonment
_	151.0				上	-	(47-lbs/bag) and about 60 - gallons of water

Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-18	SHEET	9	OF	9	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723259.1 N, 458027.2 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER LEVELS: 2.4 ft bgs on 4/22/07				/22/07 START : 4/19/2007	END : 4/2	3/200	D7 LOGGER : N. Jarzyniecki	
>00	(9			DISCONTINUITIES		O	LITHOLOGY	COMMENTS
TH BELOV RFACE AND	RE RUN, JGTH, AND SOVERY (%	(%) □	ACTURES R FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUG PLANARITY. INFILLING MATERIAL	HNESS,	MBOLIC LO	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DESCRIPTION	. AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
					_		<u> </u>	



PROJECT NUMBER:	BORING NUMBER:	
338884.FL	B-19	SHEET 1 OF 10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723369.6 N, 458134.0 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-7/8" tri-cone bit

ORIENTATION · Vertical

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-7/8" tri-cone bit ORIENTATION: Vertical									
WATER	WATER LEVELS: 4.25 ft bgs on 5/22/07 START: 5/21/2007 END: 5/23/2007 LOGGER: C. Wallestad								
				STANDARD	SOIL DESCRIPTION COMMENTS				
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION				
BEI CE.		RECOVE	ERY (ft)	120111200210	SOIL NAME, USCS GROUP SYMBOL, COLOR, SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND				
PTH RFA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
SS				(N)					
41.3	0.0			440	Topsoil				
l _		0.7	SS-1	1-1-2 (3)	│ nonplastic, organics (root and plant debris) with <10% / │ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │				
_	1.5			, ,	\fine silica sand				
_					Poorly Graded Sand With Organics (SP) 0.25-0.55' - brownish black, (5YR 2/1), wet, very				
_					loose, very fine to fine grained, 40% organics, silica				
_					Poorly Graded Sand (SP)				
					0.55-0.7' - very pale orange, (10YR 8/2), wet, very loose, fine grained, trace nonplastic fines, trace				
					organics, silica sand				
]									
5_	5.0				11				
36.3					Silty Sand (SM) 5.0-6.15' - grayish orange, (10YR 7/4), wet, loose, fine				
		1.2	SS-2	5-5-4 (9)	grained, 15% nonplastic fines, trace organics (roots),				
	6.5			(0)	silica sand, soil grades to sandy fat clay with 30-40%				
					\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\				
					11				
-					11				
-					1 1				
-					1 1				
-					1 1				
10	10.0				 				
31.3	10.0				Silt (ML) Driller's Remark: Set 5' HW casing (10'				
-		0.8	SS-3	14-17-14	10.0-10.75' - grayish orange, (10YR 7/4), wet, hard,				
-	11.5			(31)	trace roots, carbonate derived				
-	11.0								
-									
-									
-									
-									
-					-				
,	45.0								
15 <u> </u>	15.0				Silt (ML)				
-		1.2	SS-4	22-47-42	15.0-16.2' - Same as 10.0-10.75' except strong HCl				
-		1.2	33-4	(89)	reaction, 10-15% coarse sand-sized to fine gravel-sized limestone, all carbonate				
-	16.5				-				
-									
-									
-									
-									
-									
-									
20									



PROJECT NUMBER:	BORING NUMBER:

338884.FL B-19 SHEET 2 OF 10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723369.6 N, 458134.0 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-7/8" tri-cone bit ORIENTATION: Vertical

WATER					START : 5/21/2007 END : 5/23/2007 LOGGER : C. Wallestad
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY
A CE		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
EPT! URF, LEV/			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
<u>оош</u> 21.3	20.0			(N)	Silt With Limestone Fragments (ML)
-	20.0	1.0	SS-5	3-25-17	20.0-21.0' - grayish orange and pale ýellowish brown, - (10YR 6/2 and 10YR 7/4), pale orange mottling, wet,
-	21.5	1.0		(42)	hard, nonplastic, strong HCl reaction
-	21.5				
-					
-					1
-					1
]
]					Driller's Remark: Hard at 24' below ground surface
25	25.0				
16.3				13-13-17	Silt With Sand (ML) 25.0-26.2' - grayish orange, (10YR 7/4), wet, hard,
-		1.2	SS-6	(30)	nonplastic, rapid dilatancy, moderate to strong HCI
-	26.5				reaction, 15-20% fine to coarse sand-sized, all carbonate
-					
-					
-					
-					
-					
20 -	20.0				
30 <u> </u>	39:9	0.0	SS-7	50/1.5	No Recovery 30.0-30.1'
-				(50/1.5")	
-					1
-					1
]
]
_					
_]] .
_]] .
35 6.3	35.0				Silt With Sand (ML)
0.5			000	13-19-26	Silt With Sand (ML) 35.0-36.4' - moderate yellowish brown, (10YR 5/4),
-		1.4	SS-8	(45)	wet, hard, nonplastic, rapid dilatancy, moderate to
-	36.5				│ limestone fragments to 1/4" at top of sample, all /-
-					\carbonate \frac{1}{2}
-					
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-					
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PROJECT NUMBER:

338884.FL

B-19

SHEET 3 OF 10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723369.6 N, 458134.0 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-7/8" tri-cone bit

ORIENTATION : Vertical

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-7/8" tri-cone bit ORIENTATION: Vertical												
WATER	LEVELS	: 4.25 ft t	ogs on 5/2	22/07 5	START : 5/21/2007	END : 5/23/2007	LOGGEF	<u> : C.</u>	Wallestad			
≥ □ ≥				STANDARD PENETRATION	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR,				COMMENTS			
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	• • •	TEST RESULTS					DEPTH OF CASING, DRILLING RATE,			
H BE ACE		RECOVE	ERY (ft)		MOISTURE C	CONTENT, RELATIVE DEN	SITY OR	30L	DRILLING FLUID LOSS, TESTS, AND			
EV.			#TYPE	6"-6"-6"	CONSISTENCY	Y, SOIL STRUCTURE, MINE	ERALOGY	SYMBOLIC LOG	INSTRUMENTATION			
1.3	40.0	<u> </u>		(N)	Silt With Sand (I	MI \		111				
-	40.8	0.8	SS-9	30-50/4 (80/10")	40.0-40.75' - darl	k yellowish orange, (10YF	R 6/6), wet, -	$\ \ $	-			
-	10.0				hard, low plasticit	ty, rapid dilatancy, moder ion, 25% fine to coarse gr	ate to	-	-			
-					\all carbonate	ion, 2070 into to course gr	-	ł	-			
-							-	-	-			
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-							-	-	_			
45 <u> </u>	45.0				Silt With Sand (I	MI \		.	_			
-3.7				27-29-50/5.5		พ เ.) erate yellowish brown, (10)YR 5/4), -	$\ \ $	_			
-		1.4	SS-10	(79/11.5")	wet hard nonpla	astic, rapid dilatancy, mod ion, 15% fine to coarse sa	erate to	Ш	_			
-	46.5				trace gravel-size	d, all carbonate	ina-sizea, /-	ш	_			
-									_			
-							_		_			
-							_		_			
_							_		_			
-							-		_			
-							_		_			
50 -8.7	50.0			44.50/0	0:14 (841.)			.	Drillada Dansadu Handra de FO O 55 Ol mus			
-8.7	50.7	0.5	SS-11	41-50/2 (91/8")	Silt (ML) 50.0-50.5' - mode	erate yellowish brown, (10)YR 5/4),	Ш	Driller's Remark: Hard rock 50.0-55.0', run time 15-20 minutes			
-				(= -,	wet, hard, nonpla	astic, rapid dilatancy, mod	erate HCI		_			
-					carbonate	e to coarse grained sand	, all / -		_			
-								-	_			
-							_		_			
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1 -							_	1	_			
55	55.0	0.0	00.40	F0/4	C:I4 (MIL)			 	Finished drilling at 17,00 == 5/04/07 =+ 55.01			
-13.7	55.3	0.3	SS-12	50/4 \ (50/4") /	L Silt (ML) √55.0-55.25' - San	ne as 50.0-50.5'	/-	╨	Finished drilling at 17:30 on 5/21/07 at 55.0' below ground surface -			
-				, ,				-				
-							-	-	Resume drilling at 07:52 on 5/22/07			
-							_	1	Westers leaved at 07:05 in 4 05!			
-							_	1	Water level at 07:35 is 4.25' below ground surface –			
-							_		_			
-							_		_			
-							-	1	_			
-							-	-	_			
60_								<u> </u>				



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-19	SHEET	4	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723369.6 N, 458134.0 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-7/8" tri-cone bit

ORIENTATION: Vertical

	DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-7/8" tri-cone bit ORIENTATION: Vertical WATER LEVELS: 4.25 ft bgs on 5/22/07 START: 5/21/2007 END: 5/23/2007 LOGGER: C. Wallestad											
WATER	LEVELS	: 4.25 ft	bgs on 5/2		START : 5/21/2007	END : 5/23/2007	LOGGEF	₹ : C. 	Wallestad COMMENTS			
<u></u> \$9£1	04447	INITE-	N1 (6')	STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION 9				CONTINIENTS			
ELO N (SAMPLE	INTERVA		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,			IC L	DEPTH OF CASING, DRILLING RATE,			
H B ATIC		RECOVI	ERY (ft)		MOISTURE C	ONTENT, RELATIVE DENS	SITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND			
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY	, SOIL STRUCTURE, MINE	RALOGY	SYMBOLIC LOG	INSTRUMENTATION			
-18.7	60.8	0.2	SS-13	50/3.5	│ │ Limestone Fragn	nents And Silt (ML)		1111	Driller's Remark: 10-15% loss in circulation			
-				(50/3.5")	│	vellowish orange, (10YR 6	6/6), -	1	at 60.5'			
-					\nonplastic, mild to	moderate HCI reaction,	all / -	ł	Driller's Remark: Hard drilling at 61.0', will switch to rock coring			
-					Begin Rock Corin	ng at 61.5 ft bgs		ł	3			
-					See the next shee	et for the rock core log	-	ł	-			
-							-	ł	-			
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PROJECT NUMBER:

338884.FL

B-19

SHEET 5 OF 10

ROCK CORE LOG

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723369.6 N, 458134.0 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing

WATER	LEVELS: 4.2	25 ft b	gs on	5/22/07 START : 5/21/2007 END : 5/	23/20	07 LOGGER : C. Wallestad	
≥ ∩ ⊋	(%			DISCONTINUITIES	၂ ပွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - - -	61.5 R1-NQ 5 ft 91%	88	1 1 1	62.1' - Mechanical break or bedding plane, horizontal, smooth, undulating, tight 63.4, 63.5' - Bedding plane or mechanical break (2), horizontal, smooth, undulating, tight to 1/2" open		Limestone 61.5-66.05' - dark yellowish orange, (10YR 6/6), fine to medium grained, moderate HCl reaction, extremely weak to weak (R0 to R2), voids to 1/8" diameter over 0-30% of rock (mostly 25%), trace fossil casts to 3/16" diameter, no visible cavities, trace dark (possibly organic) inclusions and laminations	5/22/07 start coring at 11:25 - Driller's Remark: Cored fast (soft) at 62.0-63.0' - -
-23. 7 - -	66.5		0 0 NR			No Recovery 66.05-66.5'	R1: 5 minutes -
 70 -28.7	R2-NQ 5 ft 85%	83	0 0 3	66.9' - Mechanical break or bedding plane, horizontal, smooth, undulating, tight 69.05' - Mechanical break or bedding plane, horizontal, smooth, undulating, tight 69.75' - Bedding plane, horizontal, smooth, undulating, tight to 1/2" open		- 66.5-68.9' - moderate yellowish brown, (10YR 5/4), fine to medium grained, moderate HCl reaction, - weak to medium strong (R2 to R3), voids to 1/8" over 5-20% of rock, trace fossil casts up to 5/16" - diameter, no visible cavities, trace dark gray fine grained inclusions 68.9-69.75' - grayish orange, (10YR 7/4), fine to medium grained, strong HCl reaction, extremely weak to very	Driller's Remark: Very soft at 69.0-70.5'
- - - - - - 75 -33.7	71.5 R3-NQ 5 ft 74%	70	0 NR 0 0 NR	70.25' - Fracture, 45 deg, smooth, undulating to planar, tight		weak (R0 to R1), voids to 1/8" over 20-30% of rock, trace fossil casts/molds to 3/16" diameter, no visible cavities, trace dark (possibly organic) particles 69.75-70.75' - moderate yellowish brown, (10YR 5/4), fine to medium grained, moderate HCI reaction, weak to medium strong (R2 to R3), voids to 1/8" over 15-20% of rock, fossil casts to 3/8" over 5-10% of rock, no visible cavities No Recovery 70.75-71.5' Limestone	R2: 7 minutes
-33.7 - - - -	76.5		1 1 0	undulating, tight, related to cavities 75.65' - Fracture, 45 deg, rough, undulating, 2" thick silty gravely infill, tight 77.35' - Bedding plane or mechanical break, horizontal, smooth, undulating, associated		71.5-72.75' - grayish orange, (10YR 7/4), fine to medium grained, moderate HCl reaction, medium strong (R3), voids to 1/8" over 20-30% of rock, fossil casts to 9/16" over 10-15% of rock, no visible cavities No Recovery 72.75-74.15' Limestone 74.15 75.6' - pole vellowish brown	R3: 10 minutes - - - - - -
 80 -38.7 -	R4-NQ 5 ft 100%	80	1 0 2	with cavity, tight to 1" open 78.75' - Bedding plane, 10 deg, smooth, undulating, tight —		74.15-75.6' - pale yellowish brown, (10YR 6/2), fine grained, strong HCI reaction, medium strong (R3), trace voids, cavities to 2" diameter most with infill, trace fossil casts to 3/8"x3/16", infill is moderate yellowish brown, (10YR 5/4), medium grained, weak (R2), voids up to 3/16" over 40% of infill	Driller's Remark: Soft rock 78.5-81.5' R4: 4 minutes
	81.5		_		Ħ		



PROJECT NUMBER:

33884.FL

BORING NUMBER:

B-19

SHEET 6 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723369.6 N, 458134.0 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, NQ tools, HW casing ORIENTATION: Vertical

CORING METHOD AND EQUIP	PMENT: CME 550 S/N 186073, mud rotary, NQ tools, HW	casing	ORIENTATION : Vertical
WATER LEVELS : 4.25 ft bgs o	n 5/22/07 START : 5/21/2007 END : 5/	23/2007 LOGGER : C. Wallestad	
	DISCONTINUITIES	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (f) CORE RUN LENGTH, AND RECOVERY (%) R Q D (%)	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- <u>0</u>	81.1' - Bedding plane or mechanical break,	Silt With Limestone Fragments (ML) 75.6-75.8' - moderate yellowish brown, (10YR 5/4), strong HCI reaction, compacted, carbonate Limestone	Driller's Remark: Lost 95% circulation at 81.5' - SC-1 collected at 81.5-82.8'
85 -43.7	84.2' - Mechanical break, horizontal, rough, undulating, associated with cavities, tight to 1" open	75.8-76.5' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCI reaction, medium strong (R3), voids to 1/8" over 10-20% of rock, trace fossil casts to 3/16"x1/8", no visible cavities	Driller's Remark: Soft rock at 83.5-85.0' -
-43.7 - - - 86.5		76.5-81.5' - moderate yellowish brown, (10YR 5/4), fine to medium grained, moderate to strong HCl reaction, weak (R2), very weak (R1)	R5: 7 minutes
- 0		at 78.6-78.9' and 81.1-81.3', voids to 1/16" over 15% of rock to 78.6' and over 40% rock below 78.6', trace fossil casts to 3/8" diameter, trace	Driller's Remark: 100% circulation lost at 86.5' - SC-2 collected at 87.5-
- R6-NQ - 5 ft 70 1 70%	88.5' - Fracture, 10 deg, rough, undulating, dark stain, tight	cavities to 3/8" x 1-9/16" increasing to cover 10-15% of rock at 80.4-81.1', trace dark laminations in very weak rock sections, dark fat clay layer 3/8" thick at 78.7'	88.55' Driller's Remark: Very soft at 88.5-90.0'
90 -48.7		81.5-86.5' - moderate yellowish brown, (10YR 5/4), fine grained, moderate to strong HCl reaction, weak to medium strong (R2 to R3),	
91.5 >11 - R7-NQ 9 2 - S5 ft 56% 9 2 -53.7 NF	91.5-91.9' - Fracture zone, rounded fragments to 1-1/2" diameter, compacted silts in zone 92.4' - Fracture, 60 deg, smooth, undulating, tight 92.55' - Fracture, 75 deg, smooth, undulating, tight 93.0' - Fracture, 30 deg, smooth, planar, tight 93.2-93.45' - Fracture zone, fragments to 1-1/2" x 1" 93.75' - Fracture, <10 deg, smooth,	voids to 1/8" over 10-20% of rock (decreasing in percent coverage with depth), cavities to 2" x 1-3/16" over 40% of rock at 83.5-84.5' (open cavities) otherwise trace cavities to 1-3/16" x 3/4" with light gray fine grained infill, fossil casts comprise most of cavities 86.5-90.0' - very pale orange grading to moderate yellowish brown with depth, (10YR 8/2 to 10YR 5/4), fine grained, moderate to strong HCI reaction, medium strong (R3), voids to 1/8" over 15-30% of rock, trace cavities to 1-3/16" x 3/8" at 89.8', trace fossil casts to 3/8" diameter, trace dark (possibly organic)	Driller's Remark: Very soft at 92.0-93.5' Driller's Remark: Soft at 94.5-95.5' R7: 6 minutes
96.5 >11	97.2' - Bedding plane, horizontal, smooth, undulating, tight to 1/4" open 97.5' - Bedding plane, horizontal, smooth, undulating, tight to 1/4" open 97.65' - Bedding plane, horizontal, smooth, undulating, tight to 1/4"open	inclusions No Recovery 90.0-91.5' Silt (ML) 91.5-91.9' - grayish orange, (10YR 7/4), very strong HCl reaction, compacted	Driller's Remark: Soft at 96.0-96.5' Driller's Remark: 99.5-100.0' only resistance in run R8: 3 minutes
101.5		<u> </u>	



PROJECT NUMBER:

338884.FL

B-19

SHEET 7 OF 10

ROCK CORE LOG

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723369.6 N, 458134.0 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing

WATER	LEVELS : 4.2	25 ft b	gs on	5/22/07 START : 5/21/2007 END : 5/	23/20	07 LOGGER : C. Wallestad	
≥∩≘	(9)			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - -	R9-NQ		3 >10	102.0' - Fracture, 60 deg, smooth, undulating, open (missing opposite face) 102.1' - Bedding plane, horizontal, smooth, undulating, open (missing opposite face) 102.4-102.8' - Fracture zone, fragments to 2" x 1-1/2"		Limestone 91.9-93.15' - pale yellowish brown, (10YR 6/2), fine grained, moderate HCI reaction, medium strong (R3), in cavity infill, medium grained infill: voids to 1/8" over 5-15% of rock, cavities to 2" diameter over 35-45%	SC-3 collected at 102.8- 104.0'
-0 105 -63.7 -	5 ft 100% 106.5	52	0 >10 >10	104.8' - Bedding plane or mechanical break, — horizontal, smooth, undulating, tight 105.1-105.8' - Fracture zone, fragments to 1" diameter 106.05' - Fracture, 50 deg, smooth,		 of rock, trace fossil casts to 3/16" diameter, cavity infill is grayish orange (10YR 7/4), medium grained, with voids to 3/16" over 25-30% of infill area 93.15-94.3' - moderate yellowish brown, (10YR 5/4), fine to medium grained, moderate to strong HCI 	Driller's Remark: Soft to 105.5'R9: 7 minutes
	R10-NQ 5 ft 85%	66	>10 2 0 1	undulating, tight to open 1/2" 106.3-106.5' - Fracture zone, fragments to 1/2" diameter 106.5-106.6' - Fracture zone, fragments to 1-1/2" diameter 107.2-107.55' - Fracture zone, fragments to 2" diameter		reaction, weak to very weak (R2 to R1), voids to 1/8" over 5-15% of rock, trace cavities to 9/16" diameter, with extremely weak (R0) infill, fossil casts to 3/16"x3/8" over 5-10% of rock No Recovery 94.3-96.5' Limestone 96.5-98.0' - very pale orange, (10YR 8/2), fine to medium grained, strong HCl reaction, weak to very weak (R1 to R2) in cavities, voids to 1/16" over 5-10% of rock, no visible cavities.	Driller's Remark: Fairly soft at 106.5-109.0'
-	111.5		NR	undulating, tight to 1/2" open 110.55' - Fracture, 60 deg, smooth, undulating, tight		fossil casts to 3/4" diameter over 10-15% of rock No Recovery 98.0-101.5' Limestone	R10: 5 minutes Driller's Remark: Soft at 111.0-111.5'
- - -	R11-NQ 5 ft 98%	98	1 0	112.0' - Bedding plane or mechanical break, horizontal, smooth, undulating, tight 113.05' - Bedding plane, horizontal, smooth, undulating, tight		101.5-106.5' - pale yellowish brown, (10YR 6/2), fine to medium grained, strong HCl reaction, weak to very weak (R2 to R1), voids to 1/16" over 10-15% of rock, no visible cavities, trace fossil casts and molds to 3/16" diameter	Driller's Remark: Soft at 112.0-116.5' - - -
115_ -73.7 -	116.5		1	114.75' - Bedding plane, horizontal, rough, undulating, tight 115.15' - Bedding plane, horizontal, smooth, undulating, tight 116.3' - Fracture, 45 deg, smooth, undulating,		106.5-107.55' - very pale orange, (10YR 8/2), fine to medium grained, strong HCl reaction, very weak (R1), trace voids to 1/16", elliptical fossil molds to 1/16" over 25-30% of rock, no visible cavities 107.55-110.75' - moderate yellowish	R11: 4 minutes -
-			0	tight 117.05' - Bedding plane, horizontal, rough, undulating, tight		brown, (10YR 5/4), fine to medium grained, moderate HCl reaction, very weak to weak (R1 to R2), voids to 1/8" over 15% of rock, trace fossil casts to 3/16" diameter, no visible	- - -
- 120 -78.7	R12-NG 5 ft 99%	78	3	118.6, 118.75, 118.9, 119.15, 119.55, 119.65, 119.95' - Bedding plane (7), horizontal, smooth, undulating, tight		- cavities No Recovery 110.75-111.5' - Limestone - 111.5-113.05' - Same as - 107.55-110.75' except trace cavities - to 3/4"-1-3/16" - 113.05-114.35' - Same as - 106.5-107.55' except trace fossil	- - - - R12: 6 minutes
_	121.5		0			molds to 3/16"x3/8" from 113.05-113.3'	



PROJECT NUMBER:

33884.FL

BORING NUMBER:

B-19

SHEET 8 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723369.6 N, 458134.0 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

				TENT . CIVIE 330 3/N 100073, ITIUG TOLATY, NQ 10015, FIV			
WATER	LEVELS: 4.2	25 ft b	gs on s	5/22/07 START : 5/21/2007 END : 9	5/23/20	07 LOGGER : C. Wallestad	
				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		m	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE COLOR	
ON PER	Z, Z, Z	<u> </u>	FRACTURES PER FOOT	BEGGIAI HOIV	<u></u>	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
AACH	E E E	(%) 🛭	ĮΣŏ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Ĭ	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
F 유 공	S S S S	Q	AC R F	PLANARITY, INFILLING MATERIAL AND	₽	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
필요리	8일뿐	ď	HH	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S S	CHARACTERISTICS	BROLO, TEOL REGOETO, ETC.
			NR)			Limestone	Driller's Remark: Soft at
-			6	121.9, 122.1, 122.25, 122.35, 122.4, 122.5' -	+	 114.35-115.5' - very pale orange, 	120.5-121.5'
I _				Bedding plane (6), horizontal, smooth, planar	\perp	(10YR 8/2), fine to medium grained,	Driller's Remark: Soft at
				to undulating, tight	\vdash	strong HCl reaction, very weak (R1),	122.0-123.0'
-			0			voids to 3/16" over 25% of rock, no	1 1
-					\bot	visible cavities, fossil casts and	1 -
	R13-NQ				\vdash	molds to 3/16"x9/16" over 0-10% of	
	5 ft 100%	89	0		1	 rock decreasing in coverage with depth 	1 1
-	100%				\pm	115.5-116.2' - pale yellowish brown	-
125			0	_	\bot	— with moderate yellowish brown	
-83.7			"		\vdash	mottling, (10YR 6/2 with 10YR 5/4),	
-					+	medium grained, strong HCl	R13: 6 minutes
-			0			 reaction, very weak to weak (R1 to 	SC-4 collected at 125.65-
	126.5				Ш	R2), voids to 1/8" over 15% of rock,	126.5'
1 7				126.6' - Bedding plane, horizontal, smooth,	1	fossil casts and molds to 3/8"	1
-			3	undulating, tight to 1/4" open	+	diameter over approximately 5% of	1
-				127.4' - Bedding plane, horizontal, smooth,	\perp	rock, no visible cavities 116.2-116.7' - Same as]
				planar to stepped, tight to 1/4" open	\vdash	_ 106.5-107.55' except trace fossil	
-			1	127.45' - Fracture, vertical, smooth,	11	casts and molds to 3/16"x3/8"	1
-	D44 NO			undulating, tight	+	116.5-117.3' - Same as	1 -
	R14-NQ 5 ft	45	10	127.5' - Bedding plane, horizontal, smooth,		_ 114.35-115.5' except cavities (fossil	
	77%	43	10	planar to stepped, tight to 1/4" open	\perp	casts) to 3/4" diameter over	
400	,•			129.2' - Fracture, 20 deg, smooth, undulating,	+	 approximately 30% of rock from 	Driller's Remark: Soft at
130			10	tight to 1/4" open	_	116.7-117.3'	129.5-130.0'
-88.7				129.4-129.55' - Fracture zone, fragments to		117.3-119.55' - grayish orange,	
1 7				1" diameter 129.55, 129.85' - Bedding plane (2),	\perp	(10YR 7/4), fine grained, weak (R2), trace voids to 1/16", no visible	R14: 5 minutes
-			NR	horizontal, smooth, planar to stepped, tight to	+	cavities, trace fossil casts and molds	Driller's Remark: Soft at
I -	131.5			1/4" open	\perp	to 3/16" diameter	130.5-131.0'
				129.9-130.0' - Fracture zone, fragments to	\vdash	119.55-120.3' - Same as	Stop coring for the day at
1 -			4	1/2" x 1-1/2", horizontal bedding planes	1	117.3-119.55' except increasing void	16:55 on 5/22/07
-				129.9, 130.0, 130.1, 130.25' - Bedding plane	+	 coverage to 5-20% of rock and 	Begin coring for the day at -
I _			1	(4), horizontal, smooth, planar to stepped,		increase in fossil coverage to 5-10%	07:52 on 5/23/07
			l .	tight to 1/4" open	\vdash	120.3-120.9' - Same as 115.5-116.2'	
-	R15-NQ			131.6, 131.7, 132.1' - Bedding plane (3),	1	except fossil coverage consistent	1 1
-	5 ft	54	10	horizontal, smooth, planar to undulating, tight 132.0' - Mechanical break	-	5-10% 120.9-121.45' - Same as	1 -
1 _	80%			133.3, 133.7' - Fracture or mechanical break	\perp	- 107.55-110.75'	l J
135			[(2), <10 deg, rough, undulating, tight	\vdash	No Recovery 121.45-121.5']
-93.7			2	133.9-134.0' - Fracture zone, fragments to 1"	+	Limestone	⊢
-			<u> </u>	diameter	$-\Box$	 121.5-122.25' - pale yellowish brown, 	D45: 0 minutes
			NR	133.9, 134.0' - Bedding plane (2), horizontal,		(10YR 6/2), fine grained, strong HCl	R15: 9 minutes
]	136.5		INE	smooth, planar to undulating, tight	+	reaction, medium strong (R3),	Driller's Remark: Hard
-	100.0			134.05' - Mechanical break or fracture,	\perp	interbedded with limestone that is the	except 136.0-136.5'
-			2	vertical, rough, undulating, tight	+	same as 107.55-110.75', no visible	1
			-	134.5' - Bedding plane, horizontal, smooth, planar to undulating, tight	\vdash	voids or fossils, cavities to 3/8" diameter with infill of 107.55-110.75'	
1 7				134.65' - Mechanical break or bedding plane,	1	material, laminations, possible	1
-			1	10 deg, smooth, undulating, tight to 1/2" open	+	bioturbation] -
_				136.65' - Fracture, 30 deg, smooth,	\perp	122.5-123.5' - very pale orange	l J
	R16-NQ			undulating, tight	\vdash	grading to moderate yellowish brown	
-	5 ft	68	1	136.8' - Fracture, 80 deg, smooth, undulating,	++	with depth, (10YR 8/2 to 10YR 5/4),	Driller's Remark: All fairly
-	89%		<u> </u>	tight	\perp	_ fine grained, strong HCl reaction,	hard this run (R16)
140			10	137.45' - Fracture or mechanical break, 60		very weak to weak (R1 to R2), voids	` ''
-98.7			10	deg, rough, undulating, associated with	\perp	to 1/16" over 0-15% of surface	7
-			1	cavities 138.15' - Fracture or mechanical break, 15	+	increasing in coverage with depth, no	R16: 9 minutes
-			1	deg, rough, undulating, associated with		visible cavities, trace fossil casts and molds to 3/16"x3/8"	1.10. 9 111110103
	141.5		NR	cavities, tight to 1/2" open	\perp	molds to 5/10 X5/0	
					T		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-19	SHEET	9	OF	10	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723369.6 N, 458134.0 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

CORING	INETHOD A	ND EC	JUIPIV	MENT: CME 550 S/N 1860/3, mud rotary, NQ tools, HW	Casin	ıy		ORIENTATION : Vertical
WATER	LEVELS: 4.2	25 ft b	gs on	5/22/07 START : 5/21/2007 END : 5/	23/20	007	LOGGER : C. Wallestad	
				DISCONTINUITIES	(n	Г	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		m	DESCRIPTION	SYMBOLIC LOG	Н	DOOK TYPE COLOR	1
EEL ON	Z, A, Y	<u></u>	FRACTURES PER FOOT	DESCRIPTION	<u></u>	ı	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
ATI	IN FIN	Q D (%)		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ	ı	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
T F F J	NS S	Ø	SAC FIRE	PLANARITY, INFILLING MATERIAL AND	Ĭ₩	ı	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
SE		ď	뜐뿝	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	ı	CHARACTERISTICS	Bitor o, reor neocero, ero.
				139.1' - Fracture or mechanical break, <10	ш	Т	123.5-124.0' - grayish orange, (10YR	
-			0	deg, rough, undulating, associated with	╁	╂	7/4), fine grained, strong HCl	-
-				cavity, tight to 1/4" open	₽	╊	reaction, very weak (R1), voids to	_
			1	139.6' - Fracture, horizontal, rough, undulating, dark stain, fracture associated	Ш	1	1/16" over 25% of rock, no visible cavities, trace fossil casts and molds	SC-5 collected at 142.7-
			'	with cavity, tight	Ъ	Ł	to 3/16"x1/8"	143.85'
-	R17-NQ			139.63' - Fracture, vertical, smooth,	┰	╁	126.5-127.4' - very pale orange to	-
-	5 ft	54	10	undulating, tight	\blacksquare	1	grayish orange, (10YR 8/2 to 10YR	-
I _	74%			139.65-139.9 - Fracture zone, associated	┢	Ł	7/4), fine to medium grained, strong	_
145			2	with cavities, fragments to 1" diameter	Н	1	HCl reaction, very weak to weak (R1	Driller's Remark: Soft at
-103.7				140.7' - Bedding plane, horizontal, smooth, — undulating, tight to 1/4" open	ш	1	to R2), voids to 3/16" over 15-25% of rock, no visible cavities, fossil casts	144.5-145.0' —
-				142.7' - Bedding plane, horizontal, smooth,	╁	╂	and molds to 3/16"x3/8" over 0-20%	R17: 7 minutes
_			NR	undulating, tight to 1/4" open	+	1	of rock (variable)	IX17. / IIIIIIules
	146.5			143.85-143.95' - Fracture zone, fragments to	Ш	1	127.4-127.7' - Same as	
1 7				1/2" diameter	\vdash	Ŧ	121.5-122.25'	1
-			10	143.9, 143.95, 144.0, 144.1, 144.3, 144.4,		†	127.7-129.6' - Same as 126.5-127.4' 129.6-130.35' - Same as	-
-			<u> </u>	144.85, 145.05' - Bedding plane (8), horizontal, smooth, undulating, tight to 1/4"	ш	╀	129.6-130.35° - Same as 121.5-122.25'	-
_			4	open	\vdash	╁	No Recovery 130.35-131.5'	
			-	146.6' - Bedding plane, horizontal, smooth,		1	Limestone	
-	R18-NQ			planar, tight	ш	1	131.5-131.7' - yellowish gray, (5Y	
-	5 ft	35	3	146.75-146.8' - Fracture zone, fragments to	+	╂	7/2), fine grained, moderate HCl	-
1 _	80%			1/2" x 1-1/2" 146.8' - Bedding plane, horizontal, smooth,		1	reaction, medium strong (R3), trace voids to 1/16", no visible cavities or	_
150			40	planar, tight	ш	1	fossils	Driller's Remark: Soft at
-108.7			10	147.0' - Fracture, 70 deg, smooth, undulating,	┰	Т	131.7-134.35' - moderate yellowish	149.5-151.5' —
-				tight		1	brown, (10YR 5/4), fine to medium	R18: 7 minutes
-			NR	147.4' - Fracture, 70-80 deg, smooth,	₩	╀	grained, moderate HCl reaction,	-
	151.5			undulating, tight ☐ 147.5' - Bedding plane, 10 deg, smooth, ☐	Ь	L	extremely weak to medium strong	
				undulating, tight	1	Ш	(R0 to R3), voids to 1/16" over 5-15% of rock, no visible cavities,	Driller's Remark: 5/23/07 at
-				147.7' - Fracture, 70-80 deg, smooth,	1		fossil casts to 3/4"x3/8" (trace), trace	09:00, total depth at 151.5' -
-				undulating, tight	┨	\mathbb{H}	laminations	-
_				148.0' - Fracture, 70-80 deg, smooth,	4		134.35-134.5' - Same as	
				undulating, tight	ı	П	131.5-131.7'	Driller's Remark: 5/23/07 at
				148.4' - Bedding plane, horizontal, smooth, planar, tight	1	П	134.5-135.5' - pale yellowish brown, (10YR 6/2), fine to medium grained,	14:40, water level is 3.25' -
-				148.8' - Fracture, 75 deg, smooth, undulating,	1	H	moderate HCl reaction, weak (R2),	-
-				tight	-		voids to 1/8" over 15-25% of rock, no	-
				149.0' - Fracture, 50 deg, smooth, undulating,	1	Ц	visible cavities, fossil casts to	
				tight	1		9/16"x3/16"	
1 -				149.2' - Fracture, 75 deg, rough, undulating, tight	1		No Recovery 135.5-136.5' Limestone	1
-				149.5' - Bedding plane, horizontal, rough,	1	\mathbb{H}	136.5-139.9' - yellowish gray with	-
_				undulating, tight to 1/4" open	1		light olive gray mottling, (5Y 8/1 with	_
				150.25-150.5' - Fracture zone, fragments to	ı	П	5Y 6/1), fine grained, moderate to	
1 7				2" diameter	1		strong HCl reaction, medium strong	1
-					1	$ \cdot $	(R3), voids to 1/16" over 5-10% of	-
-					4		rock, fossil casts to 3/4" diameter over 5-10% of rock, cavities to 2-3/4"	-
							x 1-9/16" over 5% of rock, some with	
					1		coating of dark mineral with sulfur	1
-				•	1		scent (possibly pyrite), most cavities	-
-					1	\mathbb{F}	with infill that is grayish orange with	-
_				_	1	Ш	voids to 1/8" over 30-40% of infill	
					1		area	
1 7					1			1
-					1	\vdash		-
					1			
					1	ı		



WATER LEVELS: 4.25 ft bgs on 5/22/07

PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-19	SHEET	10	OF	10	

ROCK CORE LOG

LOGGER : C. Wallestad

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723369.6 N, 458134.0 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

END: 5/23/2007

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing START: 5/21/2007

>00	<u> </u>			DISCONTINUITIES	Ŋ	LITHOLOGY	COMMENTS
AND N (ft)	Ä AND ≪ (%		ES	DESCRIPTION] Š	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
						139.9-140.95' - yellowish gray, (5Y 7/2), fine grained, moderate HCI reaction, medium strong (R3), trace voids to 1/8", no visible cavities, trace fossil casts to 3/16"x3/8" No Recovery 140.95-141.5' Limestone 141.5-143.85' - pale yellowish brown, (10YR 6/2), fine to medium grained, moderate HCI reaction, medium strong (R3), voids to 1/16" over 0-20% of rock, one cavity 1-9/16" in diameter at 142.8' with medium to coarse grained infill, trace fossil casts to 1"x3/16", banding of fine to medium grained rock throughout 143.85-145.2' - moderate yellowish brown, (10YR 5/4), medium grained, moderate HCI reaction, weak (R2), voids to 1/8" over 30-40% of rock, trace fossil casts to 3/16"x3/8", no visible cavities No Recovery 145.2-146.5' Limestone 146.5-147.5' - Same as 141.5-143.85' except trace fossil casts to 3/16" diameter No Recovery 150.5-151.5' Bottom of Boring at 151.5 ft bgs on 5/23/2007	



PROJECT NUMBER:	BORING NUMBER:		
338884 FI	B-20	QUEET	1 OF 0

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723468.6 N, 458221.5 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit

WATER	LEVELS	: 0 ft bgs	on 5/30/0)7 S	START : 5/30/2007 END : 6/3/2007 LOGGER	R : J.	Burkard
				STANDARD	SOIL DESCRIPTION	ر ن	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	OOU NAME LIGOO OPCUE STATEST OOLOT	SYMBOLIC LOG	DEDTIL OF CACING COURSE DATE
4 BE ACE ATIO		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	O L K	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	≺MB	INSTRUMENTATION
<u> </u>	0.0			(N)	No Recovery 0.0-2.0'	S	13:45 Start drilling
-	0.0				-	1	- 10.40 Oldir drilling
-		0.0	SS-1	1 (1/24")	-	ł	Surface consists of grassy wetland material
-				(,	-	ł	that is 100% saturated.
-	2.0					┢	-
-					-	ł	-
-					-	1	-
-					-	1	-
-					-	1	-
5	5.0				-	1	-
35.4	5.0				Silty Sand (SM)		Lean clay at bottom of split spoon sample
-		1.1	SS-2	3-4-6	5.0-6.1' - light olive gray, (5Y 5/2), wet, loose, 14% low plastic fines, very fine to fine silica sand		-
-	6.5			(10)	plastic files, very file to file silica sand		-
-	0.0				-	1	_
-					-	1	1
-					-	1	1
-					-	1]
-					_	1	
-					-	1	_
10	10.0				-	1	_
30.4					Silty Sand (SM)		
		0.8	SS-3	0-0-1 (1)	10.0-10.75' - light olive gray, (5Y 5/2), wet, very loose, 14% low plastic fines, organics in last 1" of sample,		
	11.5			(-)	very fine to fine silica sand		
l _					_		
l .					_		_
l .					_	1	_
-					<u>-</u>	1	_
-					<u>-</u>	1	_
15	15.0				CHA/MIL)	 	_
25.4				5-6-5	Silt (ML) 15.0-16.1' - grayish yellow, (5Y 8/4), wet, soft, nonplastic, rapid dilatancy, moderate to strong HCl	4	_
-		1.1	SS-4	(11)	nonplastic, rapid dilatancy, moderate to strong HCl reaction, all carbonate	Ш	_
-	16.5				reaction, all carponate	-	_
-					-	1	-
-					-	1	-
-					-	1	-
-					-	1	-
-					-	1	-
-					-	1	-
20						\vdash	_



PROJECT NUMBER:	BORING NUMBER:			
338884 FI	B-20	CHEET	2 OF	0

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723468.6 N, 458221.5 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

WATER	LEVELS	: 0 ft bgs	on 5/30/0)7 5	START : 5/30/2007 END : 6/3/2007 LOGG	ER :	J. l	Burkard
				STANDARD	SOIL DESCRIPTION	\Box	G	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
TH BE		RECOVE			MOISTURE CONTENT, RELATIVE DENSITY OR	-	BOLI	DRILLING FLUID LOSS, TESTS, AND
DEPT SURF ELEV			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	1	SYM	INSTRUMENTATION
20.4	20.0				Silt (ML)	\neg	П	
-		1.1	SS-5	5-6-13 (19)	20.0-21.1' - Same as 15.0-16.1' except very stiff	-11		_
	21.5			(1-7)		1		_
_						4		_
-						4		-
-						+		-
-						+		-
-						\exists		-
25	25.0					1		-
15.4	20.0				Silt (ML)	\neg	П	
		1.2	SS-6	14-15-10 (25)	25.0-26.2' - dusky yellow, (5Y 6/4), some mottling, wet, very stiff, nonplastic, rapid dilatancy, moderate to			
-	26.5			. ,	strong HCl reaction, all carbonate	╱╣╵	ш	_
-						4		-
-						+		-
-						\exists		-
-						+		-
-						1		-
30	30.0					1		_
10.4				3-2-10	Silt With Sand (ML) 30.0-31.4' - dusky yellow, (5Y 6/4), wet, stiff,	1		
-		1.4	SS-7	(12)	nonplastic, rapid dilatancy, moderate HCl reaction, 25% fine to coarse sand-sized, 2" organic lens at top	\parallel		-
_	31.5				of sample, all carbonate	/ #	Ш	-
-						+		-
-						+		-
-						1		-
-						1		-
]		
35 5.4	35.0			4= == :-	Cilé Miéh Cond /MI)	4	П	
0.4	35.8	0.8	SS-8	15-50/3 (65/9")	Silt With Sand (ML) 35.0-35.75' - yellowish gray, (5Y 7/2), moist, hard,			-
-					nonplastic, rapid dilatancy, mild to moderate HCl reaction, 20-25% fine to medium sand-sized, all	Æ		-
-					carbonate	1		-
1 -						1		-
1 -						1		_
]		
-						4		-
-						+		-
40						+		
1								



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-20	SHEET	3	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723468.6 N, 458221.5 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit

ORIENTATION · Vertical

DRILLIN	DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical						
WATER	LEVELS	: 0 ft bgs	on 5/30/0)7 5	START : 5/30/2007 END : 6/3/2007 LOGGER : J. Burkard		
				STANDARD	SOIL DESCRIPTION g COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION		
L BE		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND		
JRF/			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		
<u> </u>	40.0			(N)	Silt With Sand (ML)		
0.4	40.0		00.0	20-18-22	40.0-41.5' - yellowish gray, (5Y 7/2), moist, hard, low -		
-		1.5	SS-9	(40)	plasticity, rapid dilatancy, moderate to strong HCl reaction, 15-20% fine to coarse sand-sized, all		
-	41.5				carbonate		
-					1		
-					-		
-					-		
-					-		
-					-		
-					-		
45 -4.6	45.0			41-50/1	Silt With Sand (ML)		
"-	45.6	0.6	SS-10	(100")	45.0-45.6' - dusky yellow, (5Y 6/4), moist, hard, low		
-					\ \ plasticity, rapid dilatancy, moderate to strong HCl \ \ \ reaction, 20% fine to coarse sand-sized, one 1/8" \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \		
-					\limestone lens, thin organic layer, all carbonate \[-		
-					-		
-					-		
-					-		
-					-		
-					-		
	50.0				-		
50 -9.6	50.0				Sandy Silt (ML)		
-		0.9	SS-11	24-33-50/4.5	50.0-51.4' - moderate yellowish brown, (10YR 5/4), moist, hard, low plasticity, rapid dilatancy, moderate to		
-	51.4			(83/10.5)	strong HCl reaction, 25-30% fine to coarse		
					sand-sized, trace organics, all carbonate		
-							
					1		
					1		
1					1		
55	55.0				1		
-14.6	55.3	0.3	SS-12	50/3	Silt With Sand (ML)		
1				(50/3")	\ 55.0-55.3' - moderate yellowish brown, (10YR 5/4), wet, hard, low plasticity, rapid dilatancy, moderate to		
1					\strong HCl reaction, 20% fine to coarse sand-sized, \text{trace organics, all carbonate}		
1					trace organics, all carbonate End drilling for the day 05/30/07		
]					1		
]					1		
]		
]		
]		
60_							



PROJECT NUMBER:

338884.FL

B-20

SHEET 4 OF 9

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723468.6 N, 458221.5 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 0 ft bgs	on 5/30/0)7	START : 5/30/2007 END : 6/3/2007 LOGGE	R:	Burkard	
				STANDARD	SOIL DESCRIPTION	Ţ	COMMEN	TS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,		DEPTH OF CASING, D	RILLING RATE.
TH B		RECOVE		6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	9	DRILLING FLUID LOSS INSTRUMENT	S, TESTS, AND
SUR			#TYPE	6"-6"-6" (N)		1		
-19.6 -	60.0 60.8	0.6	SS-13	32-50/4 (82/10")	Silt With Sand (ML) _ 60.0-60.6' - Same as 55.0-55.3'		05/31/07 Start drilling at 0	7:35 -
-	00.0			(02/10/)		1		-
-						┨		-
-						1		-
						1		_
-						1		-
-						1		-
65	65.0					┨		-
-24.6	65.0 65.2	0.0	SS-14	50/2	No Recovery 65.0-65.2'	‡	Driller's Remark: Rock at	64.5'
				(50/2")		1		-
-						1		-
-						-		-
-						+		-
-						1		-
-						1		-
]		_
70 <u> </u>	70.0				Silty Gravel (GM)	_		_
-		1.2	SS-15	55-25-12	70.0-71.2' - dusky yellow, (5Y 6/4), moist to wet, dense, mild to moderate HCl reaction, fine to coarse	-[]		-
-			00 10	(37)	sand-sized, 31% low plastic fines, 40% fine to coarse \sim	₽.		-
					gravel-sized limestone, all carbonate Begin Rock Coring at 71.5 ft bgs	1		-
-					See the next sheet for the rock core log	1		-
-						┨		-
-						1		-
-						1		-
75					_	1		_
-34.6						1		_
-						+		-
-						┨		-
-						1		-
						1		-
-						1		-
-						+		-
						+		-
80						†		
1						1		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-20	SHEET	5	OF	9	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723468.6 N, 458221.5 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 0 f	t bgs	on 5/3	0/07 START: 5/30/2007 END: 6/3	3/200	7 LOGGER : J. Burkard	
				DISCONTINUITIES	υ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-	71.5 R1A-NG 1.5 ft 88% 73.0		0 NR	- -		Silt (ML) 71.5-72.3' - yellowish gray, (5Y 7/2), moist, soft, loose, moderate HCl reaction No Recovery 72.3-75.2'	13:45 Start drilling on 05/31/07 - Driller's Remark: Broke drill rod (outer) 1.5' of core sample in outer rod R1A: 11 minutes
75_ -34.6	R1B-NQ 3.5 ft 37%		NR	- - - 75.4' - Joint, 10 deg, rough, undulating		Limestone 75.2-76.5' - pale olive, (10Y 6/2),	10:55 Start drilling on 06/01/07 – R1B: 3 minutes
-	76.5		0	75.6, 76.1' - Mechanical break (2), <75 deg -		medium grained, moderate HCI reaction, medium strong to strong (R3 to R4), 1/16-1/8" voids over	- 11:30 Driller's Remark:
-			0	76.9, 77.2, 77.6, 77.9, 78.0, 78.2' - Mechanical break (6), 50-90 deg 77.5' - Joint, >5 deg, rough, undulating		- 25-40% of surface, fossil casts and molds 76.5-79.3' - light olive gray, (5Y 5/2),	Drillers run out of water -
-	R2-NQ	16	0	78.5-78.9' - Fracture zone, 50-90 deg		medium grained, moderate to strong HCl reaction, medium strong (R3), 1/16" voids over 20-40% of surface, fossil casts and molds	-
80 -39.6	5 ft 56%	10	NR			- No Recovery 79.3-81.5'	
-	81.5			-			R2: 8 minutes
-			>10	81.5-82.2' - Fracture zone, 60-70 deg, rough, non-planar, fragments from 3/4-3" -		Limestone - 81.5-85.6' - light olive gray (5Y 5/2) - from 81.5-82.7', dusky yellow (5Y - 6/4) from 82.7-85.2', light olive gray	-
-	R3-NQ		0	82.7, 83.2' - Mechanical break (2)		6/4) if off occ. 7-63.2, light off occ gray - (5Y 5/2) from 85.2-85.6', mild HCl reaction, medium strong (R3), small (1/16-1/8") voids over 30-40% of	-
- 85	5 ft 82%	50	0	83.9, 84.9' - Mechanical break (2)		 surface, several large surface cavities up to 1/2" in diameter, organic stains and thin lenses 	- -
-44.6 -			0	85.4' - Mechanical break		throughout section No Recovery 85.6-86.5'	R3: 4 minutes
-	86.5		NR 0	<u>.</u>		Limestone - 86.5-91.1' - light olive gray, (5Y 6/1),]
-			0	- 88.0' - Mechanical break		medium to fine grained, moderate to strong HCl reaction, medium strong (R3), small (1/16-1/8") voids over	SC-1 collected at 88.0-
-	R4-NQ 5 ft 92%	78	0	-		25-30% of surface, highly fossiliferous with molds and casts 1/4-3/4" comprising up to 30% of rock	89.0' -
90 -49.6 -			<10	89.9-90.3' - Fracture zone, 1/2"-1-1/2" fragments, highly fossiliferous, large cavities and molds 90.9' - Mechanical break			R4: 6 minutes
	91.5		NR			No Recovery 91.1-91.5'	



PROJECT NUMBER:

33884.FL

B-20

SHEET 6 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723468.6 N, 458221.5 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

				IENT : Dietrich D-50 5/N 252, Midd rotary, NQ tools, HV			ORIENTATION : Vertical
WATER	LEVELS: 0 f	t bgs o	on 5/3	0/07 START : 5/30/2007 END : 6/	3/200	7 LOGGER : J. Burkard	
>	<u> </u>			DISCONTINUITIES	U	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표시한	N. Y.	(9)	교		윽	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
FAF	E R STE	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	<u>8</u>	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
	ORI	Ø	ER E	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ΙŽ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
Оωш	OIR	ď	ш а	THICKNESS, SON ACE STAINING, AND HOTTINESS	S	CHARACTERISTICS	
					ш	Limestone	
-			0	92.0-92.7' - Fracture zone, fragments 1/2-1"	1	- 91.5-92.8' - Same as 76.5-79.3'	1
-				in diameter, few >1-1/2", highly fossiliferous		-	-
-			0	30-40% cavities/fossil molds	ш	 92.8-93.9' - light olive gray, (5Y 5/2), 	SC-2 collected at 92.8-
					Н	fine grained, moderate to strong HCl	93.8'
-	R5-NQ			93.6' - Joint, >5 deg, smooth, undulating		reaction, medium strong to strong	1
-	5 ft	40	2	93.8' - Joint, 10-20 deg, rough, undulating,		(R3 to R4), trace voids on surface	1 -
-	68%			calcareous silt		Calcareous Silt (ML)	-
95_			0	94.6-94.7' - Mechanical break or fracture	Ш	\93.9-94.0'	
-54.6				zone	Н	Limestone _ 94.0-94.9' - dusky yellow, (5Y 6/4),	
-			NR			medium grained, strong HCl	R5: 5 minutes
-			' ' ' '		ш	reaction, medium strong to strong	-
	96.5				H	_ (R3 to R4)	
				96.7-98.2' - Fracture zone, many large		No Recovery 94.9-96.5'	
-			0	fragments 3-4" with numerous smaller	1Ш	Limestone	1 7
-				fragments 1/2-1" in diameter, larger	Н	96.5-98.7' - dusky yellow to light olive gray, (5Y 6/4 to 5Y 5/2), medium	-
-				fragments exhibit high angle (60-70 deg)		gray, (31 6/4 to 31 5/2), medium grained, moderate to strong HCl	_
			0	fracture surfaces, many in conjugate pairs,	ш	reaction, weak to medium strong (R2	
	R6-NQ			rough and semi-planar	т	to R3), 1/16-1/8" voids over 25-40%	1
-	5 ft	0		-		 of surface, cavities/fossil molds 	-
-	46%				Н	1/8-3/4" in diameter over 10-20% of	-
100				_	Ы	surface, 5-10% cavities are infilled — with secondary material, fossil molds	
-59.6			NR			and casts	
-					₩	No Recovery 98.7-101.5'	R6: 3 minutes
-					╆	-	-
-	101.5				\bot		-
			1	101.6' - Fracture, 45 deg, rough, undulating	Н	Limestone	
			L .	to non-planar		 101.5-102.3' - yellowish gray, (5Y 7/2), fine grained, strong HCl 	1
-				101.9' - Fracture, 60 deg, rough, undulating to semi-planar, intersecting	Н	reaction, very strong (R5), trace	1
-				102.0' - Parting surface, horizontal	+	 surface voids 	-
I _				- 102.0 1 draing danago, nonzona	Ш	No Recovery 102.3-108.0'	_
	R7-NQ	_			\vdash		
_	5 ft 16%	0		-	╁	=	1 7
-	1070		NR		ш	=	-
105				_	\vdash		_
-64.6							
1 7				·	Ш		R7: 4 minutes
-	400 5			•	+	_	-
-	106.5				世	-	Driller's Remark: Driller
					Щ	_	noted a void space for
			NR		H		106.5'
1 7				-			1
-			0	108.0' - Fracture or mechanical break,	Ш	_ Limestone	-
-			U	horizontal, rough, undulating	HH	- 108.0-109.2' - dusky yellow, (5Y 6/4),	-
	R8-NQ 5 ft	10	0			medium grained, strong HCI	
	24%	10	"	108.5-109.2' - Fracture zone, fragments	\mathbb{H}	reaction, weak to medium strong (R2]
440				1/2-1" with single fragment 3", irregular	HH	- to R3), 1/16-1/8" voids over 20-30%	-
110_ -69.6				fracture surface, 3" fragment exhibits near		of surface No Recovery 109.2-111.5'	-
-08.0			NR	vertical fracture surfaces	Ш	- NGCOVERY 103.2-111.3	
			' '		H		R8: 2 minutes
-	111 5			-	口	-	1
	111.5				╂╫┤		
					1		



PROJECT NUMBER:

33884.FL

B-20

SHEET 7 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723468.6 N, 458221.5 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

00.1			<u> </u>	PENT . Dietiich D-30 3/N 232, mud totaly, NQ tools, HVV	000	•	ORIENTATION : Vertical
WATER	LEVELS: 0 f	t bgs o	on 5/3		3/200		
>	<u> </u>			DISCONTINUITIES	_O	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
照光호	N. Y.	(9)	滿는		윽	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
I ∓≅ ₹	E R OVE	(%) Q	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOI	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
989	ECE	Ø	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
Δош	0 1 12	22	шФ		S		
			-10	111.5-112.2' - Fracture zone, 3/4"-1-1/2"	Н	Limestone	1
_			<10	fragments	т	 111.5-112.8' - dusky yellow, (5Y 6/4), moderate HCl reaction, very weak 	1 1
-				112.2, 112.4' - Fractures or mechanical break (2), 10-15 deg, rough, undulating to		(R1), 1/16-1/8" voids over 25% of	1 1
l -			1	semi-planar	╀╨┤	- surface	1 -
I _				112.6' - Fracture, horizontal, rough, planar,	Ш	_ 112.8-114.6' - grayish yellow, (5Y]
	R9-NQ			open	Н	8/4), medium grained, extremely	1
-	5 ft 62%	25	0	112.65' - Mechanical break, non-planar, irregular	1	 strong HCl reaction, very weak (R1), 1/16-1/8" voids over 20% of surface. 	1 1
l	02 /6			112.9, 113.1, 113.2, 113.7, 114.4' - Fractures	-Ш	cavities/fossil molds and casts	1 -
115_				(5), horizontal, rough, undulating	╀┤	— 1/8-1/2" in diameter over 5-10% of	1 -
-74.6					$m{H}$	surface	l
			NR		ш	No Recovery 114.6-116.5'	R9: 2 minutes
-	116 E				\top	-	1
-	116.5				丗	Limestone	SC-3 collected at 116.5-
l -			0		₽₩	- 116.5-118.1' - Same as 112.8-114.6'	117.5'
_					Н	_	
I -				117.5, 118.1' - Fractures (2), horizontal,	\Box		1
I -			0	rough, undulating, open	╁┼	- 118.1-120.0' - pale greenish yellow,	1 1
l -	R10-NQ			118.4' - Fracture, 60 deg, non-planar	╂	(10Y 8/2), medium to fine grained,	1 -
l _	5 ft	60	0	118.5' - Fracture, 5 deg, smooth, planar	\Box	extremely strong HCl reaction, very	-
	96%			118.9' - Fracture, 15 deg, rough, undulating	Н	weak (R1)	1
120				119.0' - Fracture, 15 deg, rough, undulating 119.1' - Fracture, vertical, irregular, tight	Ш		1
-79.6			<10	119.2' - Fracture, Vertical, irregular, light	╂┼┤	 120.0-121.3' - Same as 118.1-120.0'	
l -				119.7' - Fracture or mechanical break,	╀┤	 except extremely weak to weak (R0 	R10: 1 minute
I -			4	horizontal, rough, undulating	ш	_ to R2)	K10. Tillilide
	121.5		NR	120.0-121.3' - Fracture zone, very soft,	Н	- No Recovery 121.3-121.5']
			igcup	friable, 1-4" with rough, undulating, irregular fracture surfaces		Limestone	1
-			0	naotaro carracco	╁┼	121.5-122.5' - dusky yellow, (5Y 6/4),	1 1
-				122.5-126.4' - Fracture zone, fragments 1-4",	$\pm \Box$	 medium to fine grained, moderate to 	1
l -			>10	rough, undulating, irregular fracture surfaces,	\blacksquare	strong HCl reaction, weak to medium strong (R2 to R3), fossil casts and	1 -
				vertical fractures intersected by irregular,	Н	molds 1/2-1" in diameter over	
	R11-NQ			non-planar, low angle fracture, non-planar	ш	10-15% of surface, trace voids	1
-	5 ft 98%	43	0		╁┼┤	122.5-123.5' - dusky yellow, (5Y 6/4),	1 1
l -	90%				╂╨┨	- medium grained, strong HCI	1 -
125			3	_	\blacksquare	reaction, very weak (R1), trace voids 123.5-124.0' - Same as 121.5-122.5'	I
-84.6					\mathbb{H}	except no fossil molds and casts]
Ι -			F .			124.0-126.4' - dusky yellow, (5Y 6/4),	R11: 4 minutes
-	106 E		5		ТЩ	medium grained, strong HCl	1
-	126.5		NR	l	+	reaction, weak (R2), fossil casts and	-
-			0	126.65' - Fracture, horizontal, rough	\Box	molds up to 1/2" in diameter over 5-10% of surface, 1/16-1/8" voids	-
			Ĺ	127.1' - Fracture, 15 deg, semi-planar to	Н	_ over 15-25% of surface	
			<10	undulating	Ш	No Recovery 126.4-126.5'	1
-				127.1-128.0' - Fracture zone, fragments 3/4-2", bedding plane	+	Limestone (5)(0(4)	1
-	R12-NQ			c , bodding plane	╫	 126.5-128.0' - dusky yellow, (5Y 6/4), medium to fine grained, strong HCI 	-
-	5 ft	8			Ш	reaction, extremely weak to very	-
	30%				Н	weak (R0 to R1), fossil casts and	
130			NR			molds, 1/16-1/8" voids over 50-70%	1
-89.6				_	Ш	— of surface	-
-					+	No Recovery 128.0-131.5'	R12: 4 minutes
-						<u>-</u>	1.12. 4 IIIIIutes
	131.5				Ш		
					⊥ I		<u> </u>
_	_						

APPENDIX 2BB-571 Rev. 7



PROJECT NUMBER:

33884.FL

B-20

SHEET 8 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723468.6 N, 458221.5 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

CORING	NETHOD A	ND EC	JUIPIV	IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	casin	<u>y</u>	ORIENTATION : Vertical
WATER	LEVELS: 0 f	t bgs o	on 5/3	0/07 START : 5/30/2007 END : 6/3	3/200	7 LOGGER : J. Burkard	
≥∩≘	_ (9			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP SUR ELE	COR	a Q	FRA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-			0	131.5-132.0' - Disaggregated material 132.0' - Bedding plane, horizontal, smooth, planar		Silt (ML) 131.5-132.0' - yellowish gray, (5Y 7/2), strong HCl reaction, with limestone fragments	Finish drilling for the day at 17:30 on 06/01/07 - Start drilling at 07:55 on 06/03/07
-			0	132.3, 132.6, 132.9' - Fractures or mechanical break (3), rough, undulating to non-planar -	崫	Limestone 132.0-133.7' - dusky yellow, (5Y 6/4),	-
-	R13-NQ 5 ft 60%	22	<10	133.5' - Bedding plane, 10 deg, smooth, planar	Ħ	medium to fine grained, strong HCI reaction, weak to medium strong (R2 to R3)	-
135_ -94.6_			NR	133.6-134.4' - Fracture zone, fragments - range from 1/2-2"		133.7-134.5' - dusky yellow, (5Y 6/4), — medium grained, moderate HCl reaction, extremely weak (R0),	
-	136.5			-	Ħ	1/16-1/8" voids over 50% of surface No Recovery 134.5-136.5'	R13: 3 minutes
_ _ _			0	136.5, 136.6, 136.9, 137.1' - Fractures (4), 0-15 deg, rough, undulating to semi-planar 137.2' - fine grained limestone, no voids		Limestone - 136.5-137.2' - Same as 133.7-134.5' except very weak (R1)	-
_			0	137.3' - Fracture, 45 deg, rough to stepped, non-planar - 137.5, 138.4, 138.7, 139.0' - Fractures or _	H	137.2-139.0' - light olive gray, (5Y - 6/1), fine grained, moderate to strong HCI reaction, strong to very strong	-
_	R14-NQ 5 ft 86%	40	0	mechanical break (4), 0-10 deg, rough, undulating to semi-planar 139.0-140.8' - Fractures, rough, undulating to		(R4 to R5), trace 1/16" voids across surface, cavities/fossil molds up to 3/4" in diameter over 5% of rock	-
140 -99.6			<10	semi-planar, spaced 1-2" apart with zones of rock fragments ranging from 3/4"-1-1/2", dark — black/brown staining on some fracture		concentrated in 1-2" zones (up to 30%), numerous fossil casts and molds 139.0-140.8' - yellowish gray, (5Y	_
-	141.5		NR	surfaces (more prevalent with depth)	H	7/2), medium to fine grained, strong HCl reaction, weak to medium strong (R2 to R3), dark brown/black staining	R14: 7 minutes
-			1	141.7' - Fracture, horizontal, rough, undulating 142.2' - Bedding plane, 5 deg, smooth, planar	H	on fracture, 1/16-1/8" voids over 10% of surface	SC-4 collected at 142.2-
_			0			No Recovery 140.8-141.5' Limestone 141.5-141.7' - yellowish gray, (5Y	143.1'
_	R15-NQ 5 ft 70%	50	2	143.7' - voids 143.7, 143.8, 143.9' - Fractures (3), horizontal, rough, undulating	H	7/2), fine grained, strong HCI reaction, strong (R4), trace cavities on surface	
14 <u>5</u> -104.6			1	144.2' - Mechanical break, rough to stepped, undulating to non-planar	H	141.7-141.8' - Same as 141.5-141.7' except voids 141.8-143.6' - Same as 141.5-141.7'	_
_	146.5		NR	144.5, 144.7, 145.0' - Fractures or mechanical break (3), horizontal, rough, undulating		143.6-145.0' - moderate yellowish brown, (10YR 5/4), medium grained, mild HCI reaction, very weak to weak	R15: 7 minutes
_			0	145.1' - Bedding plane, horizontal, smooth, planar 146.6, 146.7, 146.75, 147.0, 147.2, 147.3,	H	 (R1 to R2), 1/16" voids over up to 50% of surface, cavities/fossil molds up to 1/2" in diameter over <5% of 	
_			1	147.6' - Fractures (7), 0-5 deg, rough, undulating, bedding plane partings	H	rock No Recovery 145.0-146.5' Limestone	11:30 Driller's Remark: Drillers run out of water, go to refill water tank
-	R16-NQ 5 ft 100%	67	0	- -		146.5-147.3' - moderate yellowish brown, (10YR 5/4), medium grained, mild to strong HCl reaction, very	13:30 Driller's Remark: Refill drill with water SC-5 collected at 147.9-
150 -109.6			0	- — 150.2' - Fracture, 70 deg, rough, undulating,		weak (R1), finely laminated, wavy bedding planes, 1/16" voids over 10-20% of surface, one 1" surface	148.8'
_	151.5		0	mostly planar 150.8' - voids		- cavity -	R16: 4 minutes
_							



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-20	SHEET	9	OF	9	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723468.6 N, 458221.5 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	TER LEVELS : 0 ft bgs on 5/30/07		on 5/30	START : 5/30/2007 END : 6/3/2		/200	LOGGER : J. Burkard				
≥0≎	(%			DISCONTINUITIES		ည	LITHOLOGY	COMMENTS			
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION		SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,			
H BE	E RU STH, OVEF	R Q D (%)	FOOT	DEPTH, TYPE, ORIENTATION, ROUG	HNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD			
SUR!	CORI	3 Q L	FRAC	PLANARITY, INFILLING MATERIAL THICKNESS, SURFACE STAINING, AND	. AND TIGHTNESS	SYME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.			
2378	714	-		\ 151.0, 151.2, 151.25' - Fractures (3)		9)	147.3-150.8' - light olive gray, (5Y	09:00 Finish drilling on			
-				rough, undulating, bedding plane pair	rtings / -		-\ 5/2), fine grained, moderate to strong	06/03/07			
1 -					-		HCl reaction, strong (R4), trace fossil molds and casts 1/2" on surface	11:30 Driller's Remark:			
					_		- \ 150.8-151.5' - moderate yellowish brown, (10YR 5/4), medium grained,	Drillers run out of water, go - to refill water tank			
					-		mild HCl reaction, very weak to weak	13:30 Driller's Remark:			
1 1					-		 (R1 to R2), 1/8-3/16" voids over 50% of surface 	Refill with water -			
					-		Bottom of Boring at 151.5 ft bgs on	_			
1 1											
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PROJECT NUMBER:	BORING NUMBER:	
338884.FL	B-21	SHEET 1 OF 8

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723224.9 N, 458119.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLING	G METH	DD AND	EQUIPME	ENT : CME 75 S/N	I 252437, mud rotary, auto hammer, NW rods, 4-7/8" drag bit and	4-7/8	3" tri-cone bit ORIENTATION : Vertical
WATER	LEVELS	: 3.5 ft bo	s on 6/03	3/07 S		R : C.	Dellaria, P. De Sa'rego
≥□⊋1				STANDARD PENETRATION	SOIL DESCRIPTION	چ ا	COMMENTS
SAMPLE INTERVAL (ft) RECOVERY (ft) #TYPE 6"-6"-6" (N)					SOIL NAME, USCS GROUP SYMBOL, COLOR,	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
TH E		RECOVE	#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	1BOI	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			#IYPE	(N)			
41.8 - -	0.0	1.5	SS-1	0-2-3 (5)	Top Soil 0.0-0.5' - brownish black, (5YR 2/1), moist, organic roots Poorly Graded Sand (SP)	71/2	Split spoon sampling begins at 15:13 Driller's Remark: Spade bit used to 15.0' -
-	1.5				0.5-1.5' - light gray, (N7), moist, loose, very fine to fine grained, 5% fines, nonplastic, organics decreasing with depth, sand is silica		- - - - -
5 36.8	5.0				Cillus Cound (CNA)	10.10	_
30.0	6.5	0.7	SS-2	1-2-1 (3)	Silty Sand (SM) 5.0-5.7' - moderate brown to pale yellowish brown, (5YR 4/4 to 10YR 6/2), moist, very loose, very fine to fine grained, 20% fines, low plasticity, sand is silica		- - -
10_	10.0				- - - -		- - - -
31.8	11.5	0.8	SS-3	3-16-10 (26)	Limestone Fragments 10.0-10.3' - pale yellowish brown, (10YR 6/2), strong HCl reaction, angular limestone rock fragments to 3/8" Silt (ML)		- - -
-					10.3-10.8' - grayish orange, (10YR 7/4), wet, very stiff, nonplastic, very rapid dilatancy, moderate HCl reaction, limestone fragments in shoe, all carbonate derived		Driller's Remark: Switch to 4-7/8" roller cone
					-	-]
					-	-	-
15 <u> </u>	15.0	0.0	CC 4	30-50/3	Limestone Fragments		-
	15.8	8.0	SS-4	(80/9")	\ 15.0-15.3' - Same as 10.0-10.3' except fragments up	Ш	-
					Silt With Sand (ML) 15.3-15.75' - very pale orange, (10YR 8/2), moist,]
-					hard, nonplastic, very rapid dilatancy, moderate to strong HCl reaction, 20% fine grained sand, all	-	-
-					carbonate derived	+	-
					-	1	1
					-	1	_
]					_		
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PROJECT NUMBER:

338884.FL

B-21

SHEET 2 OF 8

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723224.9 N, 458119.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 75 S/N 252437, mud rotary, auto hammer, NW rods, 4-7/8" drag bit and 4-7/8" tri-cone bit ORIENTATION: Vertical

,						auto hammer, NW rods, 4			
WAIER	LEVELS	: 3.5 ft bo	gs on 6/03		START : 5/30/2007	END: 6/4/2007 SOIL DESCRIPTION	LOGGEF	(: C.	Dellaria, P. De Sa'rego COMMENTS
≥Q⊋	CAMPIT	INTERVA	1 (6)	STANDARD PENETRATION		JOIL DESCRIPTION		90	COIVIIVIEN 13
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE		` ,	TEST RESULTS	SOIL NAME.	USCS GROUP SYMBOL,	. COLOR.	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H B		RECOVE			MOISTURE C	CONTENT, RELATIVE DEI	NSITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND
LEV SUBPL			#TYPE	6"-6"-6" (N)	CONSISTENCY	Y, SOIL STRUCTURE, MIN	NERALOGY	SYM	INSTRUMENTATION
21.8	20.0			(1.4)	Silty Sand With	Limestone Fragments ((SM)	ΗÏ	End drilling on 5/30/07
-		1.3	SS-5	36-30-8	20.0-21.25' - very	y pale orange, (10YR 8/2	2), moist, -		Begin drilling on 5/31/07 at 07:45
-	04.5	1.0	000	(38)	_ plasticity, modera	arse grained, 37% fines ate HCI reaction, 30% fir	ne _		_
-	21.5				\ gravel-sized lime	stone fragments, all car	bonate /-	ł	-
-					\derived			ł	-
-							-	ł	-
-							-	1	-
-							-	ł	-
-							-	l	-
-	05.0						-	ł	-
25 16.8	25.0				Silt With Sand (N	VIL)		Ш	Driller's Remark: Harder material at 34.5',
-		0.9	SS-6	15-22-18	25.0-25.9' - grayi	sh orange, (10YR 7/4), i	moist, hard, -	l	drill chatter -
-	00.5	0.5	00-0	(40)	trace% gravei, no to strong HCl rea	onplastic, rapid dilatancy action, 15% fine to media	/, moderate um grained /=	1	-
-	26.5				\sand, trace fine g	grained gravel, all carbor	nate derived / -	ł	-
-							-	•	-
-							-	ı	-
-							-	l	-
-							-	l	-
-							-	1	-
30	30.0						-	1	-
11.8	30.0				Silt With Sand (N			Ш	
-		1.0	SS-7	10-19-20	30.0-31.0' - Same	e as 25.0-25.9'	-	1111	_
_	31.5			(39)			-	T'''	_
_	01.0						_		
_							_		_
_							-	1	1
-							-	1	1
-							-	1	1
-							-	1	1
35	35.0						-	1	1
6.8	35.2	0.2	SS-8	50/2	Limestone Fragr			Н	Driller's Remark: Hard material
-				(50/2")	35.0-35.2' - pale y	yellowish brown, (10YR ng HCl reaction, angular	6/2), r fragments to	1	Casing set to 35.0'
-					1/4"			1	1
							-	1]
]							-	1	
							-	1	
							-	1]
1 7							-]
							_		
40				_				L	
				<u> </u>					



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	R-21	SHEET	3	OF	Ω	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723224.9 N, 458119.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 75 S/N 252437, mud rotary, auto hammer, NW rods, 4-7/8" drag bit and 4-7/8" tri-cone bit

ORIENTATION: Vertical

WATER LEVELS: 3.5 ft bgs on 6/03/07 START: 5/30/2007 END: 6/4/2007 LOGGER: C. Dellaria, P. De Sa'rego									
					START : 5/30/2007	END : 6/4/2007	LOGGEF	(: C.	
≥□⊋	OAMBLE INTESTATION			STANDARD PENETRATION		SOIL DESCRIPTION E, USCS GROUP SYMBOL, COLOI		SYMBOLIC LOG	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)			TEST RESULTS	SOIL NAMI		OLOB		DEPTH OF CASING, DRILLING RATE,
A A C E		RECOVERY (ft)			MOISTURE	MOISTURE CONTENT, RELATIVE DENSITY	ITY OR	2 2	DRILLING FLUID LOSS, TESTS, AND
EV,			#TYPE	6"-6"-6"	CONSISTEN	CY, SOIL STRUCTURE, MINE	RALOGY	YME	INSTRUMENTATION
1.8	40.0			(N)	Silt (ML)			S	
1.0	40.0			21-21-21	40.0-41.4' - pal	le yellowish brown, (10YR 6/	2), moist, -		-
I _		1.4	SS-9	(42)	hard, nonplastic	c. rapid dilatancy, moderate	to strona]	_
	41.5			. ,	HCl reaction, 1	0-15% fine to medium grain	ed sand, all	Ш	
					Carbonate denv	veu		1	_
_							-	1	-
-							-	1	-
-							-	•	-
-							=		_
_							_		-
_							-		_
45	45.0		<u> </u>					L	
-3.2		0.8	SS-10	61-50/3	Silty Sand Witl	h Limestone Fragments (SI	M)		End drilling on 5/31/07
]	45.8			(111/9")		le yellowish brown, (10YR 6/ e to coarse grained, 35% fin		Ш	Begin drilling on 6/1/07 at 07:30
_					\ plasticity, mode	erate HCI reaction, 15% fine		1	_
-					\grained gravel,	, all carbonate derived		1	-
-							_	1	-
-							-	•	-
_							-		-
_							_		_
							_		_
50	50.0						-	1	-
-8.2					Sandy Silt Witl	h Limestone Fragments (M	L)	Ш	
-		1.2	SS-11	1-2-50/4		le yellowish brown, (10YR 6/		 	-
-	51.3			(52/10")	to moderate HC	ic to low plasticity, rapid dilat CI reaction, 30% fine to coar	ancy, mila se grained	Ш	-
-						grained gravel, all carbonat			_
_									-
_							_		_
							_		_
							-	1	-
-							-		-
							-		-
55 <u> </u>	55.0	-	-		Sandy Silt With	h Limestone Fragments (M	L)		
-			00.46	19-31-39	55.0-56.4' - pal	le yellowish brown, (10YR 6/	 moist, - 		-
-		1.4	SS-12	(70)	hard, low plasti	icity, rapid dilatancy, 35% fin	e to coarse		-
-	56.5					aminated black organic laye to coarse gravel-sized limes		Ш	_
_					\fragments in la	ist 0.25', mild to moderate H			_
					\in all materials	(except organics)			
]							-		
-							-	1	-
-							-		-
-							-	l	-
-							-		-
60									



PROJECT NUMBER:	BORING NUMBER:	
338884.FL	B-21	SHEET 4 OF 8

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723224.9 N, 458119.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLIN	DRILLING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, auto hammer, NW rods, 4-7/8" drag bit and 4-7/8" tri-cone bit ORIENTATION : Vertical									
WATER	LEVELS	: 3.5 ft b	gs on 6/03	3/07 S	TART : 5/30/2007 END : 6/4/2007 LOGGER :	: C.	Dellaria, P. De Sa'rego			
				STANDARD	SOIL DESCRIPTION	g	COMMENTS			
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		SYMBOLIC LOG				
HSE		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	OLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND			
PTF JRF/ EVA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	/WB	INSTRUMENTATION			
				(N)		်				
-18.2	60.0			19-35-28	Silty Sand (SM) 60.0-61.2' - pale yellowish brown, (10YR 6/2), moist,		Driller's Remark: Harder material at 62.0- 63.0' -			
_		1.2	SS-13	(63)	hard, medium plasticity, rapid dilatancy, moderate to		_			
_	61.5			` ,	mild HCl reaction, limestone from 60.0-60.7' and 61.1-61.2', elastic silt lens from 60.7-61.1' (dark	11.1				
					yellowish brown [10YR 4/2]), all carbonate derived					
					1					
					1		_			
65	65.0				1		_			
-23.2	65.3	0.3	SS-14	50/4	¬ =	Ш				
-				(50/4")	65.0-65.3' - moderate yellowish brown, (10YR 5/4), moderate HCl reaction, 60% of sample is fine to]			
-					coarse grained limestone gravel, 40% is carbonate		-			
-					derived sandy silt similar to previous samples		-			
-					1		-			
-					1		-			
-					1		-			
-					1		-			
-					1		-			
70 -	70.0				1		-			
70 <u> </u>	70.0				Sandy Silt (ML)	ш	_			
-		0.8	SS-15	17-6-9	√ 70.0-70.4' - pale yellowish brown, (10YR 6/2), moist, √	Ш	-			
-	74.5	0.0	00 10	(15)	hard, low plasticity, rapid dilatancy, moderate HCl reaction, 25-30% fine to coarse grained sand, all		-			
-	71.5				carbonate derived		-			
-					Limestone Fragments 70.4-70.8' - pale yellowish brown, (10YR 6/2), mild to		-			
-					moderate HCl reaction, fine to coarse grained angular		-			
-					limestone rock fragments, trace organics		-			
-					-		-			
-					-1		-			
-							-			
75 <u> </u>	75				Limestone Fragments And Silty Sand (SM)	HH	-			
-55.2			00.45	21-2-3	75.0-76.5' - Same as 70.0-70.8' except limestone		-			
-		1.5	SS-16	(5)	fragments from coarse sand to coarse gravel mixed with carbonate derived silts and sands		_ Driller's Remark: 100% water loss			
-	76.5				Begin Rock Coring at 75.0 ft bgs	Ш	75.0-76.5' at 6 blow count level, very soft			
-					See the next sheet for the rock core log		\material			
-					1		_			
-					1		_			
_					4		_			
-					4		_			
-					1		_			
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-21

SHEET 5 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723224.9 N, 458119.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, NQ tools, HW casing

CORING	NILTHOD A	ND L	ZOIFIV	IENT: CME 75 S/N 252437, mud rotary, NQ tools, HW c	asiriy		ORIENTATION : Vertical
WATER	LEVELS: 3.5	ft bg	s on 6	/03/07 START : 5/30/2007 END : 6/4	4/200	LOGGER : C. Dellaria, P. De Sa'ı	rego
	<u> </u>			DISCONTINUITIES	(J	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
BRA	Er, A	(%	FRACTURES PER FOOT		일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H A L	# # 50 9 GFF	Q D (%)	FCT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BO	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
E SUB		S. O	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-33.2					, o,	No Recovery 75.0-77.0'	
-55.2					1	- No Recovery 75.0-77.0	
	R1-NQ 2 ft	0	NR			_	
	0%	U	INIX		П		R1: Run time not recorded
-	77.0			-	1	=	1 1
-	77.0			77.0-77.3' - Fracture zone, limestone rock	Н	Limestone	1 1
-			>10	fragments from 3/4"-1.5"	\Box	 77.0-78.75' - pale yellowish brown, 	1 -
_				77.5-78.5' - Fracture zone, limestone rock	Н	(10YR 6/2), fine to medium grained,	_
			>10	fragments from 3/4"-1.5"	Ш	mild HCl reaction, weak (R2), voids – (3/16") over 15-20% of rock surface,	
			10	78.55-78.75' - Fracture, vertical, rough,	Н	trace cavities up to 9/16"x3/8"	
-	R2-NQ			undulating, moderately tight		No Recovery 78.75-82.0'	1 1
-	5 ft	35		-	Н	-	1
-38.2	35%				ш	_	
			NR	-	\square	<u>-</u>	-
					Н	_	
					ш		R2: 9 minutes
-	82.0			-	Н	=	1 1
-	02.0			82.0-82.4' - Fracture zone, limestone rock		_ Limestone	1
-			>10	fragments from 3/4"-1.5"	Н	- 82.0-85.2' - Same as 77.0-78.75'	1 -
_				82.75-82.9' - Fracture zone, limestone rock	ш	except moderate yellowish brown,	
			0	fragments from 3/4"-2"	Н	(10YR 5/4), 5-10% partially infilled - cavities 3/4" x 1-3/16"	
			"	83.1, 83.7, 84.15' - Mechanical break (3)		Cavilles 5/4 X 1-5/10	
-	R3-NQ			-	ш	=	1
	5 ft	51	2	84.35-84.5' - Fracture, 30 deg, rough,	ш	_	1
85 <u> </u>	64%		0	undulating, open 84.4-84.45' - Fracture, 30 deg, rough,	Н	_	Driller's Remark: Casing —
				undulating, open	ш	No Recovery 85.2-87.0'	advanced to 85.0'
I _					Ш	_	Driller's Remark: Using
			NR		Ш		polymer EZ mud (not bentonite quick gel)
	87.0			_	Ш		R3: 18 minutes
-	07.0			87-88' - Fracture zone, limestone rock	Н	_ Limestone	Drilling ends on 6/01/2007,
-			>10	fragments from 3/4"-2"	口	 87.0-89.9' - pale yellowish brown, 	no drilling on 6/02/07 due -
-				99 0 99 21 Frantura 60 des	H	(10YR 6/2), fine grained, moderate HCl reaction, medium strong (R3),	to rain Drilling begins on 6/03/07
_			1	88.0-88.2' - Fracture, 60 deg, rough, undulating, open		- small voids (1/16"-1/8") over 5-15%	at 07:35
			Ľ.		Н	of rock surface increasing with depth.	SC-1 collected at 88.0-
]	R4-NQ			00 0 00 41	Ш	At 87.0-88.0': 25% cavities/casts up	89.1'
90	5 ft 58%	25	2	89.3-89.4' - Fracture, 60 deg, rough,	\mathbb{H}	 to 1" x 1-3/16", highly fossiliferous. At 88.0-89.9 trace cavities up to 	Driller's Remark: – Circulation loss at 89.0'
-48.2	JO /0			89.7' - Fracture, horizontal, rough, undulating,		3/4"x3/8", partially infilled with	
-				open -	₽₽	 recrystalized carbonate, some with]
-			NR		Ш	black staining, moderate HCI	15, 40
					П	reaction - 88.0-89.9' - voids (1/16"-1/8") over	R4: 18 minutes
	92.0				Ш	5-15% of rock surface (increasing	1
				92.0-93.0' - Fracture zone, limestone rock	П	with depth)	1
-			>10	fragments from 1/2"-3/4"	H	No Recovery 89.9-92.0' Limestone	-
-			\vdash	-	口	92.0-93.0' - pale yellowish brown,]
-			1	93.25' - Fracture, horizontal, rough,	₽₩	_ (10YR 6/2), fine grained, moderate]]
			·	undulating, open	Ш	HCl reaction, medium strong (R3),	l J
	R5-NQ		2	94.0' - Fracture, 60 deg, rough, undulating,	\mathbb{H}	cavities (1" x 1-3/16") over 25% of rock surface, highly fossiliferous	1
95	5 ft 44%	15		open -		_ Took surface, riigriiy lossiiiicrous	1
95_	77.70				╅╫		
$\overline{}$							



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-21	SHEET	6	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723224.9 N, 458119.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, NQ tools, HW casing

CONING	IVIL IT IOD AI	ND L	ZOIFIV	IENT: CME 75 S/N 252437, mud rotary, NQ tools, HW c	asiriy		ORIENTATION : Vertical
WATER	LEVELS: 3.5	ft bg	s on 6	/03/07 START : 5/30/2007 END : 6/4	1/2007	ZOUNT LOGGER: C. Dellaria, P. De Sa'r	ego
300	<u> </u>			DISCONTINUITIES	(J	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		Ś	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표 등 등	N 4 8	(%	FRACTURES PER FOOT		일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H A T A	(GT) (ST) (ST) (ST) (ST) (ST) (ST) (ST) (S	(%) Q	CT.	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BO	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING RATE AND
		o ×	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	\ } 	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-53.2	014			94.1' - Fracture, horizontal, rough, undulating,	9,	93.0-93.2' - pale yellowish brown,	Driller's Remark: No
_			NR	open -		- (10YR 6/2), fine grained, medium	circulation -
_			' ' '	· .	Н	strong (R3), voids over 0-3% of rock	
					ш	surface, no cavities - 93.2-94.2' - voids (1/16-1/8") over	R5: 22 minutes
1 7	97.0				Н	5-15% of rock surface (increasing	_
-	07.0			97.0-97.1' - Fracture zone, limestone rock		with depth), trace cavities up to	-
-			>10	fragments from 3/4"-1.5"	Ш	- 3/4"x3/8", partially infilled with	-
-				97.8-97.95' - Fracture zone, limestone rock -	\Box	recrystallized carbonate, some with black staining, moderate HCl	-
-			2	fragments from 1/2"-1"	Н	- reaction	_
			-	98.4-98.5' - Fracture or mechanical break, 30 deg, rough, stepped -		No Recovery 94.2-97.0'	_
	R6-NQ	00		98.75' - Fracture, <10 deg, rough, undulating,	Ш	Limestone 97.0-99.05' - Same as 88.0-88.9'	
100	5 ft 41%	23		open	Ш	except cavities 1-3/16" x 2" infilled]
-58.2	11/3			_	口	with fine grained material, voids over	-
-			NR	-		 3% of rock surface, medium light gray (N6) to grayish orange (10YR 	Driller's Remark: Cavity at
-				-	ш	7/4) infilling increases with depth	100.5-104.0'
-				_	Н	from 5% at 97.0' to 40% at 99.05'	R6: 21 minutes
	102.0			_	H	No Recovery 99.05-102.0'	_
						No Recovery 102.0-104.0'	
				_	Ш	- Cavity	
-			NR	-	Ш	_	_
-				-	\square	_	-
-	R7-NQ		0	-	Ш	Limestone	-
-	5 ft	0		-	ш	- 104.0-104.1' - Same as 88.0-88.9'	_
105_	2%					except no infilling, voids over 10% of	
-63.2			ND		Н	rock surface, no cavities No Recovery 104.1-107.0'	
			NR			No Recovery 104.1-107.0	
-				_	Ш	_	R7: 4 minutes
-	407.0			-	ш	_	-
-	107.0			- 107.0-107.3' - Fracture zone	$\vdash\vdash\vdash$	_ Limestone	-
-			>10	-		- 107.0-107.3' - pale yellowish brown,	_
-				107.6' - Fracture or mechanical break, 45 deg, rough, undulating, open	Ш	(10YR 6/2), fine grained, weak to	_
_			2	107.85' - Fracture or mechanical break,	Ш	medium strong (R2 to R3), voids over 10% of rock surface, 10%	
				horizontal, rough, undulating, 2 inch open	$\vdash\vdash$	cavities 3/16"-3/4"	
	R8-NQ	00		108.0' - Fracture or mechanical break, 45 deg, rough, undulating, open .	H	107.3-109.25' - pale yellowish brown,	
110	5 ft 74%	23	>10	108.4' - Fracture or mechanical break,	H	 (10YR 6/2), fine grained, weak to medium strong (R2 to R3), voids]
-68.2	'''		_10	horizontal, rough, undulating, open	囯	over 10% of rock surface, no cavities	_
-			>10	108.5' - Fracture or mechanical break, 45 deg, rough, undulating, open		 109.25-110.7' - pale yellowish brown, 	-
-				109.25-110.7' - Fracture zone, 60 deg and 80	口	(10YR 6/2), fine grained, weak to medium strong (R2 to R3), voids	R8: 15 minutes
-			NR	deg, limestone rock fragments from 3/4"-2"	Н	over 10% of rock surface, 10%	_
_	112.0			_	Щ	cavities 3/16"-3/4"	Driller's Remark: Water level at 3.5'
			>10	112.25,112.3' - Fracture (2), horizontal,	Н	No Recovery 110.7-112.0' Limestone	Driller's Remark: Hole
1 7			- 10	rough, undulating, open		112.0-112.85' - pale yellowish brown,	collapse, advanced NW
				112.4-113.0' - Fracture zone, limestone rock	HH	(10YR 6/2), fine to medium grained,	casing to 106.0', end - drilling on 6/03/07 at 17:00
-			>10	fragments from 1"-1.5" 113.55' - Fracture, 60 deg, rough, planar,	口	_ mild HCl reaction, weak (R2), voids (1/16") over 5-10% of rock surface,	Driller's Remark:
-	R9-NQ			open, black staining	H	no visible cavities	Circulation loss at 113.0', -
-	5 ft	22	1	113.7-114.0' - Fracture zone, limestone rock	口	_	drilling soft, not like a cavity
115	55%			fragments from 1.5"-3"	Ш		
					Ш		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-21

SHEET 7 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723224.9 N, 458119.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, NQ tools, HW casing

COMING	INICITIODAI	ND LC	ZUIFIV	IENT: CME 75 S/N 252437, mud rotary, NQ tools, HW c	asiriy		ORIENTATION : Vertical
WATER	LEVELS: 3.5	ft bgs	s on 6	/03/07 START : 5/30/2007 END : 6/-	4/2007	7 LOGGER : C. Dellaria, P. De Sa'ı	rego
	_			DISCONTINUITIES	(1)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE COLOR	
	N.Y.Y.	(9)	FRACTURES PER FOOT	DECORAL HON	잌	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
I ∃ ¥ ₹	L TES	Q D (%)	F.G.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOL	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
989		Ø	RA(PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	∑ ≻	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	075	<u>~</u>	шФ		S		
-73.2				114.2' - Fracture, horizontal, rough,	Н	112.85-113.45' - Same as	Drilling resumes on 6/04/07 at 07:20
-			NR	undulating, open 114.5' - Mechanical break	Ш	 112.0-112.85' except pale yellowish brown, (10YR 7/4), trace cavities up 	at 07:20
-			INIX	114.0 Wediamodi break	Н	to 3/8"x3/8"	R9: 15 minutes
-					╀┤	 113.45-114.75' - medium gray to 	-
l -	117.0				Ш	grayish orange, (N5 to 10YR 7/4),	-
			,	117.1' - Fracture, horizontal, rough,	Н	cavities (up to 3/8") over less than 5% of rock surface	
-			4	undulating, open	Ш	No Recovery 114.75-117.0'	Driller's Remark: Soft
-			3	117.5' - Fracture, horizontal, rough, undulating, open	ш	Limestone	zones at 117.5-118.5,
-			3	117.9-117.9' - Fracture, horizontal and 60	H	 117.0-117.7' - medium gray, (N5), 	119.0-120.0'
-				deg, rough, undulating, open	口	fine to medium grained, mild HCl	
	R10-NQ			118.1' - Fracture, 45 deg, rough, undulating,	ш	reaction, weak to medium strong (R2 to R3), voids (up to 3/16") over 10%	
120	5 ft 31%	8		open	Н	of rock surface, trace cavities up to] 1
-78.2	01/0		NR	118.3, 118.4' - Fractures (2), horizontal, rough, undulating, open	口	 3/8"	-
-			INEX	Tought, and alating, open	╀┤	_ 117.7-118.55' - Same as	-
I -					ш	112.0-112.85' No Recovery 118.55-122.0'	
					Н	NO Recovery 116.55-122.0	R10: 10 minutes
I -	122.0				뻐] 1
-	122.0			122.0-122.15' - Fracture zone	Ш	_ Limestone	Driller's Remark:
-			>10		Н	 122.0-123.1' - grayish orange, (10YR 	Numerous 3"-6" soft zones -
-				122.85' - Fracture, horizontal, rough,		7/4), fine to medium grained, mild	in R11 _
l _				undulating, open	Ш	HCl reaction, weak (R2), voids (up to 1/16") over 10% of rock surface,]
				123.0' - Mechanical break	Ш	trace cavities up to 3/8"x3/16"	1
1 -	R11-NQ			•	Ш	No Recovery 123.1-127.0'	1 1
	5 ft	14			Н	-	-
125_ -83.2	22%		NR	_	ш	_	
-03.2					Н	=	
1							Driller's Remark: Cavity from 125.5-128'
-					Н		R11: 6 minutes
-	407.0				ш	-	-
-	127.0			127.0-127.45' - Fracture zone	\Box	Limestone	Driller's Remark: Several
-			>10		HH	 127.0-127.1' - pale yellowish brown, 	soft zones, probably not
I -				127.6' - Fracture, horizontal, rough,	Ш	(10YR 6/2), fine to medium grained,	cavities
1			2	undulating, open 127.8' - Mechanical break	Н	mild HCl reaction, weak (R2), voids]
1 -				127.6 - Mechanical break 128.0-128.1' - Fracture, horizontal, rough,	口	 (1/16") over 5-10% of rock surface 127.1-128.35' - grayish orange, 	1
-	l R12-NQ			undulating, open	╁┼┤	(10YR 7/4), fine to medium grained,	-
-	5 ft	7		128.3' - Mechanical break	Ш	 mild HCl reaction, weak (R2), voids 	-
130_	27%			_	口	(up to 1/16") over 10% of rock	
-88.2			NR	130.3' - Mechanical break	Н	surface, trace cavities up to – 3/8"x3/16"	
I -				130.3 - McGhailleal bleak	ш	No Recovery 128.35-132.0'	1
I -					H	<u>.</u>	R12: 12 minutes
-					口	-	-
1 -	132.0				₽₽		-
I -			1	132.2' - Mechanical break	Ш	Limestone - 132.0-132.6' - grayish orange to pale]
				132.4' - Fracture, horizontal, rough,		yellowish brown, (10YR 7/4 to 10YR]
1 -				undulating, open	₽₩	6/2), fine to medium grained, mild	1
-					ш	HCl reaction, weak to medium strong	Driller's Remark: Cavities
-	D40 NO			-	$\vdash\vdash$	(R2 to R3), voids (1/16") over 15% of rock surface, cavities (3/8"x1/16")	from 133.5-135.0' and
-	R13-NQ 5 ft	8				over 5-10%	135.5-136.0'
135	12%	3	NR		Ш	No Recovery 132.6-137.0'	
					П		
					_		•



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-21

SHEET 8 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723224.9 N, 458119.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT: CME 75 S/N 252437, mud rotary, NQ tools, HW casing

LEVELS: 3.5	ft bg	s on 6/	03/07 START : 5/30/2007 END : 6/	4/200	LOGGER : C. Dellaria, P. De Sa'r	rego
_			DISCONTINUITIES	(2)	LITHOLOGY	COMMENTS
CORE RUN, LENGTH, AND RECOVERY (%	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LO	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
137.0 R14-NQ 5 ft 92% 142.0 R15-NQ 5 ft 66%	44 48	>10 1 4 >10 0 NR >10 0 NR 1 2 >10 0 NR 1 2 >10 0 NR	137.0-137.15' - Fracture zone, limestone rock fragments up to 1" 137.5' - Fracture, <10 deg, smooth, undulating, open 3/4" likely due to large cavity 138.7-138.95' - Fracture, 60 deg, rough, undulating, open 138.75, 139.15, 140.4' - Mechanical break (3) 139.05, 139.4, 139.8' - Fractures (3), 15 deg, rough, undulating, open 139.9-140.8' - Fracture zone 142.0-142.15' - Fracture zone, fragments up to 1" 142.7' - Fracture, horizontal, rough, undulating, open 146.5, 146.7' - Fracture (2), horizontal, rough, undulating, open 147.0-147.1' - Fracture, horizontal, rough, undulating, open 147.5-147.85' - Fracture zone, limestone rock fragments from 1/2"-1" 149.15' - Fracture, horizontal, rough, undulating, open 149.3-149.6' - Fractures or mechanical break, 30 deg and 20 deg, smooth, planar, open 150.2-150.6' - Fracture zone, limestone rock fragments from 3/4"-1.5"		Limestone 137.0-138.8' - medium light gray, (N6), fine grained, strong HCI reaction, medium strong to strong (R3 to R4), trace voids (to 3/16") over rock surface, 15% cavities up to 1/4"x3/16" partly infilled with yellowish gray (5Y 7/2) mottling around cavities (similar to 132.0-132.6'), fossiliferous, some cavities extend through core 138.8-140.9' - very pale orange to medium light gray, (10YR 8/2 to N6), from 140.6-140.9', cavities (up to 3/16") over 20% of rock surface (same as 137.0-138.8'). 140.9-141.2' - cavities absent (same as 137.0-138.8'). 141.2-141.6' - pale yellowish brown, (10YR 6/2), fine grained, mild HCI reaction, medium strong (R3), trace voids (1/16") over surface of rock, no visible cavities No Recovery 141.6-142.0' Limestone 142.0-142.6' - pale yellowish brown to grayish orange, (10YR 6/2 to 10YR 7/4), fine to medium grained, moderate to strong HCI reaction, voids (up to 1/16") over 10% of rock surface, trace cavities up to 3/8"x1/16" 142.6-143.65' - light brownish gray, (5YR 6/1), fine grained, moderate to strong HCI reaction, trace voids (up to 1/16") over rock surface No Recovery 143.65-145.5' Limestone 145.5-147.0' - Same as 132.0-132.6' except weak (R2), coarse gravel, voids (up to 1/16") over 20% of rock surface 147.0-147.85' - pale yellowish brown, (10YR 6/2), fine to medium grained, moderate to strong HCI reaction, weak to medium strong (R2 to R3), voids (up to 1/16") over 15% of rock surface, cavities up to 1/16" diameter 150.2-151.3' - Same as 147.0-147.85' except light gray, (N7), medium strong (R3), trace voids, trace cavities up to 1/16" diameter 150.2-151.3' - Same as 147.0-147.85' except pale yellowish brown, (10YR 6/2), weak to medium strong (R3), trace voids, trace cavities up to 1/16" diameter 150.2-151.3' - Same as 147.0-147.85' except pale yellowish brown, (12 to R3), voids (up to 1/16") over 15% of rock surface, cavities	R13: 9 minutes R14: 30 minutes SC-2 collected at 142.8-143.65' Driller's Remark: Possible cavity from 143.5-145.5' Light drill chatter to heavy drill chatter R15: 19 minutes R16: 33 minutes
					(3/16"x3/4") over 15-20%	
	137.0 CORE RUN 137.0 R14-NQ 5 ft 92% 142.0 S ft 86%	137.0 R14-NQ 5 ft 92% 142.0 R15-NQ 5 ft 666% 147.0 R16-NQ 3 33	137.0 CORE ROW (%)	DISCONTINUITIES DESCRIPTION	DISCONTINUITIES DESCRIPTION DESCRIPTIO	DESCRIPTION DESCRIPTION



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-21	SHEET	9	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723224.9 N, 458119.4 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

WATER	LEVELS : 3.5	ft bgs	s on 6/	/03/07 START: 5/30/2007 END: 6/	4/2 <u>00</u>	7 LOGGER : C. Dellaria, P. De Sa'r	rego		
				DISCONTINUITIES		LITHOLOGY	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,		
H BE ATIC	E RU STH, J	QD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LK	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND		
JEPT SURF	SORE	A D	RAC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YME	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.		
поп	014	Ω.	шп	,	S	No Recovery 151.3-152.0'			
-					-	Bottom of Boring at 152.0 ft bgs on	-		
-					-	_ 6/4/2007	-		
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-22	SHEET	1	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723410.3 N, 458287.4 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS	: 1.61 ft k	ogs on 6/	14/07	START : 5/19/2007
				STANDARD	SOIL DESCRIPTION COMMENTS
AND (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	ğ
A BEI		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6"	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
□ io iii 40.5	0.0			(N)	σ σ Boring drilled in wetlands area
	0.0	0.7	SS-1	0-0-1	0 to 0.7' - dusky brown, (5YR 2/2), wet, very soft
-		0.7	33-1	(1)	- Water level is based on Ground Water
-	1.5				- Monitoring at LNP site (FSAR Table
-					2.4.12.08)" Water levels not recorded during drilling
-					- · · · · · · · · · · · · · · · ·
-					
_					
-					1 1
5	5.0				1 1
35.5	0.0				Poorly Graded Sand (SP)
-		0.9	SS-2	4-3-5 (8)	5.0-5.9' - moderate brown to grayish orange pink, (5YR 4/4 to 5YR 7/2), mottled, wet, loose, fine
	6.5			(0)	grained, trace non-plastic fines, grading into clayey \sand (SC) with 30% low to medium plasticity fines
					Sand (SC) with 30% low to medium plasticity lines
]
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_					_
_					-
10 30.5	10.0				5/19/07, 15:00, set 6" casing to 9.5' Silt (ML)
30.5			00.0	3-4-7	10.0-11.0' - grayish orange, (10YR 7/4), wet, stiff, very -
-		1.0	SS-3	(11)	rapid dilatancy, strong HCl reaction, trace sand, carbonate, sands are fine to grained
-	11.5				
-					
-					- 1
-					
-					-
-					
15	15.0				
25.5	10.0				Silt (ML)
-		1.2	SS-4	13-13-10	15.0-16.2' - very pale orange, (10YR 8/2), wet, very stiff, 10 to 15% sand, very rapid dilatancy, strong HCI
_	16.5			(23)	├ reaction, carbonate, 10-15% fine gravel-sized
					\limestone fragments \/ -
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-22	SHEET	2	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723410.3 N, 458287.4 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS	: 1.61 ft k	ogs on 6/	14/07 S	START : 5/19/2007 END : 5/21/2007 LOGGER : R. Gomez
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
표일은		RECOVE	ERY (ft)	120111200210	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTH			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
E S E				(N)	
20.5	20.0			18-5-4	Silt With Sand (ML) 20.0-20.8' - very pale orange, (10YR 8/2), wet, stiff, 15
_		0.8	SS-5	(9)	∖ to 20% sand, nonplastic, very rapid dilatancy, strong
_	21.5				\HCI reaction, carbonate, sand is fine to medium \ \frac{1}{-} \ \qq \
_					
_					_
_					<u> </u>
_					<u> </u>
_					<u> </u>
_					<u> </u>
25	25.0				
15.5				6-6-4	Silt With Sand (ML) 25.0-26.0' - grayish orange, (10YR 7/4), wet, stiff, 10
-		1.0	SS-6	(10)	to 15% gravel, 25% sand, nonplastic, rapid dilatancy,
-	26.5				mild to moderate HCl reaction, carbonate, sand is fine / -
-					
_					-
_					-
_					-
-					-
-					-
30 <u> </u>	30.0				C:ta With Cond (All)
10.5				32-28-50	Silt With Sand (ML) 30.0-31.5' - grayish orange, (10YR 7/4), wet, hard, Heavy chattering at 30.0' 15 minutes to drill to 35.0'
-		1.5	SS-7	(78)	27% sand, nonplastic, very rapid dilatancy, moderate HCl reaction, carbonate, sand is fine to medium
-	31.5				grained
-					
-					-
-					-
-					-
-					
35 5.5	35.0				Sandy Silt With Limestone Fragments (ML) Hard and soft drilling 35- 40'
-		0.5	SS-8	15-50/6 (65/12")	├ 35.0-35.5' - pale vellowish orange. (10YR 6/2). grav
-	36.0			(==: -= /	mottling, moist, hard, 25 to 30% sand, low plasticity, rapid dilatancy, 40% moderate yellowish brown
-					\limestone fragments, HCl reaction strong for silt, mild / -
-					for limestone fragments
-					-
-					
-					
-					-
40					+



PROJECT NUMBER:

33884.FL

BORING NUMBER:

B-22

SHEET 3 OF 9

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723410.3 N, 458287.4 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

						END : 5/01/2007			ONIENTATION : Vertical
WATER	LEVELS	: 1.61 ft b	ys on 6/		START : 5/19/2007	END: 5/21/2007 SOIL DESCRIPTION	LUGGE	n : K	. Gomez COMMENTS
≩Q≆ I	CAMPIE	INTERVA	I /ft\	STANDARD PENETRATION		GOIL DEGUNIF HON		98	O IVIIVILIALO
ELO ON (SAIVIPLE			TEST RESULTS	SOIL NAME	E, USCS GROUP SYMBO	L. COLOR.	일	DEPTH OF CASING, DRILLING RATE,
H B		RECOVE			MOISTURE	CONTENT, RELATIVE D	ENSITY OR	B	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENC	CY, SOIL STRUCTURE, N	IINERALOGY	SYMBOLIC LOG	INSTRUMENTATION
0.5	40.0			(14)	Silt With Sand	(ML)		+ "	
-		1.3	SS-9	5-4-6	40.0-41.3' - mod	derate yellowish brown,	(10YR 5/4),	$\parallel \parallel$	-
-		1.3	33-9	(10)	wet, stiff, 26% s mild HCl reaction	sand, nonplastic, very ra on, carbonate, sand is fi	pid dilatancy, ne grained	$\parallel \parallel$	1
-	41.5					,, oa. 50a.o, 5aa .o	g. u ou	 	1 -
-								-	-
_								4	-
_								4	
_								4	1
_								1	_
_									
45	45.0							1	
-4.5				000	Sandy Silt (ML) 45 0-46 0' - mod) derate yellowish brown,	(10YR 5/4)]]
_		1.0	SS-10	3-3-2 (5)	wet, medium sti	iff, 25 to 30% sand, non	plastic, verv	Ш	
	46.5			(-)	rapid dilatancy, medium grained	mild HCl reaction, sand	I is fine to	_	
					mediam gramed	<u>u</u>		1	
								1	1
								1	1
-								1	Medium chattering/grinding
-								1	Lost and regained 80-90% of circulation
-								1	1
50	50.0							1	1
-9.5	30.0				Silty Sand With	n Limestone Fragment	s (SM)	117	5/20/07, 08:45 to 10:15, set HW casing to
-		1.4	SS-11	7-3-3	50.0-51.4' - darl	k yellowish brown, (10Y parse grained, 23% fine	R 4/2), wet,	11	50.0'
-	51.5			(6)	HCI reaction, 40	0% limestone fragments	s. limestone is	111	1
-	31.3				moderate yellov moderate HCl re	wish brown (10YR 5/4) v	vith mild to	Ť	1
-					(moderate riori)	Cacilon		1	1
-								1	-
-								┨	-
-								┨	-
-								-	1
-								-	-
55 <u> </u>	55.0				Silty Sand With	n Limestone Fragment	s (SM)	1	d –
'5			00.46	3-3-7	55.0-56.15' - da	ark vellowish brown to p	ale vellowish	-	-
-		1.2	SS-12	(10)	brown, (10YR 4	1/2 to 10YR 6/2), wet, in te HCl reaction, fine to d	edium dense,	411	<u> </u>
-	56.5				25-30% fines, 3	85% limestone fragment	S	4	-
-								-	Heavy grinding, lost 80-90% of circulation at
-								-	Heavy grinding, lost 80-90% of circulation at 57'
-								4	1
-								-	1
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60							_	┺	



PROJECT NUMBER:

33884.FL

BORING NUMBER:

B-22

SHEET 4 OF 9

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723410.3 N, 458287.4 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

						END : 5/01/0007			Onientation : vertical
WATER	LEVELS	: 1.61 ft k	ogs on 6/		START : 5/19/2007	END: 5/21/2007 SOIL DESCRIPTION	LUGGE	<u>к. К.</u>	Gomez COMMENTS
ŽQ≆	CAMPIE	INTERVA	1 (4)	STANDARD PENETRATION		JOIL DEJONIF HON		00	OCIVIIVILINIS
ELO ON (SAMPLE		` '	TEST RESULTS	SOIL NAM	IE, USCS GROUP SYMBOL	COLOR.	S L	DEPTH OF CASING, DRILLING RATE,
H B		RECOVE			MOISTURE	CONTENT, RELATIVE DE	NSITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTEN	ICY, SOIL STRUCTURE, M	INERALOGY	SYMBOLIC LOG	INSTRUMENTATION
-19.5	60.0			(14)	Limestone Fra	agments		Ü	5/20/07, 11:15, begin to set casing to 60.0'
-		1.2	SS-13	4-17-32	60.0-61.2' - gra	ayish orange and olive gra	ay, (10YR 7/4	╆	-
-		1.2	33-13	(49)	and 5Y 4/1), mi	ild to moderate HCl react sized fragments, 25% silt	ion, fine to and sand	£] -
-	61.5				similar to SS-1	2	and sand	-]
_								4	
_								4	
_								1	
_								_	_
								┨	<u> </u>
								╛	<u> </u>
65	65.0								
-24.5					Silty Sand With	th Limestone Fragments	(SM)		1
		0.9	SS-14	6-6-3 (9)	vellowish brown	le yellowish brown to moo n, (10YR 6/2 to 10YR 5/4), wet, loose.]
-	66.5			(5)	\ mild to modera	ate HCl reaction, fine to co	parse grained, /	1	1
-	00.0				\28% fines, 40-5	50% limestone fragments		1	1
_								1	1
-								1	1
-								1	1
-								1	1
-								┨	
								┨	
70 -29.5	70.0				Silty Sand Wit	th Limestone Fragments	(SM)	1111	-
			SS-15	12-14-10	70.0-71.4' - pal	le yellowish brown to mod	derate	-	-
-		1.4	55-15	(24)	yellowish browr	n, (10YR 6/2 to 10YR 5/4 e, mild to moderate HCl re), wet, paction fine to	-[1
-	71.5				coarse grained	l, 30% fines, 40-50% lime		-	
_					fragments		/	-	60% circulation loss
-								4	60% Circulation loss
_								4	
_								1	_
_								1]
	75.0							1]
75	75.0	0.1	SS-16	50/2	☐ Limestone Fra	agments	+	╆	F/20/07 15:20 hagin to advance LIM assiss
-34.5	75.1		22 .0	(50/2")	√75.0-75.1' - pal	le yellowish brown, (10YF	R 6/2),		5/20/07, 15:30, begin to advance HW casing 75'
					fragments up to				
					See the next sh	oring at 75.0 ft bgs heet for the rock core log		1]
1 7								1	1
								1] 1
-								1	1
-								1	1
-								1	1
-								1	
								1	-
80								+	-



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-22

SHEET 5 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723410.3 N, 458287.4 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

	LEVELS : 1.6			6/14/07 START : 5/19/2007 END : 5/2			
			,	DISCONTINUITIES		LITHOLOGY	COMMENTS
BELOW SE AND TON (ft)	LUN, H, AND ERY (%	(%	JRES OT	DESCRIPTION	LIC LO	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-34.5 _	75.0		>10	75.5-76.0' - Mechanical break, multiple	\exists	Limestone 75.0-75.5' - very pale orange, (10YR 8/2), strong HCl reaction, medium	Begin rock coring on 5/21/07 at 08:02
-			0	irregular breaks -	Ħ	strong (R3), moderately fossiliferous, voids up to 1/4" over 20-30% of	-
-	R1-HQ 5 ft	20		-	Ħ	surface 75.5-76.7' - pale yellowish brown, (10YR 6/2), moderate to strong HCl	-
-	34%		NR	-	臣	reaction, weak to medium strong (R2 to R3), voids up to 3/8" over 20-30% of surface	-
-				-		No Recovery 76.7-80.0'	R1: 5 minutes
80 <u> </u>	80.0			20 0 04 01 Fractives rough irregular breaks	₽	Limostono	
-39.5			>10	80.0-81.0' - Fracture zone, irregular breaks, some mechanical breaks -		Limestone - 80.0-83.1' - pale yellowish brown, (10YR 6/2), strong HCl reaction, very	_
-			1	81.1' - Fracture, 50-55 deg, rough, planar, dark grey staining	H	weak to weak (R1 to R2), trace solution cavities up to 3/8", moderately fossiliferous, 10-20%	SC-1 collected at 81.1- 81.95'
	R2-HQ 5 ft	23	>10	82.0-82.6' - Fracture zone, irregular breaks	H	voids up to 1/16", 5-10% silt	
-	62%		1 /	82.6' - Fracture, 50-60 deg, rough, planar	H	_	_
-			\ <u>'</u>	-	片	No Recovery 83.1-85.0'	-
-			NR	-	片	-	R2: 5 minutes
85	85.0			-	Ħ	_	-
-44.5	00.0		_	_	Ħ	Limestone	Driller's Remark: Drilling is
-			2	85.7, 85.9' - Mechanical break (2), rough, planar		 85.0-86.6' - Same as 80.0-83.1' except solution cavities up to 9/16"over 5-10% of surface 	soft 85.0-87.5'
-			_	86.1' - Fracture, horizontal, rough, planar	H	No Recovery 86.6-90.0'	-
	R3-HQ 5 ft	20			ightarrow	_]
-	32%	20		_	H	_	
-			NR	-	H	_	Driller's Remark: Core barrel has no resistance at -
-				-	H	_	88.0-90.0' R3: 5 minutes
90	90.0			-	囯	-	-
-49.5	50.0		1	-	囯	Limestone	Driller's Remark: No
-				-	H	 90.0-90.2' - Same as 80.0-83.1' No Recovery 90.2-95.0' 	resistance to drilling 90.0 95.0'
				_	I		
-	5446			-	H	_	_
-	R4-HQ 5 ft	0	NR	-	H	_	-
-	4%			-	H	_	-
-				-	団	-	-
-				-	口	-	R4: 2 minutes
95	95.0				$oxed{oxed}$		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-22	SHEET	6	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723410.3 N, 458287.4 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS: 1.6	1 ft bo	gs on 6	6/14/07 START : 5/19/2007 END : 5/	21/20	07 LOGGER : R. Gomez	
≥0.0	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ZES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH BE	E RU STH, OVEF	D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	301	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SURF	SOR	RQI	-RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMI	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-54.5		_		95.0-96.3' - Fracture zone, multiple fractures		Limestone	
-			>10	and mechanical breaks, fragments range from 0.05' in length to 0.4' in length	╆	- 95.0-96.3' - pale yellowish brown, (10YR 6/2), very strong HCl reaction,	-
-			>10	nom 0.00 in length to 0.4 in length	╆	very weak to weak (R1 to R2), 30%	-
-					F	 voids up to 1/4", 20-30% silt No Recovery 96.3-100.0' 	1
	R5-HQ	0			H	Ī]
	5 ft 26%	U			井	[]
_			NR		片	_	
_					片	<u> </u>	
_					₽	 -	R5: 3 minutes
100_ -59.5	100.0					Silty Clay (CL)	-
-			>10	fragments	 	100.0-100.5' - pale yellowish brown,	-
-			1		F	(10YR 6/2), stiff to very stiff, moderate plasticity, strong HCl	-
-				101.2' - Fracture, 50-60 deg, rough, planar, open	厈	- ∖reaction, carbonate	-
-	R6-HQ			•	炐	Limestone 100.5-101.5' - light brown, (5YR 6/4),	
-	5 ft 30%	0			Ħ	strong HCl reaction, extremely weak to very weak (R0 to R1), 10-20%	-
-			NR		⇇	voids up to 1/16", poorly fossiliferous	1
-					世	- No Recovery 101.5-105.0'	1
]-	[R6: 3 minutes
105_	105.0				₽	<u></u>	_
-64.5			>10	105.0-105.6' - Fracture zone, irregular pieces up to 3/4"	₽	Limestone - 105.0-108.9' - grayish orange, (10YR	-
-					₽	7/4), strong HCl reaction, extremely weak to very weak (R0 to R1), trace	SC-2 collected at 105.7- 106.8'
-			2		仠	voids, poorly fossiliferous, silty	-
-	R7-HQ			106.8' - Fracture, rough, stepped, 3/8" relief on face of fracture	厂	}-	-
-	5 ft 78%	22	>10	106.9' - Fracture, smooth, stepped, 5/16"	ፗ	-	-
-	7070		- 10	relief 107.0-108.0' - Fracture zone, rough, planar,	世	<u> </u>	
-			>10	less than 1/8" infilling 108.0-108.9' - Fracture zone, rough, planar,	世	<u> </u>	Drillorlo Domania Handat
			NR	fractures and mechanical breaks	上	No Recovery 108.9-110.0'	Driller's Remark: Hard at – 109.0'
	110.0		. 41 \	_	上		R7: 5 minutes
-69. 5			>10	110.0-110.2' - Fractures (2), horizontal and vertical, rough, undulating	上	Limestone - 110.0-110.2' - grayish orange, (10YR	
_				110.8-111.0' - Fractures, multiple, irregular	\perp	7/4), strong HCl reaction, very weak	
-			0	gravel-size pieces, 0.1' to 0.2' in size	\vdash	to weak (R1 to R2), 10-15% voids up to 1/16", silty	-
-	R8-HQ				\vdash	110.2-111.0 - pale yellowish brown, (10YR 6/2), strong HCl reaction,	-
-	5 ft	7			븎	weak (R2), 20-30% voids up to 3/16"	-
-	28%		NR		#	111.0-111.4' - pale yellowish brown, (10YR 6/2), strong HCl reaction,	
-					#	 weak (R2), 30% voids up to 3/8" No Recovery 111.4-115.0' 	-
-					⊭		R8: 2 minutes
115	115.0				壯	Ť	-
					1		



PROJECT NUMBER:

33884.FL

B-22

SHEET 7 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723410.3 N, 458287.4 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS: 1.6	1 ft bo	gs on (6/14/07 START : 5/19/2007 END : 5/	21/20	007	LOGGER : R. Gomez	
≥∩ ∵	(9)			DISCONTINUITIES	ڻ		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ZES T	DESCRIPTION	SYMBOLIC LOG		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH BE	E RU STH, OVEF	(%) O	FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30	ı	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SURF SURF SLEV	SOR! ENG	RQD	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	3Y ME		AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-74.5	014	ш.		115.0-115.2' - Mechanical break, multiple		士	Limestone	
-			>10	irregular breaks, gravel-size pieces,	F	╀	115.0-115.35' - pale yellowish brown,	-
-			3	0.05'-0.15' in size 115.7, 116.0' - Fractures (2), horizontal,	Ħ	1	(10YR 6/2), strong HCl reaction, extremely weak (R0), 20-30% voids	Disaggregated limestone
-			$\overline{}$	rough, planar, horizontal	-	F	<1/16" 115.35-116.0' - Same as	-
-	R9-HQ				11	ŀ	115.0-115.35' except grayish orange,	1
-	5 ft 30%	17			1	H	(10YR 7/4) Silt And Sand-Sized Carbonate	1
-	0070		NR			1	Grains With Clay	1
-					1	I	116.0-116.5' - medium gray, (N5), nonplastic to low plasticity, trace	1
-							solution cavities up to 3/8",	R9: 2 minutes
120	120.0				1		unconsolidated No Recovery 116.5-120.0'	1
-79.5				_			Silt And Sand-Sized Carbonate	Disaggregated limestone
			2	120.45' - Fracture, 30 deg, rough, planar, lithologic contact	\mathbb{H}	Ⅎ	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	1
			6	120.6' - Fracture, 30 deg, rough, planar	厂	ſ	Limestone]
				121.0, 121.3, 121.45, 121.5, 121.55, 121.6,' - Fractures (6), horizontal, smooth, planar	耳	1	120.4-121.0' - pale yellowish brown, (10YR 6/2), strong HCl reaction,	_
_	R10-HQ 5 ft	20	_1_/	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	耳	1	extremely weak (R0), 20-30% voids up to 1/16"	_
_	42%				口	‡	121.0-121.65' - pale yellowish brown,	_
_			NR		上	╁	(10YR 6/2), medium grained, 10-20% fines, strong HCl reaction, very weak	_
_			1414		╁┼	╁	to weak (R1 to R2), 20-30% voids up	
_					F	7	to 1/16", poorly fossiliferous, cyclic bedding	R10: 3 minutes
125 <u> </u>	125.0				F	1	_ 121.65-122.1' - coarse grained, weak HCl reaction, very weak (R1), 5-10%	-
-			3	125.1' - Fracture, horizontal, rough, planar, 1/16" thick infilling, open	#	1	solution cavities, 20-30% voids,	-
-				125.25' - Fracture, horizontal, rough, undulating, 1/16" thick infilling, open	岸	╪	highly fossiliferous No Recovery 122.1-125.0'	-
-				undulating, 1710 trick infilling, open	世	╁	Limestone 125.0-125.25' - yellowish gray, (15Y	-
-	R11-HQ				世	╁	7/2), coarse grained, mild to	-
-	5 ft 18%	12			╁	╁	moderate HCl reaction, very weak (R1), trace solution cavities up to	-
-	1070		NR		┲	╀	1/4", 10-20% voids up to 3/16"	1
-					口	‡	125.25-125.5' - Same as 125.0-125.25' except pale yellowish	1
-					世	‡	brown, (10YR 6/2) 125.5-125.9' - Same as	R11: 2 minutes
	130.0				口	‡	125.0-125.25'	1
-89.5			>10	130.0-132.0' - Mechanical break, multiple		4	No Recovery 125.9-130.0']
			/10]		\ 130.0-103.3' - dark yellowish orange,]
			>10]	L	\((10YR 6/6)\), stiff, mild to moderate \(\)\\HCI reaction	
_			- 10		Ţ	1	Poorly Graded Sand (SP)]
_	R12-HQ 5 ft	0	>10	132.1' - Fracture, horizontal, rough, undulating	口	‡	130.3-131.6' - grayish orange to moderate yellowish brown, (10YR 7/4]
_	60%	-		132.5-132.8' - Fracture zone, multiple breaks,	口	‡	to 10YR 5/4), fine to coarse grained,	_
-				infilling	廿	╁	slow HCI reaction	-
-			NR		\vdash	╁		R12: 5 minutes
-					\vdash	7		TC12. 3 ITIIIIU(G3
135	135.0				+	7		
$\overline{}$					_	_		



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	B-22	SHEET	8	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723410.3 N, 458287.4 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS: 1.6	31 ft bo	gs on 6	6/14/07 START : 5/19/2007 END : 5/	/21/20	07 LOGGER : R. Gomez	
≥D≎	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(0	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
THE FAC	SE RI GTH SOVE	(%) _Q	CTU	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	1BOL	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEF SUR ELE	COF	RQ	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-94.5			. 40	135.0-138.3' - Mechanical break, multiple	T	Limestone	
			>10		世	 131.6-133.0' - grayish orange, (10YR 7/4), moderate to strong HCl 	_
			>10		上	reaction, very weak to weak (R1 to R2), trace solution cavities up to	
			-10		上	5/16", 20-30% voids up to 1/16",	
_	R13-HQ 5 ft	0	>10		\perp	poorly to moderately fossiliferous, 20-30% silt	_
_	66%				\vdash	No Recovery 133.0-135.0' Limestone	_
_			_1_		F	 135.0-135.3' - grayish orange, (10YR 	_
-			NR		井	7/4), moderate to strong HCl reaction, very weak to weak (R1 to	R13: 8 minutes
-			\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\		井	R2), trace solution cavities up to	-
140 <u> </u>	140.0			_	世	5/16", 20-30% voids up to 1/16", poorly to moderately fossiliferous,	_
-			3	140.2, 140.4, 140.75' - Fractures (3), rough, planar, along weak contact	世	20-30% silt 135.3-137.5' - very light gray, (N8),	-
-					╨	very fine grained, strong HCI	-
-			1	141.2' - Fracture, 60-70 deg, smooth, planar	╨	reaction, weak to medium strong (R2 to R3), solution cavities up to 3/4" in	-
-	R14-HQ			141.8' - Fracture, horizontal, rough, planar, infilling	厂	diameter, 5-10% voids, moderately fossiliferous	_
_	5 ft 94%	28	2	142.6' - Fracture, 60-70 deg, smooth, planar	世	137.5-138.3' - pale yellowish brown,	-
			>10	142.9' - Mechanical break, rough, along weak contact	世	(10YR 6/2), medium to coarse grained, moderate HCl reaction, very	_
			>10	143.1-144.7' - Fracture zone, possible	」	weak to weak (R1 to R2), solution	
			5	mechanical breaks	上	cavities up to 3/16", 10-15% voids <1/16", silt, moderately fossiliferous	R14: 5 minutes
145_	145.0		NR	_	上	No Recovery 138.3-140.0' Limestone	_
-104.5 -			>10	145.2-145.4' - Fractures, gravel-sized pieces	╁	140.0-140.5' - grayish orange and	_
_				145.85-145.95' - Fractures, horizontal, rough,	\vdash	pale yellowish brown, (10YR7/4 and 10YR 6/2), fine grained, strong HCl	_
_			0	planar, open 146.4-146.5' - Mechanical break, multiple	H	reaction, very weak to weak (R1 to R2), laminated bedding	_
_	R15-HQ			147.15' - Mechanical break	厈	 140.5-140.8' - dark yellowish brown, 	-
-	5 ft	53	0		岸	(10YR 4/2), no HCl reaction, extremely weak to very weak (R0 to	SC-3 collected at 148.15- 149.05'
-	84%				世	R1), laminated bedding, 10-15%	(SC-3 depth adjusted from - 148.5-149.05' due to
-			>10	148.4-148.75' - Mechanical break	世	small (<1/16") voids, 30-40% cavities (<3/8"), moderately fossiliferous, silty	change in accounting for
-			0	148.9' - Fracture, horizontal, rough, planar, open, fragments don't fit together	世	- 140.8-143.0' - Same as 140-140.5' 143.0-144.7' - dark yellowish brown,	core loss) – R15: 5 minutes
150	150.0		NR	open, nagments don't lit together	世	(10YR 4/2), mild to moderate HCl	
-109.5					Ţ	reaction, extremely weak to very weak (R0 to R1), 20-30% voids	Total depth of boring 150.0'
]	<1/16", moderately fossiliferous, silty No Recovery 144.7-145.0'	
					_	Limestone	
_					1	145.0-146.05' - moderate yellowish brown, (10YR 5/4), medium to	
_					-	coarse grained, moderate HCl reaction, very weak (R1), 5-10%	_
_					-	solution cavities up to 1/4", 20-25%	-
-					-	voids 146.05-148.8' - pale yellowish brown	-
-					-	to grayish orange, (10YR 6/2 to 10YR 7/4), fine grained, mild HCl	-
-					-	reaction, weak to medium strong (R2	-
-			\blacksquare		+	to R3), trace cavities and voids	-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-22	SHEET	9	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723410.3 N, 458287.4 E (NAD83)

ELEVATION: 40.5 ft (NAVD88)

DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS: 1.6	31 ft bo	gs on (6/14/07 START : 5/19/2007	END : 5/2	1/20	D7 LOGGER : R. Gomez	
≥ □ ₽	<u> </u>			DISCONTINUITIES		၅	LITHOLOGY	COMMENTS
ELO N (F	ANE 37 (3		ZES T	DESCRIPTION		CLC	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUG	SHNESS,	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
PICE SURF	SORI	3 Q L	-RAC	PLANARITY, INFILLING MATERIAL THICKNESS, SURFACE STAINING, AND	L AND TIGHTNESS	SYME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
В 07 Ш	014	ш.		· ·		0)	148 8-149 2' - moderate vellowish	
-					-		brown, (10YR 5/4), mild HCl reaction,	-
-					-		weak (R2), laminated bedding, 5% cavities up to 1-1/2"x1/2"	-
-					-		No Recovery 149.2-150.0'	-
-					-		Bottom of Boring at 150.0 ft bgs on 5/21/2007	-
-					-		-	-
-					-		_	-
-					-		_	-
-					-		_	-
-					-		_	-
					_			
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1	PROJECT NUMBER:	BORING NUMBER:					
	338884.FL	B-23	SHEET	1	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723150.7 N, 458210.1 E (NAD83)

ELEVATION: 40.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 240, mud rotary, cathead, AWJ/NWJ rods, 3-15/16" tri-cone bit

WATER	LEVELS	: 2.3 ft bo	ıs on 4/18	3/07	START : 4/11/2007 END : 4/19/2007 LOGGER : J. Schaeffer, D. Roraback
				STANDARD	SOIL DESCRIPTION COMMENTS
AND (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	ο ο ι ο ο ο ο ο ο ο ο ο ο ο ο ο ο ο ο ο
ACE VTO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
<u>аош</u> 40.7	0.0			(N)	Fill Driller use 10' section of NWJ rod then AWJ
_		1.0	SS-1	2-2-5	─、0.0-0.3' - Fill material, road import fill /一口 rods for SPT sampling.
-	1 5	1.0	00 1	(7)	\(\sum_{0.3-0.5'\) wood fragments \(\sum_{\frac{11.1}{11.1}}\) \(\sum_{\text{Poorly Graded Sand With Silt (SP-SM)}}\) \(\sum_{\text{SIL (SP-SM)}}\) \(\sum_{\text{SIL (SP-SM)}}\)
-	1.5				0.5-1.0' - brownish black, (5YR 2/1), moist, loose, fine grained, no HCl reaction, lighter color with depth,
-					\frac{\text{grained}, no Horreaction, lignler color with depth, 1
-					silica sand
_					1
] [
]
5	5.0				
35.7				4-4-3	Poorly Graded Sand With Sand (SP-SM) 5.0-6.5' - moderate yellowish brown, (10YR 5/4), wet,
-		1.5	SS-2	(7)	loose, fine grained, no HCl reaction, 5% nonplastic fines, trace organics, silica sand
_	6.5				Tines, trace organics, silica sand
-					
-					
_					-
-					
-					
10	10.0				
30.7	10.0				Silty Sand (SM) Material in shoe was more fines with higher
-		1.2	SS-3	6-13-14 (27)	10.0-11.2' - light olive gray, (5Y 6/1), wet, medium dense, fine grained, no HCl reaction, 25-30% low to
_	11.5			(21)	nonplastic fines, silica sand
] [
]
l _					
-					
-					
-					
15 <u> </u>	15.0				Interbedded Silty Sands And Sandy Clay (SM-CL)
- 20.7		0.7	SS-4	5-14-16	15.0-15.3' - white to medium light gray to greenish
-	4.5 -	0.7	JJ-4	(30)	gray, (N9 to N7 to 5G 6/1), wet, medium dense, fine grained, moderate to strong HCI reaction, low to
-	16.5				nonplastic fines in silty sands, medium to high plastic -
-					fines in sandy clay, beds 1/4" thick, (2) 1"-2"
-					carbonate material -
-					15.3-15.5' - yellowish gray, (5Y 6/1), wet, hard to stiff, $\ \ \ $
-					low plasticity, moderate HCl reaction, carbonate material
-					Limestone Fragments
20					15.5-15.7' - moderate to strong HCl reaction, mottled appearance



PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	B-23	SHEET	2	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723150.7 N, 458210.1 E (NAD83)

ELEVATION: 40.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 240, mud rotary, cathead, AWJ/NWJ rods, 3-15/16" tri-cone bit ORIENTATION: Vertical

						y, cathead, AWJ/NWJ rods,			ORIENTATION: Vertical
				3/07	START : 4/11/2007	END : 4/19/2007	LOGGER	: J. (Schaeffer, D. Roraback
>				STANDARD PENETRATION		SOIL DESCRIPTION		ဖွ	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	0011 1111	11000 0D011D 01/1/1D01	001.00	SYMBOLIC LOG	DEDTIL OF GAOING DRILLING DATE
뿝병은		RECOVE	RY (ft)		SOIL NAME, MOISTLIBE (, USCS GROUP SYMBOL, CONTENT, RELATIVE DEN	COLOR, ISITY OR	OLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTF RFF			#TYPE	6"-6"-6"	CONSISTENC	Y, SOIL STRUCTURE, MIN	ERALOGY	MB	INSTRUMENTATION
SS				(N)				S	
20.7	20.0			44405	Silt With Sand (I	ML) wish gray, (5Y 8/1), wet, l	hard low -		
		0.7	SS-5	14-41-35 (76)	nlasticity, mild to	moderate HCI reaction,	15-20% /	ш	
	21.5			(. 0)	sand size particle	es, carbonate materials			
-							_	l	1
-							_	i	1
-							-		1
-							-		-
-							-		-
-							-		-
_							_		-
25 <u> </u>	25.0				0:11.145:11.0	•••			_
15.7				27-40-50/5	Silt With Sand (I 25.0-26.0' - gravi	ML) ish orange, (10YR 7/4), w	vet. hard		_
_		1.0	SS-6	(90/11)	nonplastic, mild t	to moderate HCI reaction	, 26% fine to	Ш	_
	26.4				\medium sand siz	ze material, carbonate ma	aterials/_		
							-		1
_							_		1
-							_		1
-							-		-
-							-		-
30 <u> </u>	30.0				Silt With Sand (I	ML)		Ш	Driller's Remark: 20'-35' drills hard but not
-		1.0	SS-7	10-19-22	30.0-31.0' - Sam		-		rock, just fairly dense
-		1.0	33-7	(41)				Ш	-
-	31.5						_		-
-							-		-
-							_		_
-							_		_
l _							_		_
							_		
]
35	35.0						_		1
5.7	35.3	0.1	SS-8	50/4	Limestone Fragi		0)(D, E(4)		Driller's Remark: Rock pieces are falling into
-				(50/4")	\35.0-35.1' - mode	erate yellowish brown, (10 1"x1/4", very poor recove	UYR 5/4), / -		hole at approximately 12-13', can't get bit – back in hole; Installed 17' of 6" casing.
-					(maginionite up to	T XI/ T , VOI J POOL TOOGVO	·· y / –		Driller's Remark: 35'-35.5' is very hard
-							-		Driller's Remark: 35.5'-40.0' drills similar to - 20-35'
-							-		_
-							-		-
-							-		-
-							-		-
-							_		-
-							_		_
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-23	SHEET	3	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723150.7 N, 458210.1 E (NAD83)

ELEVATION: 40.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 240, mud rotary, cathead, AWJ/NWJ rods, 3-15/16" tri-cone bit ORIENTATION : Vertical

						tary, cameau, Avvo/NVVJ rous			ONIENTATION : VEItical	_
WATER	LEVELS	: 2.3 ft bg	gs on 4/18		START : 4/11/2007	END: 4/19/2007 SOIL DESCRIPTION	LOGGE	{ : J. ≀ I	Schaeffer, D. Roraback COMMENTS	٦
≯ □⊋1	0.41451.5		1 (0)	STANDARD PENETRATION		SOIL DESCRIPTION		g	COMMENTS	\dashv
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		TEST RESULTS	SOIL NAM	ME, USCS GROUP SYMBOL	COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,	
H BI ATIC		RECOVE	RY (ft)		MOISTURE	E CONTENT, RELATIVE DE	NSITY OR	岌	DRILLING FLUID LOSS, TESTS, AND	
EPT URF			#TYPE	6"-6"-6"	CONSISTEN	NCY, SOIL STRUCTURE, MI	NERALOGY	Σ	INSTRUMENTATION	
о́и 0.7	40.0	<u> </u>	<u> </u>	(N)	Sandy Silt (ML	11		1111		\dashv
- 0.7	40.0	0.7	SS-9	44-50/6	40.0-40.7' - mo	oderate yellowish brown, (10YR 5/4),	4		4
_	41.0			(94/12")	wet, hard, low	plasticity, mild to moderate	e HCl	1		4
_					carbonate mate	0% sand-sized particles to terials	1/8",	1		4
					(oarsonato mat					
							·			Ī
_							•			1
_							-	1		1
45 -	45.0							1		4
45 <u> </u> -4.3	45.0			40.50/5	Silt With Sand	d (ML)		Ш	Driller's Remark: Chatter on and off from	\dashv
-	45.9	0.9	SS-10	42-50/5 (92/11")	45.0-45.9' - Sa	ame as 40.0-40.7' except 2		1	approximately 40' on, layers with chatter are	+
-	45.5			, ,	trace black par	rticles and streaks; trace g	reen streaks	╫	thin, only a few inches thick	\exists
-								-		+
_										4
-								1		4
_								1		
							_			
								1		1
50	50.0							1		1
-9.3	50.0 50.2	0.1	SS-11	50/2.5	\[\] Limestone Fra		Γ	Ħ	-	٦
-				(50/2.5")	\ 50.0-50.05' - pa	pale yellowish brown, (10Yl reaction, fragments to 1/2	R 6/2), mild to /	1		1
-					recovery	reaction, tragments to 1/2	, pooi	1		-
_								1		\exists
_								ł		+
-								-		4
_								-		4
_								1		_
								1		
55_	55.0							L		
-14.3	55.4	0.4	SS-12	50/5	Silt With Sand	d (ML)	40VD 5/4) 5	Ш	_	
1				(50/5")	\ 55.0-55.4' - mc	oderate yellowish brown, (plastic, mild to moderate F	IUYH 5/4), ICI reaction.	1		1
_					\10-15% sand-s	sized particles to 1/16", ca	rbonate	1		1
-				ĺ	materials, trace	e black organic lenses		1		1
-								1		+
-								1		+
-								1		+
-								1		4
-								-		4
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60								<u> </u>		\bot



PROJECT NUMBER:	BORING NUMBER:	
338884.FL	B-23	SHEET 4 OF 9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723150.7 N, 458210.1 E (NAD83)

ELEVATION: 40.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 240, mud rotary, cathead, AWJ/NWJ rods, 3-15/16" tri-cone bit ORIENTATION : Vertical

DRILLIN	PRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 240, mud rotary, cathead, AWJ/NWJ rods, 3-15/16" tri-cone bit ORIENTATION: Vertical									
WATER	LEVELS	: 2.3 ft bg	s on 4/18	3/07 S		R : J	. Schaeffer, D. Roraback			
				STANDARD	SOIL DESCRIPTION	J o	COMMENTS			
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		SYMBOLIC LOG				
HU		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	١	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION			
PTF/			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	₩.				
	60.0	0.0	00.40	(N)	. Well 6:11 A 10					
-19.3 - - - - - -	60.0 60.2	0.0	<u>SS-13</u>	50/2 (50/2")	Limestone Fragments With Silt And Sand 60.0-60.2' - limestone fragments, silt and sand-sized particles, poor recovery	- - - - -	More chatter from 60'-65'			
65	65.0					1	1			
-24.3 -	66.0	0.9	SS-14	50-50 (100/12")	Silt (ML) 65.0-65.9' - moderate yellowish brown, (10YR 5/4), moist to wet, hard, nonplastic to low plasticity.		Driller's Remark: 65.0'-70.0' drilled similar to 60.0'-65.0', more rock chips in cuttings			
- - - - -	66.0				moderate to strong HCl reaction, 5-10% fine sand size particles, carbonate materials	- - - - -				
70 -	70.0					1	switch to rock coring at 70.0'			
70	70.1	0.0	<u>(SS-15</u>)	50/1 (50/1")	Limestone Fragments 70.0-70.1' - 3 fragments to 1/2x1/8", mild to moderate HCl reaction, poor recovery Begin Rock Coring at 70.0 ft bgs See the next sheet for the rock core log	- - - - -	Finish soil drilling at 17:00 on 4/11/07; setting HW casing to 70' End day at 18:00 on 4/11/07, set 35.0' of HW casing Start at 8:00 on 4/12/07, set remainder of casing and clean out hole Cannot take water levels due to tooling in hole Finish setting casing to 70', clean and flush hole at 11:00 on 4/12/07			
7534.3 34.3 						-	- - - - - - - - - -			
						1				



PROJECT NUMBER:

338884.FL

B-23

SHEET 5 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723150.7 N, 458210.1 E (NAD83)

ELEVATION: 40.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 240, mud rotary, NQ tools, HW casing

				MENT : Dietrich D-30 3/N 240, midd rotary, NQ tools, HW			
WATER	LEVELS : 2.3	ft bgs	s on 4		19/200	·	1
≥∩ ∵	_ (6			DISCONTINUITIES	ا ي	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
岩병흔	₹ <u>`</u> #	(%	R P		1 일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
±₹8	# # F S S	Q D (%)	ES	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	<u> 8</u>	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
989		S O	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
000	0 J E	LE.		,	0)		
-29.3	70.0 R1-NQ 70.5 0.5 ft		NR		ΙI	No Recovery 70.0-70.5'	R1: 1 minute
1	0.5 1			70.7.70.95.71.4.71.6.72.0' Frosturos (5)	Ш	Limestone	
-			3	70.7, 70.85, 71.4, 71.6, 72.0' - Fractures (5), 0-10 deg, rough, undulating, tight to open	H	70.5-75.2' - moderate yellowish	-
-				with some fragmenting at fractures	Н	brown, (10YR 5/4), mild to moderate HCl reaction, medium strong to	-
1 .			3		Ш	strong (R3 to R4), small (up to 1/16")	
			٦		Н	voids cover 30% of surface, many	
-	R2-NQ			72.35' - Fracture, horizontal, rough,	╁	1/4" to 1/2" cavities some with fossil	1
-	5 ft	65	0	undulating 72.95' - Mechanical break	ш	- casts, and a 1" elongated cavity at	1
1 -	94%			72.95 - Mechanical Dreak	Н	92.5', small voids decrease to <5% at	
					Н	72.5-73.0', trace organic fossil infills	
_			3	73.9, 74.0' - Fractures (2), horizontal, rough,	Ш	 and increased fossil molds and casts at 73.0-73.9', extremely weak (R1) 	1
-				undulating, tight, join a vertical rough	╂┼┤	rock at 94.0-94.6'	R2: 13 minutes
75			1	undulating fracture at 73.95' 74.4, 74.6' - Fractures (2), horizontal, rough,		-	1.2. 10 1110.00
-34.3	75.5		NR	undulating, two horizontal fractures bound a	Ш	No Recovery 75.2-75.5'	
1 -				vertical fracture at 74.5'	$\vdash\vdash\vdash$	Limestone] 1
-			4	75.5-75.6' - Fracture zone, subangular 3/4" to	╀┤	75.5-78.6' - Same as 70.5-75.2'	1
-				1" fragments	ш	except medium strong (R3), small	l -
			3	75.6' - Fracture, termination of fracture zone	Н	(up to 1/16") voids cover 30% of surface at 75.5-77.2', increased	
			3	at a stepped 30 deg face 76.2' - Fracture, 70 deg, rough, undulating,	Н	cavities up to 1/4" (elongated) at	1
-	R3-NQ			0.4' long cleave	口	76.4-77.2', very weak (R1) between	1
-	5 ft	23	4	76.4' - Fracture, rough, undulating, 10 deg	+	fractures at 77.1' and 77.2', weak	-
	62%			and 45 deg fractures terminate above 70 deg	Н	_ (R2) at 77.2-78.6'	
				fracture, and 76 deg before fracture, appears	Ш	No Recovery 78.6-80.5'	
-				weathered with cavities	Н	-	1
-			NR	76.6' - Fracture, 70 deg, rough, undulating, missing side of core, fracture terminated	H	-	R3: 14 minutes
80				above horizontal fracture —	ш	_	1\(\). 14 IIIIIIdles
-39.3	80.5			77.1, 77.2' - Fractures (2), horizontal, rough,	Н		
1 -	·			undulating, open, friable, voids decrease with	ш	Limestone	Fractures tend to occur at
-			1	depth -	ш	- 80.5-85.0' - moderate yellowish	weaker (R2) sections that
-				77.8' - Fracture, horizontal, rough, stepped 77.8-77.9' - Fracture zone, rock crush	H	brown to dark yellowish orange,	are friable
l _			3	78.4' - Fracture, horizontal, rough, undulating,		(10YR 5/4 to 10YR 6/6), fine grained, - moderate HCl reaction, medium	
			٦	open	ш	strong to weak (R3 to R2),	
1 -	R4-NQ			78.5' - Fracture, 15 deg, rough, planar	╂┼┼	fossiliferous with 25% small voids	1
1 -	5 ft	52	>10	81.1' - Fracture, horizontal, with	口	and several fossil cavities (up to 1"	
1 -	90%			fragmentation	Щ	long), trace 1/4" organic fragments]
1				81.8-81.95' - Fracture, vertical, rough, undulating, bonded by horizontal to 10 deg	H	and several organic laminations,	
1 -	1		1	rough, undulating fracture		- weaker with depth] 1
1			5	82.6' - Fracture, 70 deg, rough, undulating,	╁┼┼	-	R4: 12 minutes
85				leading to underlying fracture zone	╀┼	N D	
-44.3	85.5		NR	82.8-83.0' - Fracture zone, rock crush leading	口	No Recovery 85.0-85.5']
1				to a 10 deg rough stepped fracture at 83.0' 83.4' - Fracture, 60 deg, rough, undulating,	Ш	Limestone] 1
1 -			2	with fragmentation, friable	╆┼	- 85.5-90.5' - Same as 80.5-85.0'	1
1 -				84.2' - Fracture, 80 deg, rough, undulating,	口	except weak to medium strong (R2 to R3), fossiliferous voids cover 30% of	
1 -			2	with fragmentation, friable	₽Щ	- surface (10% minimum, 40%]
1			_	84.7' - Fracture, 70-90 deg, rough,	Ш	maximum), occasional fine	
1 -	R5-NQ			undulating, leading into fracture zone with		laminations] 1
-	5 ft	48	5	organics 85.5' - Fracture, 30 deg, smooth, planar	╂┴╂	-]
1 -	100%			86.2' - Fracture, 30 deg, smooth, planar 86.2' - Fracture, horizontal, rough, stepped,	旪	-]]
1			٦	fracture terminates underlying vertical	口		
1 -			2	fracture	$\vdash \vdash \mid$	-	1 1
1				-	╚	-	SC-1 collected at 89.3-
90					\Box		90.5'
1							
					\Box		



PROJECT NUMBER:

338884.FL

B-23

SHEET 6 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723150.7 N, 458210.1 E (NAD83)

ELEVATION: 40.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 240, mud rotary, NQ tools, HW casing

COMING	INCTITOD A	ND LC	ZOIFIV	IENT: Dietrich D-50 S/N 240, mud rotary, NQ tools, HW	Casiii	3	ORIENTATION : Vertical
WATER	LEVELS: 2.3	ft bgs	s on 4	/18/07 START : 4/11/2007 END : 4/	19/20	D7 LOGGER: J. Schaeffer, D. Roral	pack
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
		(9)	FRACTURES PER FOOT		윽	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
FXF	SES	6)	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOI	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
PR-R	RNN	Q D (%)	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	Olk	œ			S	CHARACTERISTICS	
-49.3	90.5		0	86.7' - Fracture, 70 deg and vertical, rough,	Н		R5: 14 minutes
-				undulating, tight to open, 5/16" relief, extends - 86.2-87.4"	Н	Limestone	Based on overlying and
-			3	87.15' - Fracture, 40 deg, rough, undulating,		90.5-91.7' - Same as 85.5-90.5'	underlying rock in the rock -
-				extends through half core joining vertical	Н	except moderate yellowish brown,	crush zone; picked 91.7' as
			>10	fracture	Н	(10YR 5/4), medium strong (R3), fossiliferous, many cavities up to 1/2"	contact End of core from R6-NQ -
1 -				88.0-88.7' - Fracture zone, several horizontal		91.7-92.1' - light olive gray, (5Y 5/2),	matches top of R7-NQ
-	R6-NQ			fractures with a 70 deg fracture crossing all	ш	fine grained, moderate to strong HCl	core, therefore core loss
-	5 ft	28		horizontal fractures, clean large (2"-3") fragments, bounded by 30 deg fractures	Ш	 reaction, strong (R4), increasing 	interpreted to be from -
l _	50%		NR	rough to undulating on top and bottom		voids with depth from 5-15%,	middle of core run
				89.0, 89.25' - Fractures (2), horizontal, rough,	Н	elongated cavities near 94.8', large	Core loss assumed to be
_				undulating	Ш	 1"x1"x1/2" cavity at 95.1' No Recovery 92.1-94.6' 	from 92.1-94.6' –
				91.0' - Fracture, 70 deg, rough, undulating, 4"	H	-	R6: 14 minutes
95 <u> </u>			2	long, weathered edges, tight 91.4-92.1' - Fracture zone	H	Limestone 94.6-95.5' - Same as 91.7-92.1'	_
-54.3	95.5			94.8' - Fracture, 80 deg, rough, undulating,	Д		l J
				tight, 4" long	Н	95.5-99.3' - Same as 94.6-95.5'	
1 -			0	95.5' - Fracture, 45 deg, rough, planar, tight	Ш	 except voids increasing to 20-25%, weak (R2) at 97.9-98.85' 	1
-				to healed, joints with R7 core	ш		I -
-			0	<u>-</u>	Н	_	_
					ш		
-	R7-NQ			97.7, 97.9' - Fractures (2), 20 deg, rough,	Ш	_	1
-	5 ft	42	>10	undulating, open, fragmented beneath 97.9'	Н	<u>-</u> T	1
-	92%			98.25, 98.55, 98.65' - Fractures (3), 10 deg,		_	
l -			8	somewhat fragmented	ш	_	
				98.4' - Fracture, vertical, rough, undulating,	Н	00 2 100 11 vallowish grov (EV 7/2)	
100			8	open and somewhat fragmented, bounded by 10 deg fractures at 98.25' and 98.55'	П	 99.3-100.1' - yellowish gray, (5Y 7/2), moderate HCl reaction, strong (R4), 	R7: 14 minutes
-59.3			NR	99.1' - Fracture or mechanical break, 10 deg,	Н	voids decreasing to 5-10%, transition	-
-	100.5		NK	rough, undulating, tight to healed	ш	 from above is irregular with infilling of 	Water level at 2.3 below
l -			5	99.3' - Fracture, horizontal, rough, undulating,	Н	cavities, 1/2"x3/4" deep spiral fossil	ground surface
				open at contact	Н	at 99.5' - No Recovery 100.1-100.5'	ground canado
-				99.5' - Fracture, vertical, rough, undulating, bounded at 99.3' and 99.75'	ш	Limestone	1
-			2	99.75-100.1' - Fracture zone, angular block	Н	100.5-104.0' - light olive gray, (5Y	-
-	50.110			with horizontal and vertical breaks 1"-2" in	Н	 5/2), fine grained, moderate HCI 	
I _	R8-NQ 5 ft	52	1	size	П	reaction, strong (R4), 1/16" voids	l J
	70%	02	'	101.15' - Fracture, rough, undulating to	H	varying from 5-30%, few 1/2" elongated fossils, few cavities,	SC-2 collected at 103.25-
-			1	planar, open 101.4-101.5' - Fracture zone, bounded by <5		mostly shallow and <1/2", trace	103.95'
-			<u> </u>	deg, rough, undulating, very open fracture	Ш	organics laminations and inclusions	-
-				101.8, 102.1' - Fractures (2), 50 deg, rough,	\vdash	No Recovery 104.0-105.5'	D0: 00
105_			NR	undulating	口		R8: 20 minutes
-64.3	105.5			103.25' - Mechanical break	Н		7
-				103.9' - Mechanical break 105.5-106.2' - Fracture zone, angular rock	ш	Limestone	1
-			>10	fragments and nearly fractures at 106.0'	口	- 105.5-108.0' - Same as 100.5-104.0'	-
-				106.2' - Fracture, 10 deg, rough, stepped	Н	except light olive gray to moderate	-
			0		Ш	olive brown, (5Y 5/2 to 5Y 4/4), 10-20% voids, fragmented at	
I -			١		H	105.5-106.2'	1
-	R9-NQ		0		╁┼┤	55.0 100.2	-
-	5 ft	33	J	107.9' - Mechanical break	ш	No Recovery 108.0-110.5'	-
I -	50%			-	$\vdash\vdash$	- No Necovery 100.0-110.5]
					H		
I -			NR	_	Ш		1
-				-	Н	<u></u>	R9: 19 minutes
110					H		
1							



PROJECT NUMBER:

338884.FL

B-23

SHEET 7 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723150.7 N, 458210.1 E (NAD83)

ELEVATION: 40.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 240, mud rotary, NQ tools, HW casing

				IENT : Dietrich D-50 5/N 240, mud totaly, NQ tools, HV		•	ORIENTATION . Vertical
WATER	LEVELS : 2.3	s π bgs	s on 4/		19/20	•	
ĕ₽£	CORE RUN, LENGTH, AND RECOVERY (%)			DISCONTINUITIES	ဗ္ဂ	LITHOLOGY	COMMENTS
N S S	Ä, Y X X X X X X X X X X X X X X X X X X		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
	SH	(%) Q	158	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Ğ	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
투유	# P S S S S S S S S S S S S S S S S S S	Oρ	AC R	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND ELEVATION (ft)	SEES	R	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SY	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-69.3					\vdash		
-	110.5			-	╀	Limestone	-
-			0	-	₽	- 110.5-115.5' - moderate yellowish	
I .					口	brown, (10YR 5/4), moderate HCl	
				111.7, 111.9' - Fractures (2), 50 deg, rough,	Н	reaction, very weak to strong (R1 to	
-			8	undulating, tight		 R4), small (1/16") voids 10-20%, minimal cavities, strong (R4) rock at 	1
-	R10-NQ			112.25' - Fracture zone, horizontal, stepped,	╙	110.5-113.0', medium strong (R3)	-
_	5 ft	53	8	1"-2" angular fragments	H	- rock 113.0-113.5', intermingled	1
I _	100%			113.1' - Fractures, vertical, rough, moderately		zones of very weak and weak (R1	
				open, bounded by similar horizontal fractures at 113.0' and 113.25'	\vdash	and R2) rock at 113.5-115.2',	
I -			3	113.5' - Fracture, vertical, rough, undulating,	ш	 medium strong to strong (R3 to R4) at 115.1-155.5', intermittent zones of 	1 1
				open, bounded at 113.1' by horizontal	\vdash	solid core and rock fragments	R10: 17 minutes
115 <u></u> -74.3			>10	fracture		<u> </u>	-
	115.5			114.25, 114.6' - Fractures (2), 40 deg, rough, undulating, between fractures are columnar	ш	 	
			2	vertical fragments and fractures that are	\vdash	115.5-117.5' - Same as 110.5-115.5' - except moderate vellowish brown.	
1 -				rough, undulating, tight to open		(10YR 5/4), medium strong to strong	Sand on outside of core
1 -				115.1-115.5' - Fracture zone, angular,	\vdash	(R3 to R4), with intermittent core and	from 115.5'-116.0', chatter - started about 6-7 minutes
-			>10	columnar 115.5-116.1' - Fracture, vertical, rough,	仜	 fracture zones similar to 	into run
-				undulating, half core intact, the other half		112.25-115.5'	-
	R11-NQ 5 ft	14		multiple fragments	Н	No Recovery 117.5-120.5'	
1	40%	14		116.1' - Fracture, horizontal, rough,	Ш		
-				undulating, open	\vdash	<u> </u>	1
-			NR	116.7' - Fracture, horizontal, rough, undulating to stepped, open		-	-
-				116.7-117.5' - Fracture zone, angular 1-3"	\vdash	_	R11: 12 minutes
120				fragments	厂		RTT: 12 minutes
-79.3	120.5						
-				<u> </u>	╨	Limestone	1
-			>10	120.8' - Fracture or bedding plane, horizontal,	口	- 120.5-120.8' - Same as 115.5-117.5'	1
-				planar, open, weathered with rounded face on lower side, less rounded on upper side	Н	except moderate HCl reaction, medium strong to strong (R3 to R4),	-
-			3	121.1-121.5' - Fracture zone, larger angular		- fine grained, slighty banded with	
				to subangular 1-2" fragments of both	ш	beige and gray	
1	R12-NQ		>10	over-and underlying rock		120.8-121.3' - Same as 120.5-120.8'	1
1 -	5 ft 46%	8		121.5, 121.75, 122.15' - Fractures (3), horizontal and 10 deg, rough, undulating,		 except mild HCl reaction, very weak (R1), end of weaker rock in fracture 	1 1
1 -	40 /0			open		zone	1 -
-			NR	121.6' - Fracture, 70-90 deg, rough,	口	No Recovery 122.8-125.5'	-
-			INIK	undulating, small vertical terminated by	\vdash	_ _	l
125				horizontal fracture and fracture zone 122.15-122.25, 122.5-122.8' - Fracture zone	片		R12: 12 minutes
-84.3	125.5			(2), 1/4" to 1" subangular to rounded	Щ		7
1 -	120.0			fragments		Limestone	1 1
1 -			>10	122.25, 122.5' - Fractures (2), horizontal,	广	 125.5-125.8' - Same as 120.5-122.8' 	SC-3 collected at 125.8-
1 -				rough, stepped 125.5-125.8' - Fracture zone, rounded 3/4" to	╀	except light olive gray to moderate	126.6'
1			2	1-1/2" fragments	ш	yellowish brown, (5Y 5/2, 10Y 5/4), mild to moderate HCl reaction, very	
1 -				125.8' - Fracture, horizontal, rough,	\vdash	weak to weak (R1 to R2), rounded	1
1 -	R13-NQ		2	undulating		3/4" to 1-1/2" spherical fragments	1 1
1 -	5 ft	28		126.9' - Fracture, 60 deg, rough, undulating 127.7' - Fracture, horizontal, rough,	口	- 125.8-126.9' - Same as 125.5-125.8'	1
1 -	46%			undulating	H	except very weak to weak (R1 to R2),	-
1 -				- · · · · · · · · · · · · · · · · · · ·	广	intact core - 126.9-127.8' - Same as 125.5-125.8'	l J
1			NR		Н	except very weak (R1), friable]
130				-	ш	No Recovery 127.8-130.5'	R13: 19 minutes
130							



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-23	SHEET	8	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723150.7 N, 458210.1 E (NAD83)

ELEVATION: 40.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 240, mud rotary, NQ tools, HW casing

				12.07 . Dietrich D-50 5/N 240, Midd Totaly, NQ 10015, FW			ORIENTATION . VEILICAI
	LEVELS : 2.3	o it bg:	S OH 4/	<u>/18/07 START : 4/11/2007 END : 4/</u> DISCONTINUITIES		D7 LOGGER : J. Schaeffer, D. Roral LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		(0	DESCRIPTION	SYMBOLIC LOG		COMMENTO
OH A	L'A',	(9)	FRACTURES PER FOOT	DESCRIPTION	임	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
FACE	E R GTH OVE	(%) Q	STU	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOL	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
F S E	SEC	A Q	-RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	3×M	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-89.3	014	ш.	ш.ш	<u>, , , , , , , , , , , , , , , , , , , </u>	0)		
00.0	130.5			120 El Fractura harizantal recent planer		Limantona	-
-			>10	130.5' - Fracture, horizontal, rough, planar 130.65-131.25' - Fracture zone, subangular	₽	Limestone - 130.5-130.65' - yellowish gray, (5Y	
l .				1/2" to 1-1/2"	厂	7/2), fine grained, moderate HCl	
			>10	130.65' - Fracture, horizontal, rough, planar	\vdash	reaction, medium strong to strong	
1 -				131.25, 131.35, 131.40, 131.55, 131.65' - Fractures (5), planar fractures along bedding		 (R3 to R4), fine voids cover less than 5% of surface, very abrupt transition 	1
-	R14-NQ			planes, open	╁	to 30% voids at 130.6' followed by a	1
-	5 ft	0		131.65-132.1' - Fracture zone, angular,	口	- fracture	1
-	36%			broken along horizontal planes and small 1/4" to 3/4" fragments	+	130.65-131.25' - moderate yellowish brown, (10YR 5/4), mild HCl reaction,	-
-			NR	132.2' - Fracture, horizontal, smooth, planar		very weak to weak (R1 to R2),	1 4
1 -				132.25' - Fracture, beginning of vertical	\vdash	10-30% voids, entirely	1
135				fracture with strong black to gray staining _	Д	fragmented,10-30% voids — 131.25-132.3' - Same as	R14: 17 minutes
-94.3	135.5			_		130.5-130.65' except strong (R4),	1
1 -	. 50.0			135.5-136.25' - Fracture zone, numerous 3/4"		<3% voids, horizontal planes visible] 1
-			>10	to 2" fragments, subangular to subrounded,	╁	_ (<1/16") No Recovery 132.3-135.5'	1
-				contains lithology transition at 136.1'	仜	Limestone	1 1
-			1	136.7' - Fracture, 10 deg, smooth, stepped,	╁┼	_ 135.5-136.1' - moderate yellowish	1 -
_				fracture steps at cavity, tight	F	brown to light olive gray, (10YR 5/4 to 5Y 5/2), moderate HCl reaction,	_
	R15-NQ 5 ft	25	1	137.6' - Fracture, 0-45 deg, stepped, tight	Н	weak (R2), 10% 1/16" voids, few 1/4"	
	48%	25				elongated cavities	1
-					\vdash	136.1-137.9' - light olive gray to	1
-			NR		匚	yellowish gray, (5Y 6/1 to 5Y 7/2), fine grained, moderate to strong HCl	1
-					₩	reaction, grayer transitioning to	R15: 22 minutes
140_ -99.3				_	╨	yellower with depth, 5% fine voids,	Driller's Remark: Water
	140.5			440 5 444 01 5	╁┼	several 1/4" to 1/2" elongated and deep (3/4") cavities. Cavities infilled	level = 4.79' below ground -
-			<10	140.5-141.2' - Fracture zone, angular to subangular fragments 1/4" to 1-1/2"	\blacksquare	in places with porous appearance,	surface
			-10	141.2' - Fracture, horizontal, rough,		moderately HCl reaction	Bit clogged, pulled casing, rocks in clay matrix,
				undulating	\vdash	No Recovery 137.9-140.5' Limestone	stopped at 143.0' to check
-			2	141.3' - Fracture, 80 deg, smooth, undulating	\top	140.5-141.2' - yellowish gray to	bit (mechanical break)
-	R16-NQ		1	141.5' - Fracture, horizontal, rough, undulating, open	一	dusky yellow, (5Y 7/2 to 5Y 6/4),	
-	5 ft	10	<u> </u>	141.7' - Fracture, 70 deg, rough to smooth.		strong HCl reaction, 1/16" voids over 5% of surface, 1/16" to 1/8" voids	1 1
-	50%			undulating, may join with 80 deg fracture at 141.3'	$+\Box$	 over 5% of surface, fracture zone] -
1 -				141.3 142.1' - Mechanical break	\perp	with 1/4" to 1-1/2" fragments at	1 1
1 -			NR		\vdash	141.2' - 141.2-143.0' - yellowish gray, (5Y	1
145_						7/2), fine grained, moderate HCl	R16: 23 minutes
-104.3	145.5			_	\vdash	reaction, medium strong to strong (R3 to R4), variations of 0-10% fine	7
1 -					口	voids vary over interval] 1
-			2	145.9' - Bedding plane, 10 deg, smooth,	1	No Recovery 143.0-145.5'	
-				planar, open 146.3' - Fracture, horizontal, planar, open		Limestone	Retrieved core from barrel
1 -			5	146.4' - Fracture, nonzontal, planar, open 146.4' - Fracture, 50 deg, planar	₩	145.5-146.5' - Same as 141.2-143.0' 146.5-148.0' - yellowish gray to	when rods pulled (1.5' of
1 -	_			146.5' - Fracture, horizontal, undulating, open	口	usky yellow, (5Y 7/2 to 5Y 6/4),	core)
1 -	R17-NQ 5 ft	20	1	146.8, 147.1' - Fractures (2), horizontal, rough, undulating, tight	\bot	medium strong to strong (R3 to R4),]
1	50%	20		rougn, undulating, tight 147.2, 147.4, 147.55' - Fractures (3),		up to 20% 1/16" voids, few 1/4" thin elongated fossils, red iron staining]
1 -				horizontal, rough, undulating, open	╨	embedded and in fractures] 1
1 -			NR		\Box	No Recovery 148.0-150.5'	1
1 ,50					+	-	R17: 18 minutes
150					+		-



PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	B-23	SHEET	9	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723150.7 N, 458210.1 E (NAD83)

ELEVATION: 40.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 240, mud rotary, NQ tools, HW casing

WATER	LEVELS : 2.3	3 ft bgs	on 4	/18/07 START : 4/11/2007 END : 4/	19/20	07 LOGGER : J. Schaeffer, D. Roral	pack
				DISCONTINUITIES	ß	LITHOLOGY	COMMENTS
ANE (ff	N AND ≪		ES	DESCRIPTION	3.50	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
LEV.	CECC	ΔΩ	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ΥME	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
100.2		ш	шш		10,		
-	150.5					Bottom of Boring at 150.5 ft bgs on	
-					┨	- 4/19/2007	-
-					1	-	1
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PROJECT NUMBER:	BORING NUMBER:					Т
338884.FL	B-23A	SHEET	1	OF	4	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723147.5 N, 458207.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: Mark Boatright; Cathead Operator: M. Griffin

DRILLIN	G METH	OD AND	EQUIPM	ENT : CME 550, S	3/N 186073, mud rotary, cathead, AWJ rods, 2-7/8" drag bit ORIENTATION: Vertical						
WATER	WATER LEVELS : 5.0 ft bgs on 6/30/07										
				STANDARD	SOIL DESCRIPTION COMMENTS						
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY						
BEI CE.		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND						
PTH EVA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY						
SUI				(N)							
42.4	0.0				Topsoil (ML)						
		1.1	SS-1	1-2-5 (7)	organics, 0.3-0.45' wood and roots						
-	1.5			(,,	Poorly Graded Sand With Organics (SP)						
-					0.45-1.1' - brownish black to light brownish gray, (5YR / 2/1 to 5YR 6/1), moist, loose, very fine to fine grained,						
-					no HCl reaction, 30% organic fines, decreasing with						
-					depth						
-											
-											
-											
-					-						
5 37.4	5.0				Silty Sand (SM)						
"," -			00.5	5-8-12	5.0-5.9' - moderate vellowish brown. (10YR 5/4), wet						
-		0.9	SS-2	(20)	medium dense, very fine to fine grained, no HCl reaction, 25% nonplastic fines, slight orange staining						
-	6.5				\teaction, 25% horiplastic lines, sight drange staining / - \at 5.0-5.3', trace organics and black staining						
_											
_					_ 						
_] 						
					11						
-					11						
10	10.0				1						
32.4					Silty Sand (SM)						
-		1.1	SS-3	2-2-2	10.0-10.75' - dark yellowish orange, (10YR 6/6), wet,						
-	11.5			(4)	\very loose, very fine to fine grained, no HCl reaction, \\\ \\\\ \ \ \ \ \ \ \ \ \ \ \ \ \ \						
-	11.5				Sandy Silt (ML)						
-					\\ 10.75-11.1' - moderate yellowish brown, (10YR 5/4), \\ wet, nonplastic, rapid dilatancy, no HCl reaction, 40% \ \						
-					fine silica sand						
-											
-											
-					Driller's Remark: Becomes harder-rocky at						
-					- 14' -						
15	15.0				C:I4 (MIL)						
27.4				3-7-15	Silt (ML) 15.0-16.0' - dark yellowish orange, (10YR 6/6), wet, -						
_		1.0	SS-4	(22)	very stiff, nonplastic, rapid dilatancy, mild to moderate ┃┃┃┃┃						
_	16.5			. ,	HCI reaction, 5-10% very fine sand sized, carbonate						
] [
1 7					1						
1 7					11						
					1						
-					1 						
20					1 						
20											



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-23A

SHEET 2 OF 4

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723147.5 N, 458207.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: Mark Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT: CME 550, S/N 186073, mud rotary, cathead, AWJ rods, 2-7/8" drag bit

			gs on 6/30		START : 11/28/2007	v, cathead, AWJ rods, 2-7/9 END : 11/28/2007		S · D	ORIENTATION : Vertical Whitaker
	LLVLLO	. 0.0 10 0	90 011 0/01			SOIL DESCRIPTION	LOCOLI		COMMENTS
§ Q €	SAMPLE	INTERVA	L (ft)	STANDARD PENETRATION TEST RESULTS				LOG	
BEL CE A		RECOVE	ERY (ft)	TEST RESULTS	SOIL NAME, I	USCS GROUP SYMBOL, ONTENT, RELATIVE DEN	COLOR,	CLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)		, SOIL STRUCTURE, MIN		SYMBOLIC LOG	INSTRUMENTATION
22.4	20.0	1.4	SS-5	12-42-50 (92)	Silt (ML) 20.0-21.35' - Sam	ne as 15.0-16.0' except h	nard -		-
- - - - 25 17.4 - -	25.0	0.9	SS-6	20-20-24 (44)	and 5Y 6/4), wet, mild HCl reaction.	vish gray and dusky yello hard, nonplastic, rapid o , 35% fine to coarse san el-sized limestone fragm	lilatancy, d sized,		Driller's Remark: Hard drilling from 26.5-30.0'
30	30.0	1.1	SS-7	45-26-33 (59)	Sandy Silt And L 30.0-31.05' - Sam (5Y 6/4), moderat	e as 25.0-25.9 except d	usky yellow, -		- - - - - -
- - - - 35 7.4	35.0				Silty Sand (SM)				Driller's Remark: Encountering rock at 33' and chattering
- - - - - - 40	36.5	0.7	SS-8	9-4-2 (6)	fine to coarse gra	olive gray, (5Y 2/2), wet ined, moderate HCI read d limestone fragments, carbonate materials	ction, 10%		Driller's Remark: Hard at 37'; change to 2-7/8" tricone bit



PROJECT NUMBER:	BORING NUMBER:					Т
338884.FL	B-23A	SHEET	3	OF	4	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723147.5 N, 458207.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: Mark Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT: CME 550, S/N 186073, mud rotary, cathead, AWJ rods, 2-7/8" drag bit

						y, cathead, AWJ rods, 2-7/8			ORIENTATION : Vertical
WATER	LEVELS	: 5.0 ft b	gs on 6/30		START : 11/28/2007	END : 11/28/2007	LOGGER	: D.	Whitaker
≥0£				STANDARD PENETRATION TEST RESULTS		SOIL DESCRIPTION		98	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		TEST RESULTS	SOIL NAME.	USCS GROUP SYMBOL, C	OLOR.	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
ATI B		RECOVI			MOISTURE C	CONTENT, RELATIVE DENS	SITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND
P.S.E.			#TYPE	6"-6"-6" (N)	CONSISTENCY	Y, SOIL STRUCTURE, MINE	RALUGY	SYN	INSTRUMENTATION
2.4	40.0	0.0	SS-9	50/1.5	No Recovery 40.	.0-40.1'		H	
-				(50/1.5")					-
-	1						-		Driller's Remark: Medium hard drilling from
-	1						-		41-62'
-							-		-
-	1						-		-
-							-		-
-	1						-		-
-							-		-
45	45.0						-		-
-2.6	45.0			46-50/5.5	No Recovery 45.	.0-46.0'			_
-	46.0	0.0	SS-10	(96/11.5")			-		-
-	40.0								-
-							-		-
-							_		-
-							_		-
-							-		-
-							-		-
-							-		-
50	50.0						-		-
-7.6	00.0	0.3	SS-11	33-50/3.5	_ Limestone Fragr	ments			_
-	50.8	0.5	33-11	(83/9.5")	\ 50.0-50.25' - light	t olive gray, (5Y 5/2), mild vel-sized fragments	HCI /-		_
-					l vectoris, into gra	70. 0.200agoo			_
-							_		1
-							-		_
_							-		
-							-		_
-							-		1
-							-		1
55	55.0						-		
-12.6	55.4	0.0	SS-12	50/5 (50/5")	No Recovery 55.	.0-55.4'			_
-				(50/5")	1		_]
-							_]
-							_		_
-	1						-]
-	1						-]
							_]
							_		
							_		
60									



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-23A	SHEET	4	OF	4

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723147.5 N, 458207.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: Mark Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT: CME 550, S/N 186073, mud rotary, cathead, AWJ rods, 2-7/8" drag bit

						y, cathead, AWJ rods, 2-7/8		_	ORIENTATION : Vertical
WATER	LEVELS	: 5.0 π Β	gs on 6/30		START : 11/28/2007	END: 11/28/2007 SOIL DESCRIPTION	LOGGER	: D.	VVNITAKET COMMENTS
> 우 우 우	CAMPIE	INTERVA	\1 / 4 \	STANDARD PENETRATION TEST RESULTS		OOIL DEGOINF HON		90	OGIVIIVILINIO
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	RECOVE		TEST RESULTS	SOIL NAME, MOISTURE C	USCS GROUP SYMBOL, CONTENT, RELATIVE DEN	COLOR, ISITY OR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTI SURF, ELEV/			#TYPE	6"-6"-6" (N)	CONSISTENCY	Y, SOIL STRUCTURE, MIN	ERALOGY	SYME	INSTRUMENTATION
-17.6 _	60.0 60.8	0.0	SS-13	50-50/4 (100/10")	No Recovery 60.	.0-60.8'	-		-
-							-		-
_							-		Drillada Damadu, Hard et 601
-							-		Driller's Remark: Hard at 62' Driller's Remark: Soft from 62.5-64.5'
							-		
-							-		-
65 <u> </u>	65.9						=		Driller's Remark: Hard from 64.5-66.5'
-22. 6		0.0	\SS-14)	50/1 (50/1")	No Recovery 65.	.0-65.1'			-
-							-		-
-							- -		Driller's Remark: Soft from 66.5-67.5'
-							_		Driller's Remark: Hard from 67.5-70.0'
_							-		_ -
-							_		-
70 -27.6	7 9:9	0.0	00.45	50/4	- N- D70	0.70.41			
-27.0		0.0	\SS-15	50/1 (50/1")	No Recovery 70. Bottom of Boring	at 70.1 ft bgs on 11/28/2	2007		Boring completed at 16:55 on 11/28/2007 Water level at 5.0' below ground surface Driller's Remark: 25% loss of circulation
_							- -		throughout entire boring
-							_		-
_							-		
-							-		-
_							-		
75 <u> </u>									_
_							-		
-							-		-
_							-		
-							=		-
_							-		
-							-		-
80									_



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-24	SHEET	1	OF	8

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723356.3 N, 458351.5 E (NAD83)

ELEVATION: 40.9 ft (NAVD88)

DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER LE	EVELS	: 1.61 ft b	gs on 6/	14/07	START : 5/15/2007 END : 5/17/2007 LOGGER : R. Gomez
				STANDARD	SOIL DESCRIPTION COMMENTS
AND AND	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	Ŏ C
ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6"	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
40.9	0.0			(N)	Silty Sand With Organics (SM) "Water level is based on Ground Water
-	0.0	0.4	SS-1	0-4-4	↑ 0.0-0.4' - grayish brown to dusky brown, (5YR 2/3 to /= Monitoring at LNP site (FSAR Table
1 1	1.5	0.1	00 1	(8)	\\ 5Y 2/2), moist to wet, loose, fine sand, 16% fines, \\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
I +	1.5				Begin drilling with 3-7/8" tri-cone bit at 2.0'
1 1					† †
1 1					1
1 7					1
]
					<u> </u>
5	5.0				
35.9				2-3-4	Poorly Graded Sand With Silt (SP-SM) 5.0-5.95' - moderate yellowish brown, (10YR 5/4), wet,
-		1.0	SS-2	(7)	loose, very fine to fine grained, no HCl reaction, 11%
1 +	6.5				sand is silica
-					-
-					-
1 1					
1 1					-
1 1					† †
10	10.0				1
30.9					Silt (ML) Driller's Remark: Surface around borehole
		1.1	SS-3	4-5-10 (15)	10.0-11.05' - grayish orange, (10YR 7/4), wet, stiff, onnplastic, rapid dilatancy, moderate HCl reaction,
	11.5			(1-7)	trace fine grained sand, all carbonate derived
					<u> </u>
					_
-					-
-					-
-					
	45.0				-
15 25.9	15.0	0.0	00.	47-50/3	Limestone Fragments And Silt (ML)
1 1	15.8	0.6	SS-4	(97/9")	15.0-15.6' - silt is grayish orange, (10YR 7/4), wet,
					\ limestone, pale yellowish brown, (10YR 6/2), fine
1					\grained sand to coarse grained gravel-sized / - \fragments, moderate HCl reaction
1					
]]
] [
]]
]]
20					



PROJECT NUMBER:

338884.FL

B-24

SHEET 2 OF 8

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723356.3 N, 458351.5 E (NAD83)

ELEVATION: 40.9 ft (NAVD88)

DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

						otary, auto nammer, Avvj rous			ORIENTATION : Vertical
WATER	LEVELS	: 1.61 ft b	ogs on 6/	14/07	START : 5/15/2007	END : 5/17/2007	LOGGE	K : R.	
200				STANDARD		SOIL DESCRIPTION		ğ	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				SYMBOLIC LOG	
ᆱᇰᇋ		RECOVE	ERY (ft)	1	SOIL NAME	E, USCS GROUP SYMBOL, ECONTENT, RELATIVE DEN	COLOR,	١ĕ	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
YFA VAN			#TYPE	6"-6"-6"		CY, SOIL STRUCTURE, MIN		l M	INSTRUMENTATION
			#ITPE	(N)	00.10.0.2.1	o , , o o o		SYI	internation.
20.9	20.0			` '	Silt With Sand	(ML)		1	
-		, ,		13-47-18	21.0-21.25' - gr	rayish orange to moderate	yellowish	-	-
-		1.3	SS-5	(65)	brown, (10YR 7	7/4 to 10YR 6/2), moist to v	wet, hard,	4111	_
	21.5				nonplastic, rapi	id dilatancy, moderate HCl zed grains, 5-10% medium	reaction,	╫	-
					grained materia		i to coarse	1	1
-					grained materia	ai .		1	-
-								-	Driller's Remark: Harder drilling at 22.5'
_								1	Diller's Remark. Harder drilling at 22.5
								1	
								1	
-								1	1
-								-	-
25	25.0				0 1 0 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1 2 1	,		 ,,,	-
15.9					Sandy Silt (ML	.) me as 20.0-21.25' except 2	27% fine		
]		1.5	SS-6	8-8-6 (14)	grained sand 1	13% medium to coarse gra	ined sand		1
-	00.5			(14)	granioa baria, i	10 /0 modium to obdico gra	anoa oana	1	1
-	26.5							╂Ш	-
-								-	_
_								┛	
								1	
-								1	Driller's Remark: Hard drilling at 28', 20%
-								┨	circulation loss -
-								-	_
_								╛	
30	30.0							1	
10.9	30.0 30.2	0.2	SS-7	50/2		gments		+	4" casing set at 30'
-				(50/2")	\30.0-30.15' - lig	oht brown, (5YR 5/6), mild	to moderate /	1	-
-					HCI reaction, m	noderately fossiliferous		-	-
_								1	_
								1	
								1	1
-								1	-
-								1	-
-								-]
]
25	35.0							1	1
35 5.9	35.0				Silty Sand (SM	1)		1111	1 −1
-			00.	6-10-19	35.0-36.5' - dar	k vellowish brown. (10YR)	4/2), moist to	-	1
		1.5	SS-8	(29)	wet, medium de	ense, fine to coarse graine	d, mild HCl		
	36.5			l ' '	reaction, 30% r	nonplastic fines, all carbon	ate derived		1
1 7								T] 1
-				I				1	
-				I				-	-
-								-]
]
-								1	1
								1	-
40							_	+	-
				I					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-24	SHEET	3	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723356.3 N, 458351.5 E (NAD83)

ELEVATION: 40.9 ft (NAVD88)

DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS	: 1.61 ft t	gs on 6/	14/07 S	START : 5/15/2007 END : 5/17/2007 LOGGE	ER:	. Gomez	
				STANDARD	SOIL DESCRIPTION	Т		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	II TS		D=0.7:	OF OAOINO DDILLING DATE
ACE VTIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	1	DEPTH	OF CASING, DRILLING RATE, IG FLUID LOSS, TESTS, AND
LEV.			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY			INSTRUMENTATION
0.9	40.8	0.0	SS-9	50/3	No Recovery 40.0-40.3'	士		
-				(50/3")		1		_
-						1		-
-						1		-
-						1		_
]		
_						1		<u> </u>
_						1		_
-						-		_
45 -4.1	45.0 45.4	0.4	SS-10	50/5	Silty Sand (SM)	-	Driller's Rer	mark: Hard to soft material from
-	40.4	0.4	00 10	(50/5")	√ 45.0-45.4' - moderate yellowish brown, (10YR 5/4),	∕╬		vy to no grinding) -
-					moist, very dense, fine to coarse grained, mild HCl reaction, 25-30% low plasticity fines, 5% fine grained	1		_
-					gravel	1		_
-						1		-
]		_
_								_
-						1		_
-						4		-
50 -9.1	50.0				Limestone Fragments And Silty Sand (SM)	-	Driller's Rer	mark: Medium grinding from 50-
-		1.5	SS-11	39-37-50	50.0-51.5' - Same as 45.0-45.6' except dark vellowish	-	55'	-
-	51.5	1.5	00-11	(87)	brown, (10YR 4/2), 60% limestone fragments, 40% silty sand	-		-
-	31.3					†	1	-
-						1		-
						1		- -
-]		
-						1		-
-	<u>54</u> .8					1	Advanced 4	" casing to 55', switch to rock
55 <u> </u>	54:9	0.0	SS-12	50/1	No Recovery 55.0-55.1'	#		rock core log
-				(50/1")	Begin Rock Coring at 55.0 ft bgs See the next sheet for the rock core log	+		-
-						+		_
-						1		-
-						1		-
]		- -
-]		_
-						1		-
-						-		-
60						+		



PROJECT NUMBER:

338884.FL

B-24

SHEET 4 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723356.3 N, 458351.5 E (NAD83)

ELEVATION: 40.9 ft (NAVD88)

DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 1.6	31 ft bo	as on (6/14/07 START : 5/15/2007 END : 5/	17/20	07 LOGGER : R. Gomez	
				DISCONTINUITIES	Т	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	5010	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ACE ATIO	LTH.	(%) _Q	TUR -00-	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	O L IC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EV.	CORE	Ø	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	55.0	<u>~</u>	шп		S	Limestone	
-			>10	55.1' - Fracture, horizontal, rough, planar, open	Ħ	55.0-57.0' - moderate yellowish	-
-				55.4-55.6' - Fracture zone, multiple fractures, gravel-sized rock fragments	岸	brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), medium	-
-			0	55.9' - Fracture or mechanical break,	世	 grained, mild to moderate HCl 	-
-	R1-HQ			horizontal, rough, planar, tight 57.0-57.2' - Clay seam, 0.2' thick	ZZ	reaction, weak (R2), voids ☐ (1/16-3/16") over 20-30% of surface, ☐	-
-	5 ft 82%	45	2	or.o or.z olay scam, o.z unok	H	moderately fossiliferous (shell fragments), black organic lenses	-
-	0270			57.9-58.4' - Fracture zone, multiple fractures	///	3/16-3/8" at 55.6-55.9' and 56.8-57.0'	-
-			>10		TT.	Fat Clay (CH) 57.0-57.2' - moderate brown, (5YR	-
-			0		口	4/4), high plasticity	R1: 11 minutes
60	60.0		NR			Limestone 57.2-58.0' - Same as 55.0-57.0'	=
-19.1	00.0			_	╁	Fat Clay (CH)	
-			2	60.3' - Fracture or mechanical break, 60 deg 60.6' - Fracture, rough, stepped, open	F	58.0-58.4 - grayish brown to dusky	_
-				1/8-5/16"	Ħ	yellowish brown, (5YR 3/2 to 10YR 2/2), medium to high plasticity	_
-			0			Limestone	_
-	R2-HQ	00	_	62.1, 62.5, 62.7, 62.8, 63.0, 63.3, 63.4, 63.7,	Ш	 58.4-59.1' - Same as 55.0-57.0' except cavities (3/16-9/16") over 40% 	-
-	5 ft 96%	33	5	64.1, 64.4' - Fractures (10), rough, planar, <1/16" clay infilling	╨	of surface No Recovery 59.1-60.0'	=
-			2	1710 day illining	\vdash	Limestone	_
-			3		ፗ	60.0-61.2' - Same as 55.0-57.0' - except pale yellowish brown, (10YR	=
-			2		Ш	6/2), medium to coarse grained	R2: 12 minutes
65	65.0		NR.		╁	61.2-64.8' - pale yellowish brown to — dark yellowish brown, (10YR 6/2 to	
-24.1			>10	65.0-66.2' - Fracture zone, rough to smooth, planar, <1/16" silt and/or clay sized infilling	F	10YR 4/2), fine to coarse grained,	
			/10	planar, < 1/10 silt and/or day sized infilling	F	moderate HCl reaction, very weak (R1), weak rock (R2) at 63.7', 63.8'	
l _			2	66.35, 66.5' - Fractures (2), rough, stepped,	片	and 64.0', friable, poorly fossiliferous	_
				open 1/8"	\vdash	No Recovery 64.8-65.0' Limestone	SC-1 collected at 66.5- 67.25' -
_	R3-HQ 5 ft	38	1	67.2' - Fracture, rough, stepped, open	\vdash	65.0-66.2' - Same as 61.2-64.8'	-
l .	94%	50		3/16-1/4"	厂	except increase in weak rock (R2), rock chips	_
l .			2		上	66.2-69.7' - dark yellowish brown, (10YR 4/2), moderate HCl reaction,	_
_				68.5, 68.7' - Fractures (2), rough, stepped, open 1/16-3/16"	\vdash	very weak to weak (R1 to R2), voids	
-			<10		\vdash	(up to 3/16") over 30% of surface, solution cavities (up to 3/4") over	R3: 9 minutes
	70.0		NR		F	10% of surface, intervals of fine	
-29.1			10	70.0-74.0' - Fracture zone, vertical, multiple fractures, mostly vertical along weak joints,		grained limestone with no voids or solution cavities from 69.0-69.7'	_
-				slight infilling	片	No Recovery 69.7-70.0'	_
-			10		世	Limestone - 70.0-72.4' - pale yellowish brown,	_
-	B				\vdash	(10YR 6/2), fine grained, moderate	_
-	R4-HQ 5 ft	0	10		ZZ	HCl reaction, weak to medium strong (R2 to R3), voids (<1/8") over 5-10%	_
-	76%				╀	of surface, silt-like matrix over 5% of surface, poorly fossiliferous	_
-			10		\vdash	- \Fat Clay (CH)	_
-					厂	72.4-72.6 - light brown, (5YR 5/6), medium to high plasticity, no HCl	R4: 8 minutes
-			NR		世	reaction, with black, friable organics	1\4. 0 IIIIIIules -
75	75.0				╄		

Rev. 7



PROJECT NUMBER:

33884.FL

BORING NUMBER:

B-24

SHEET 5 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723356.3 N, 458351.5 E (NAD83)

ELEVATION: 40.9 ft (NAVD88)

DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS: 1.6	1 ft bg	gs on 6	5/14/07 START : 5/15/2007 END : 5/	17/20	D7 LOGGER : R. Gomez	
> O :=	(9)			DISCONTINUITIES	Ö	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH BE	E RU STH, OVEF	D (%)	FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
EN SEPT	SORE	RQ	FRAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	3 Y ME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-34.1	034	ш			0)	Limestone	
-			0	-	Ħ	- 72.6-73.8' - moderate yellowish	-
-				-	Ħ	brown, (10YR 5/4), very weak (R1), voids (up to 1/16") over 10-20% of	-
-			1	- 76.6' - Fracture, horizontal, rough, stepped,	Ħ	 surface, moderately fossiliferous No Recovery 73.8-75.0' 	-
-	R5-HQ		-	open 3/16-5/16", fracture along cavity	Ш	Limestone	-
-	5 ft 92%	72	3	77.5-77.8' - Fractures, irregular fractures	₩	 75.0-79.6' - moderate yellowish brown to dark yellowish brown, 	-
-	3270			along solution cavities	\square	(10YR 5/4 to 10YR 4/2), moderate	-
-			2	- 78.6' - Fracture, 60 deg, rough, planar	口	 HCl reaction, very weak to weak (R1 to R2), voids (up to 1/16") over 	-
-			1		世	30-40% of surface, solution cavities	R5: 7 minutes
80	80.0		NR	79.6' - Fracture, horizontal, rough, stepped,	Н	at 76.4-77.3', highly fossiliferousNo Recovery 79.6-80.0'	
-39.1	00.0			open 1/16-1/8"	Ħ	Limestone	-
-			2	80.5, 80.8' - Fractures (2), horizontal, rough,	Ħ	 80.0-83.4' - pale yellowish brown to dark yellowish brown, (10YR 6/2 to 	1
-				planar, some silt and sand infilling	H	10YR 4/2), weak to medium strong	1
-			>10	81.6, 82.0' - Fracture zone, multiple fractures	Ш	 (R2 to R3), voids (1/16") over 20-30% of surface, solutions cavities 	1
-	R6-HQ			along solution cavities 82.2' - Fracture or mechanical break, vertical		(<3/4") over 10-15% of surface	1
-	5 ft 68%	37	3	82.4' - Fracture, 3-5 deg, rough, stepped,	Ш	_	1
_			1	trace infilling, open 1/8-1/4" 83.1' - Fracture, 15 deg, rough, planar	Ш	_	1
-				os. i - Fracture, 15 deg, fough, planai	Ш	No Recovery 83.4-85.0'	1
-			NR	-	Н	_	R6: 7 minutes
85	85.0			-	H		1
-44.1			4	85.0-85.2' - Fracture zone, irregular fractures	Ħ	Limestone	
			4	along solution cavities 85.5' - Fracture, horizontal, smooth,	H	 85.0-87.3' - very pale orange to grayish orange, (10YR 8/2 to 10YR 	
			1	undulating 86.2' - Fracture, horizontal, smooth, stepped,	Н	7/4), fine grained, strong HCl reaction, weak (R2), trace voids,	
				infilling	Н	trace fossils, 20-30% silt sized matrix	
_	R7-HQ 5 ft	35	1	87.1, 87.4' - Mechanical break (2), horizontal,	\square	material - 87.3-87.9' - Same as 85.0-87.3'	<u> </u>
_	58%	00		rough, planar	H	except extremely weak to very weak	
_				87.9' - Fracture, smooth, planar, irregular pieces	Ш	(R0 to R1), silty matrix increases to 40-50%	Driller's Remark: 90% circulation loss at 88' -
_			NR	_	Н	No Recovery 87.9-90.0'	_
-				<u>-</u>	\square	_	R7: 8 minutes
	90.0			00.01 5	H		_
-49.1 -			2	90.6' - Fracture, 7-10 deg, rough, planar	H	Limestone - 90.0-94.3' - grayish orange, (10YR	_
-				90.9' - Fracture, 0-1 deg, rough, planar	H	7/4), medium to coarse grained, moderate HCl reaction, extremely	-
-			3	91.7, 91.8, 91.9' - Fractures (3), 2-4 deg, rough, planar	븬	weak to very weak (R0 to R1), voids	-
-	DO LIG			_	円	(up to 1/8") over 20-30% of surface,	-
-	R8-HQ 5 ft	52	10	92.0-92.2' - Fractures or mechanical break, irregular fractures -	H	moderately fossiliferous, silty matrix up to 40-50%	-
-	100%			92.4' - Fracture, horizontal, rough, planar,	H	-	-
-			1	trace infilling 92.7' - Fracture, 40-50 deg, rough, planar, to -	Н	-	-
-				undulating 93.9' - Fracture, 5-10 deg, rough, stepped,	F	-	R8: 7 minutes
-			10	<3/16" infilling -	H	_	1\0. / IIIIIIules -
95	95.0				H		_
					1		



PROJECT NUMBER:

338884.FL

B-24

SHEET 6 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723356.3 N, 458351.5 E (NAD83)

ELEVATION: 40.9 ft (NAVD88)

DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS: 1.6	1 ft bo	gs on (6/14/07 START : 5/15/2007 END : 5/	17/20	D7 LOGGER : R. Gomez	
300	<u> </u>			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S .	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	CIZE AND DEDTH OF CACING
A SE	RUT. VER	(%) O	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	1 5	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
LEV.	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND	ΥMB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	225	ď	E E	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	
-54.1			1	94.3-95.0' - Fracture zone, multiple fractures, very soft material	Н	Limestone - 94.3-95.0' - Same as 90.0-94.3'	SC-2 collected at 95.2-
_				95.2' - Fracture, horizontal, smooth, planar	Ш	except strong HCl reaction, silty	96.4'
_			2	00.4.00.051	Щ	matrix increases to 60-70% 95.0-100.0' - pale yellowish brown,	_
_				96.4, 96.85' - Fractures (2), 1 deg, rough, stepped, open 1/8-5/16"	Ш	(10YR 6/2), strong HCl reaction, very	_
_	R9-HQ 5 ft	78	3	97.2, 97.8, 97.9, 98.0, 98.15, 98.9' -	┟┼┤	weak (R1), voids (up to 1/16") over 10-20% of surface, solution cavities	
	100%	70	J	Fractures (6), rough, stepped, open 3/16"		(up to 3/8") over 5-10% of surface,	
			3			moderately fossiliferous, 5-10% silty - matrix (chalk-like)	
			٦		Н	- Hatix (chaix-like)]
			2		Ш		R9: 6 minutes
100	100.0			99.6, 99.7' - Fractures (2), horizontal,	Щ]
-59.1			10	smooth, planar 100.0-100.35' - Fracture zone, irregular	Ш	100.0-101.4' - grayish orange, (10YR 7/4), medium to coarse grained,]
			10	pieces	\mathbb{H}	strong HCl reaction, very weak (R1),]
			1	101.0, 101.3' - Fractures (2), 60 deg, rough,	Ħ	voids (up to 1/16") over 5-10% of]
				planar, tight		 surface, poorly to moderately fossiliferous]
	R10-HQ				Н	No Recovery 101.4-105.0']
	5 ft 28%	0			Н]
			NR		ш		1
-					Ш		1
-					\mathbb{H}		R10: 4 minutes
105	105.0				H]
-64.1	·		0	_		Limestone	
			U		Ш	- 105.0-108.5' - Same as 100.0-101.4' except pale yellowish brown, (10YR	
			1		Н	6/2)	1
			'	106.75, 107.2' - Fractures (2), horizontal,	Н		
	R11-HQ	52	4	smooth, planar, tight	Ш]
	5 ft 100%	52	4	107.4, 107.7, 107.9' - Fractures (3), horizontal, rough, planar, open	Ш		
]			10	108.3-108.7' - Fracture zone, irregular breaks	\mathbb{H}]
			10	along weak fractures	Ħ	108.5-110.0' - pale yellowish brown, - (10YR 6/2), strong HCl reaction,]
]			3	109.3, 109.5, 109.9' - Fractures (3), rough,	H	extremely weak (R0), poorly	R11: 5 minutes
110_	110.0		J	stepped, open 1/8-3/16"	H	fossiliferous, no voids	
-69.1			4	110.1, 110.2, 110.3' - Fractures (3), smooth,	Н	Limestone - 110.0-113.9' - grayish orange to pale	
			4	breaks along smooth fractures 110.8' - Fracture, rough, undulating	Д	yellowish brown, (10YR 7/4 to 10YR]
			4	111.1, 111.6' - Fractures (2), rough, planar	Щ	6/2), strong HCl reaction, very weak (R1), voids (up to 3/16") over 30-40%]
			4	444.0.444.001.5	Ш	of surface, trace solution cavities (up]
	R12-HQ 5 ft	23	>10	111.9, 111.98' - Fractures (2), 5 deg, smooth, planar	\mathbb{H}	to 3/8"), 10-20% silty and sandy sized matrix]
	78%	23	- 10	112.1-112.6' - Fracture zone, multiple	Ħ	- 0.254 Hatix	
			>10	irregular breaks, some gravel sized rock fragments	H	_	
				113.0-113.9' - Fracture zone, multiple	H	- No Decover: 440 0 445 0]
			NR	irregular breaks along weak fractures	Щ	No Recovery 113.9-115.0'	R12: 4 minutes
115	115.0				Ш		

APPENDIX 2BB-610 Rev. 7



PROJECT NUMBER:

33884.FL

BORING NUMBER:

B-24

SHEET 7 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723356.3 N, 458351.5 E (NAD83)

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS : 1.6	31 ft bo	gs on (6/14/07 START : 5/15/2007 END : 5/	17/20	D7 LOGGER : R. Gomez	
>00				DISCONTINUITIES	ŋ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A TIC	TH.,	D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Ğ	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EPT URF	ORE	Ø	ZAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	√MB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	025	₩.			Ś		, i
-74.1 -			1	115.3' - Fracture, horizontal, rough, planar	Ш	Limestone - 115.0-120.0' - grayish orange to pale	SC-3 collected at 115.3-
l _					₽	yellowish brown, (10YR 7/4 to 10YR	116.15'
_			2	116.25' - Fracture, rough, stepped, open	ш	6/2), strong HCl reaction, very weak (R1), voids over 20-30% of surface,	_
_				1/16-1/8"	Ш	solution cavities (9/16") over 15-20%	_
_	R13-HQ 5 ft	62	1	116.45' - Fracture, rough, planar	Н	of surface from 116.5-118.0', silty laminations (pale yellowish brown)	_
	100%	02		117.7' - Fracture, smooth, undulating	Ħ	with no voids/cavities at 118.7' and	_
_			6	118.1' - Fracture, horizontal, smooth, planar,		118.9' 	
				open 1/16" 118.6' - Fracture, 60 deg, rough, undulating	Н		
			2	118.7-118.9' - Fracture zone, regular breaks	Ш		R13: 7 minutes
120	120.0			along weak fractures 119.2, 119.4' - Fractures (2), irregular breaks —	Щ]
-79.1			4	120.2, 120.3, 120.5, 120.8' - Fractures,	Ш	120.0-124.3' - grayish orange to pale yellowish brown, (10YR 7/4 to 10YR	
]			4	smooth, stepped, open 1/8-3/16"	\mathbb{H}	6/2), strong HCl reaction, very weak]
]					Ħ	to weak (R1 to R2), voids (up to 1/16") over 20-25% of surface,]
			0			10-15% silty matrix, silty laminations	1
-	R14-HQ			122.1, 122.2, 122.6, 122.95' - Fractures (4),	╁	at 123.5-123.6', fine grained	1
-	5 ft 86%	58	4	horizontal, rough, stepped	Ш	 carbonate laminations (very pale orange [10YR 8/2], weak to medium 	1
-				123.1, 128.2, 123.35, 123.5' - Fractures (4),	ш	strong [R2 to R3]) at 123.8' and	1
-			4	0-1 deg, smooth, planar	\Box	– 123.9' -	1
-			0		\vdash	T	R14: 6 minutes
125	125.0		NR		Ħ	- No Recovery 124.3-125.0'	1
-84.1	120.0			— 125.1' - Fracture, rough, undulating	Ш	Limestone	
-			2	125.5' - Fracture, 2 deg, rough, planar	╁┼	 125.0-130.0' - pale yellowish brown, (10YR 6/2), moderate to strong HCI 	-
_				-	Ш	reaction, very weak to weak (R1 to	1
-			0	126.6, 127.7' - Mechanical break (2)	ш	 R2), voids (up to 1/16") over 15-20% of surface, solution cavities (up to 	-
-	R15-HQ				Ш	3/4") over 20-30% of surface at	-
-	5 ft 100%	70	0	-	╂┼┤	 125.0-126.7', moderately fossiliferous, fine grained at 	-
-	100 /0			100 0 100 0 100 4 100 0 100 0 100 0	Ħ	128.8-129.5', 15-20% silty matrix	
-			5	128.2, 128.3, 128.4, 128.6, 128.8, 129.0' - Fractures (6), smooth, planar, breaks along	Ш	-	
-				weak fractures 129.1, 129.3' - Fractures (2), 0-2 deg, rough,		-	R15: 6 minutes
130	130.0		2	planar	円	-	
-89.1	130.0			_	世	 130.0-132.5' - moderate yellowish	-
-			4	420.7. 420.0. 420.0. 420.05!. F		brown, (10YR 5/4), mild to moderate	-
-				130.7, 130.8, 130.9, 130.95' - Fractures (4), smooth, planar, breaks along weak fractures	H	HCl reaction, very weak (R1), solution cavities (up to 9/16") over	-
-			1	131.3' - Fracture, rough, stepped, open	Ħ	 5-10% of surface, moderately fossiliferous 	-
-	R16-HQ			1/8-3/16"	世	L iossilierous	-
-	5 ft	70	0	132.2, 132.4, 132.5, 134.6' - Mechanical break (4), irregular breaks	$oldsymbol{arphi}$	132.5-134.6' - very pale orange to	
-	92%				囯	pale yellowish brown, (10YR 8/2 to	-
-			0		田	10YR 6/2), fine grained, strong to moderate HCl reaction, medium	-
-					H	strong to strong (R3 to R4), solution	R16: 7 minutes
			0	-	Ħ	cavities (up to 3/4") over 5% of surface, moderately fossiliferous	-
135	135.0		NR		H		_
					•		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-24	SHEET	8	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723356.3 N, 458351.5 E (NAD83)

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS : 1.6	1 ft bo	gs on 6	6/14/07 START: 5/15/2007 END: 5/	17/20	07 LOGGER : R. Gomez	
200				DISCONTINUITIES	ß	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
ACE A	B.F.P.	(%) _Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
LEV.	ORE	ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	×ΜΕ	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	024	œ	正正	THICKNESS, SURFACE STAINING, AND HIGHTNESS	Ś		
-94.1 -			4	135.1, 135.4, 135.7, 135.9' - Fractures (4), horizontal, rough, undulating, open, dark	片	No Recovery 134.5-135.0' Limestone	-
				yellowish brown staining	₽	135.0-136.0' - pale yellowish brown	_
			10	136.0-136.5' - Fracture zone, some gravel sized rock fragments	Д	to grayish orange, (10YR 6/2 to 10YR 7/4), fine grained, moderate]
				136.6' - Fracture zone or mechanical break,	Ш	HCl reaction, weak (R2), voids (up to	
	R17-HQ 5 ft	47	0	60 deg, tight	┢	3/16") over 10-20% of surface, cavities (up to 1-3/16"x3/8") over]
	88%	7'	Ŭ	137.2 - Fracture or mechanical break, 40 deg, smooth, planar, tight	广	15-25% of surface, some fossil	SC-4 collected at 137.75-
			0	137.6' - Fracture or mechanical break, rough,	L	casts/molds - 136.0-136.4' - moderate yellowish	138.6'
				planar, tight 138.6, 138.9' - Mechanical break (2), rough,	\vdash	brown, (10YR 5/4), fine grained,]
1 7			0	stepped, open 3/16-5/16"	ш	moderate HCl reaction, very weak (R1), voids (up to 3/16") over 30-40%	R17: 9 minutes
140	140.0		NR	139.3, 139.8' - Mechanical break (2), rough, planar	Ш	of surface, trace cavities (3/8"x3/16"),	1
-99.1					1—	moderately fossiliferous 136.4-138.6' - pale yellowish brown	
1 1			0		Ħ	interlaminated with moderate	1 1
			\Box		片	yellowish brown, (10YR 6/2 with	
1 1			0	-	╨	10YR 5/4), fine to medium grained, moderate HCl reaction, weak (R2),	1
	I R18-HQ			-	口	trace voids (up to 1/16"), trace fossils	1
	5 ft 100%	93	4	142.3, 142.35, 142.4, 142.5' - Fractures (4), horizontal, smooth, planar, breaks along	世	_ (casts/molds), laminated 138.6-139.4' - pale yellowish brown,	1
	100 /6		\dashv	weak fractures	╁	(10YR 6/2), fine to medium grained,	1 -
I −			0	-	F	strong HCl reaction, very weak to weak (R1 to R2), trace voids (up to	1 -
-			-	-	世	1/16"), some fossils	R18: 5 minutes
I ⊢			0	-	₩	No Recovery 139.4-140' Limestone	-
145 -104.1	145.0		-		厂	— 140.0-142.5' - pale yellowish brown	-
			5	145.1, 145.3, 145.4, 145.5, 145.8' - Fractures (5), horizontal, rough, planar, open 3/16"	口	to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine to medium	
I ⊣			-	-	╁	grained, strong HCl reaction, very	1 -
I ⊣			0	-	H	weak to weak (R1 to R2), voids (up to 1/16") over 5-10% of surface,	-
I ⊣	DIOLIO			-	Ħ	- trace fossils	-
	R19-HQ 5 ft	67	0	-	Ľ	142.5-142.8' - moderate yellowish brown, (10YR 5/4), fine to medium	-
	88%				₽	 grained, mild HCl reaction, very weak 	-
I ⊣			0		П	to weak (R1 to R2), voids (up to	-
					上	1/16") over 10-20% of surface, trace fossils	D40: 5
			0		\vdash	142.8-145.0' - pale yellowish brown,	R19: 5 minutes
	150.0		NR		F	(10YR 6/2), fine grained, mild to moderate HCl reaction, very weak to	T-1-1 d11 450 01
-109.1			l	_	1	weak (R1 to R2), voids (up to 1/8")	Total depth 150.0'
				_		over 10% of surface, fossils (molds/casts) over 10% of surface	<u> </u>
 					1	145.0-146.0' - moderate yellowish]
			l			brown, (10YR 5/4), mild HCl reaction, very weak (R1), voids (up to 1/8")	
1						over 30-35% of surface, laminated,]
						20% silty matrix, friable 146.0-149.4' - moderate yellowish]
			l		1	brown to pale yellowish brown,	1
1			l		1	(10YR 5/4 to 10YR 6/2), fine to medium grained, moderate HCl	1
1				-	1	reaction, very weak to weak (R1 to	1
				-	1	R2), solution cavities (up to 3/4") at	1
					1	THE PARTY OF THE P	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-24	SHEET	9	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723356.3 N, 458351.5 E (NAD83)

ELEVATION: 40.9 ft (NAVD88)

DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

WATER	ATER LEVELS: 1.61 ft bgs on 6/14/07 START: 5/15/2007 EN						7 LOGGER : R. Gomez	
				DISCONTINUITIES	Т	Т	LITHOLOGY	COMMENTS
ELOV : ANE	IN, AND ?Y (%		ZES T	DESCRIPTION			ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH BI	E RU 3TH, OVEF	(%) ⊂	TUF	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	2		MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNES	SYMBOLD DE		AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
		_			+	+	No Recovery 149.4-150.0'	
-					1	ŀ	Bottom of Boring at 150.0 ft bgs on	-
-					1	ŀ	_ 5/17/2007	-
-					1	ŀ	-	-
_					1	ı	-	_
-					1	ı	-	_
]		-	
]		_	
_					1	L	-	_
_					4	ŀ		
_					4	ŀ	-	_
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-25	SHEET	1	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722845.8 N, 458024.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 240; CME 55 S/N 299205, mud rotary, cathead, AWJ/NWJ rods, 3-15/16" tri-cone bit ORIENTATION : Vertical

WATER LEVELS: 2.3 ft bgs on 6/30/07									
WATER	LLVELS	. Z.J IL DĻ	13 UH 0/31		START : 4/19/2007	END: 4/23/2007 SOIL DESCRIPTION	LUGUE	Т	D. Roraback COMMENTS
<u>\$</u> 9€	SAMPI F	INTERVA	I (ft)	STANDARD PENETRATION				- 5	35
DEPTH BELOW SURFACE AND ELEVATION (#)	J, WIII LL	RECOVE		TEST RESULTS	SOIL NAME,	USCS GROUP SYMBOL,	COLOR,	SYMBOLICITOR	DEPTH OF CASING, DRILLING RATE,
FAC VAT		110076	#TYPE	6"-6"-6"		CONTENT, RELATIVE DEN Y, SOIL STRUCTURE, MIN		AR _O	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
SCE			#ITPE	(N)	00.10.012.10	.,		\ \frac{1}{\delta}	5
42.5	0.0				─ Topsoil			7/	Limited space in header: 3-15/16" tri-cone bit
		1.1	SS-1	2-2-4 (6)	\0-0.2' - roots	Sand With Organics (SP	<u> </u>	1	1
	1.5			(0)		ay, (N7), moist, loose, fir	ne grained, /	1	Soils logged by D. Roraback and J. Schaeffer
						silica sand, trace nonpla es decreasing with depth		1	Note: D50 S/N 240 (with cathead) started
					(1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	<u> </u>]	boring; due to mechanical issues, rig swapped to CME-55 S/N 299205 at 60 feet
]	below ground surface. Soils drilled with D50.
]	
]	
]	
5	5.0							L	
37.5					Poorly Graded S	Sand (SP) ite yellowish brown, (10\	/P 5/4) wot	\rfloor	
		1.2	SS-2	2-3-4 (7)	loose, very fine to	o fine grained, no HCl re	action, silica]	
_	6.5			. ,	sand, trace nonp	lastic fines, trace roots/c	organics.	╁	-
_								┨	
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_								┨	
_								┨	
_								⅃	
10	10.0						_	\perp	
32.5				4.4.5		Sand With Silt (SP-SM) yellowish brown, (10YR	6/2) wet	H	11
_		1.2	SS-3	4-4-5 (9)	loose, very fine to	o fine grained, no HCl re	action, silica	45	<u>_</u>
_	11.5				sand, 5% nonplage black minerals or	stic fines, trace very fine	e sand-sized	╁	<u> </u>
_					black millerals of	organios	/]	_
_								1	_
_								1	
_								1	
_								1	
_								1	
15	15.0							<u> </u>	
27.5				6-6-5	Clayey Sand (SC 15.0-16.0' - mottle	ċ) ed yellowish gray, (5YR	8/1), wet	1//]
_		1.0	SS-4	(11)	very fine to fine g	rained, no HCl reaction,	, silica sand,		
_	16.5				21% medium pla	stic fines	/	1	
_								1	
_								1	
_								1	
-									
								1	
_								1	
20								┺	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-25	SHEET	2	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722845.8 N, 458024.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 240; CME 55 S/N 299205, mud rotary, cathead, AWJ/NWJ rods, 3-15/16" tri-cone bit ORIENTATION : Vertical

WATER	LEVELS	: 2.3 ft bo	s on 6/30)/07 S	START : 4/19/2007 END : 4/23/2007 LOGGE	DGGER : D. Roraback							
				STANDARD	SOIL DESCRIPTION	U	COMMENTS						
AND AND (#)	SAMPLE INTERVAL (ft) PENETRATION TEST RESUL		PENETRATION TEST RESULTS	COLL NAME LICOS OPOLID CVANDOL COLOD	CLO	DEDTH OF CACING DRILLING DATE							
H BE ACE		RECOVE	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		3 S	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND							
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	INSTRUMENTATION						
22.5	20.0				Clayey Sand (SC)								
		1.1	SS-5	2-5-5 (10)	20.0-21.1' - yellowish gray, (5YR 8/1), moist, stiff, high plasticity, no dilatancy, no HCl reaction, 68% fine]						
	21.5			(,	silica sand		1						
-						1							
-						-	1						
-						-	-						
-						1	1						
-						1	1						
25	25.0					1	1						
25 17.5					Silty Sand (SM) 25.0-26.0' - pale yellowish brown, (10YR 6/4), wet,								
_		1.0	SS-6	5-5-5 (10)	loose, very fine to fine grained, no HCl reaction, silica								
-	26.5				sand, 20% low to medium plasticity fines	-	1						
-						-	-						
-						┨							
-						1	1						
-						1	1						
]]						
30	30.0					777							
12.5			00 -	3-3-4	Clayey Sand (SC) 30.0-30.7' - pale yellowish brown, (10YR 6/2), wet,	- 1//	4						
-		0.7	SS-7	(7)	loose, very fine to fine grained, no HCl reaction, silica sand, 25-30% medium to high plastic fines, clay	$\overline{\mathbf{I}}$	1						
-	31.5				lenses throughout	┨	1						
-						1	1						
-						1	1						
]							
-						1							
-						-	-						
35 7.5	35.0				Sandy Silt (ML)	+							
-		1.4	SS-8	22-44-41	35.0-36.4' - light olive gray, (5Y 5/2), wet, very hard, nonplastic to low plasticity, rapid dilatancy, mild to	$\ \ $	-						
-	36.5		-	(85)	moderate HCl reaction, 20-35% very fine to coarse	111] 1						
-					sand-sized particles, carbonate materials		1						
] -]						
-						-							
-						-	-						
-						+	-						
40						1	-						
1						t	1						



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-25	SHEET	3	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722845.8 N, 458024.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 240; CME 55 S/N 299205, mud rotary, cathead, AWJ/NWJ rods, 3-15/16" tri-cone bit ORIENTATION : Vertical

WATER	WATER LEVELS: 2.3 ft bgs on 6/30/07 START: 4/19/2007 END: 4/23/2007 LOGGER: D. Roraback										
				STANDARD	SOIL DESCRIPTION	U	COMMENTS				
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	RECOVE		PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND				
SURF.			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYME	INSTRUMENTATION				
2.5	40.0	1.0	SS-9	17-47-43 (90)	Sandy Silt (ML) 40.0-41.0' - Same as 35.0-36.4'	-	Driller's Remark: Hitting hard material				
 45 2.5	45.0	0.0	SS-10	50/0.5 (50/0.5")	Slough And Limestone Fragments 45.0-45.05' - very poor recovery	- - - - - - - -					
 50 -7.5	49.9	0.0	\SS-11,	50/0.5	¬\ Slough And Limestone Fragments 7	- - - - - - -	-				
-7.3 - - - - - -				(50/0.5")	Slough And Limestone Fragments 50.0-50.05' - Same as 45.0-45.05' Begin Rock Coring at 50.0 ft bgs See the next sheet for the rock core log	-	- - - - - -				
55_ -12.5 - 					_						
60						+					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-25	SHEET	4	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722845.8 N, 458024.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 240; CME 55 S/N 299205, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

COKING	INICITIODA	AD L	ZOII IV	IENT: Dietrich D-50 S/N 240; CIVIE 55 S/N 299205, Muc	Total	y, 14Q (0013, 1144 Cd3li1g	ORIENTATION: Vertical
WATER	LEVELS : 2.3	ft bas	s on 6/	/30/07 START: 4/19/2007 END: 4/	23/20	07 LOGGER : D. Roraback	
*****		it by	011 0/	DISCONTINUITIES	1	LITHOLOGY	COMMENTS
⋛⋂⊋	CORE RUN, LENGTH, AND RECOVERY (%)			DIOCONTINUITIEO	1 2	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	7N ≻		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	OIZE AND DEDTH OF GAGING
	H,4 E,4,4 E,4,4	(%) 🛭	R C		1 ∺	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
±₹.	P E P	٥	FS	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
E S E	RES	Ø	RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Z	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
		œ	ΗД	THIORNEOU, OUR AGE CTAINING, AND HOTTINEOU	S	CHARACTERISTICS	
-7.5	50.0					No Recovery 50.0-55.0'	Rock core logged by D.
-	1				┺	ŀ ´	Roraback and P. De
l -					╨	_	Sa'Rego
1					Н		
-					_	<u> </u>	Driller's Remark: Possible
-					\perp	_	sand layer; tagged bottom -
1	R1-NQ	_			\vdash		at 55' below ground
-	5 ft	0	NR		┺	<u> </u>	surface
-	0%				╁┯	-	-
1						1	
-					ш	Ţ.	1
-					╁	 -	D1: 16 minutos
1]				┵	L	R1: 16 minutes
55	55.0				\vdash		1
-12.5	55.0		\vdash	_	芐	Limestone	-
1			4	55.3' - Fracture, 20 deg, rough, undulating,		- 55.0-59.75' - pale yellowish brown,	_
1			'	open		(10YR 6/4), fine to medium grained,	
1 -	1		\Box	55.55' - Fracture, 10 deg, rough, undulating,	1	mild delayed HCl reaction, extremely	-
1 -			4	open	╀	 weak to very weak (R0 to R1), 	-
				55.7-55.75' - Fracture, 30 deg, rough, planar	Н	variable 10-20% voids to 1/16", trace	
	R2-NQ			55.8' - Fracture, horizontal, rough, undulating,		casts/cavities up to 3/8"x3/8"	1
-	5 ft	0	7	lenticular	╨	 throughout run, 30-40% cavities at 	-
	94%			55.95-56.0' - Fracture, 20 deg, rough,	ь	56.0-56.15'	
				undulating, open	\vdash		R2: 11 minutes
-			>10	56.15' - Fracture, 20 deg, rough, undulating,	╁	-	-
I -				open 56.4-56.7' - Fracture zone	╂	-	-
			5	56.8, 56.85, 56.95, 57.05, 57.2, 57.3, 57.5' -	Н		
60	60.0		NR	Fractures (7), <10 deg, rough, undulating,	\top	Γ	Rig switched out partway
-17.5	00.0		INIX	open –		No Recovery 59.75-60.0'	through boring due to —
			1	57.7-57.8' - Fracture zone	╨	Limestone	mechanical issues
			' I	57.9, 58.1' - Fractures (2), horizontal, rough,	Н	60.0-62.6' - yellowish gray, (5Y 7/2), fine to medium grained, mild delayed	change to CME 55 rig SN
-				undulating, open	┰	HCI reaction, weak (R2), 15-20%	299705 at 60'
-			2	58.15-58.3' - Fracture zone		voids up to 1/16", trace voids up to	Drillaria Damariki Water
				58.5, 58.6, 58.8' - Fractures (3), 10 deg,		1-3/16" by 3/8", thread-like black	Driller's Remark: Water
	R3-NQ		1	rough, undulating, open	╨	mottling up to 1-9/16" by 1/32" at	level at 2.3' below ground – surface
-	5 ft	9	_'_	59.1-59.3' - Fracture zone	╁╌	62.4'-62.8'	SC-1 collected at 60.15-
1 -	52%			59.6, 59.75' - Fractures (2), 10 deg, rough,		No Recovery 62.6-65.0'	61.20'
1				undulating, open 60.1, 61.5' - Fractures (2), horizontal, rough,		·]
1 -				undulating, open	╁	†	-
1 -			NR	61.85-62.1' - Fracture, 60 deg, rough,	╁┷	 -	
1				undulating	\Box	1	
	1050			62.5' - Mechanical break		<u> </u>	R3: 5 minutes
65 <u> </u>	65.0		\vdash	_	4	Limestone	-
-22.5]		5	65.1, 65.2, 65.35, 65.5, 65.7, 66.3' -	╁┼	Limestone - 65.0-68.9' - moderate yellowish	
1			ا ا	Fractures (6), <10 deg, rough, undulating,		brown, (10 YR 5/4), mild delayed HCl	
1 -			\vdash	open		reaction, weak (R2), 25-30% voids	-
1 -			1		1	up to 3/16", no visible cavities except	
1			'		\vdash	67.75-67.95': large 3-1/8" by 2"	
1 -	R4-NQ			67.15 67.51 Moohaniss break (2)	1—	infilled with medium gray (N5),	1
1 -	5 ft	42	3	67.15, 67.5' - Mechanical break (2)	-[medium strong (R3) fine grained 	-
1	78%			67.7' - Fracture, horizontal, rough, undulating,		carbonate	
1 -]			open	1	Γ	1
1 -			2	68.2' - Mechanical break	₩	ŀ	
1 _]			68.7' - Fracture, horizontal, rough, undulating,	ᅪ	No December 60 0 70 0	
1			, _	open		No Recovery 68.9-70.0'	R4: 4 minutes
1			NR		Ҵ	†	-
70	70.0		\sqcup		╆╾		
1							
1	1					i e e e e e e e e e e e e e e e e e e e	i I



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-25	SHEET	5	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722845.8 N, 458024.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 240; CME 55 S/N 299205, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS : 2.3	ft bgs	on 6/	30/07 START : 4/19/2007 END : 4/2	23/20	D7 LOGGER : D. Roraback	
≥∩≎	. (9			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
-27.5	CORE LENG RECC	RQD	FRAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYME	AND ROCK MASS CHARACTERISTICS Limestone	DROPS, TEST RESULTS, ETC.
-27.5			2	70.35' - Fracture, horizontal, rough, undulating, open	Ē	 70.0-72.5' - Same as 65.0-68.9' except black (organic) 1/8" thick 	_
-			0	70.95' - Mechanical break - -		irregular laminae at 72.3' and moderately fossiliferous at 72.35-72.5'	-
-	R5-NQ 5 ft 86%	50	3	72.35, 72.5' - Fractures (2), horizontal, rough, undulating, open	H	72.5-74.3' - pale yellowish brown mottled with dark yellowish brown, (10YR 6/2 and 10YR 4/2), fine to	_
_			3	72.8, 73.0-73.05' - Fractures (2), 30 deg, rough, undulating, open 73.4' - Fracture, <10 deg, rough, undulating,	Ħ	medium grained, mild delayed HCl reaction, weak (R2), 10% voids up to 1/16", trace cavities to 3/4" x 3/8",	-
75	75.0		1 NR	open 73.6' - Mechanical break 74.2' - Fracture, horizontal, rough, undulating,		trace black (organic) thread-like mottles at 73.6' No Recovery 74.3-75.0'	R5: 8 minutes
-32. 5			2	open 75.1' - Fracture, horizontal, rough, undulating, open		Limestone 75.0-76.9' - Same as 72.5-74.3' except very weak to weak (R1 to R2),	_
_			2	75.25, 75.8' - Mechanical break (2) 75.6' - Fracture, horizontal, smooth, planar, open		80% dark yellowish brown mottled from 75.6-76.15' 76.4-76.9' - moderate yellowish]
-	R6-NQ 5 ft 100%	69	5	76.2, 76.45' - Fractures (2), horizontal, rough, undulating, open 76.7-77.5' - Fracture, 85 deg, rough,		brown, (10YR 5/4), fine grained, mild HCl reaction, weak to medium strong (R2 to R3), 15-20% voids up to 3/16",]
-			1	undulating, tight to open over depth 77.1-77.5' - Fracture, 85 deg, parallel to above		no visible casts/cavities 76.9-78.7' - pale yellowish brown to moderate yellowish brown, (10YR 6/2]
80	80.0		1	77.5, 77.6' - Mechanical break (2) 77.6-77.7' - Fracture, vertical, rough, undulating, open	H	to 10YR 5/4), fine grained, mild HCl reaction, medium strong (R3), no visible voids, 10% casts/cavities up	R6: 12 minutes
-37.5			2	77.75' - Fracture, vertical, rough, stepped 78.15' - Fracture, <10 deg, smooth, planar 79.75-79.8' - Fracture, 30 deg, rough,	Ė	to 2-3/8" by 9/16", infilled with material similar to 76.4-76.9' 78.7-80.0' - Same as 65.0-68.9'	-
_			1	undulating, open 80.6-80.7' - Fracture, 45 deg, rough, undulating, open		80.0-83.05' - moderate yellowish brown, (10YR 5/4), fine to medium grained, mild HCl reaction, weak to	-
-	R7-NQ 5 ft 72%	40	2	80.8-81.2 ^T - Fracture, 60 deg, rough, undulating, open 82.5' - Mechanical break		medium strong (R2 to R3), 15% voids up to 3/16", 10% casts/cavities up to 1-3/16" by 3/4", poorly]
-			<10	82.95-83.15' - Fracture zone 83.3-83.6' - Fracture, 60 deg, rough, undulating, open		fossiliferous 83.05-83.6' - yellowish gray to very pale orange, (5Y 7/2 to 10YR 8/2),	-
85	85.0		NR	83.5-83.6 - Fracture zone	Ħ	fine grained, mild HCl reaction, medium strong to strong (R3 to R4), trace voids to 1/16", 15-20%	R7: 8 minutes
-42.5 _			2	85.2, 85.25, 87.0' - Mechanical break (3) 85.45-85.5' - Fracture, 30 deg, rough,		casts/cavities up to 1-9/16" x 3/4", infilled with material similar to 80.0-83.5'	
-			2	undulating, open 85.7-85.85' - Fracture, 60 deg, rough, undulating, open	H	No Recovery 83.6-85.0' Limestone 85.0-87.4' - moderate yellowish]
-	R8-NQ 5 ft 75%	38	2	86.35' - Fracture, horizontal, rough, undulating, open 86.6' - Mechanical break		brown, (10YR 5/4), fine to medium grained, mild HCl reaction, extremely weak to very weak (R0 to R1),]
-			1	87.2-87.5' - Fracture, 60 deg, rough, undulating 87.75-87.8' - Fracture, 30 deg, smooth,	H	 10-15% voids up to 1/16", trace casts/cavities up to 3/8" x 9/16" at 85.5-85.7']
90	90.0		NR	undulating, black (organic?) clay infill up to 1/16" thick, open		-	R8: 9 minutes
30	30.0						



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-25	SHEET	6	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722845.8 N, 458024.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 240; CME 55 S/N 299205, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS : 2.3	ft bgs	s on 6/	30/07 START : 4/19/2007 END : 4/	23/20	D7 LOGGER : D. Roraback	
≥∩ <i>⊊</i>	(%			DISCONTINUITIES	ဖွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	507.5	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	: RU :TH, :VEF	Q D (%)	TE S	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FR H	ORE	Oρ	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	×₩	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	074	ď	╙╙	, ,	S		
-47.5 _			1	88.6' - Fracture, horizontal, rough, undulating, open		87.4-88.75' - Same as 85.0-87.4' - except very weak to weak (R1 to R2),	
l -				90.6-90.65' - Fracture or mechanical break,	₽	and at 87.7-88.2' trace voids up to]
l _			1	30 deg, rough, undulating, open 91.1-91.2' - Fracture or mechanical break, 60	厂	1/16" - No Recovery 88.75-90.0'	
l _			'	deg, rough, undulating, open	Н	Limestone	
	R9-NQ	70	4	92.05-92.15' - Fracture, horizontal, rough,		90.0-92.3' - pale yellowish brown, (10YR 6/2), fine to medium grained,	
	5 ft 95%	72	4	undulating, open 92.5' - Fracture, horizontal, rough, undulating,	Ė	mild HCl reaction, medium strong	
-			. 40	open	╨	(R3), 5-10% voids up to 1/8" in size,	1
-			>10	92.5-92.8' - Fracture, 75 deg, rough, undulating, open	H	casts/cavities up to 9/16"x3/8"92.3-92.5' - Same as 90.0-92.3'	1
-			1	92.65' - Fracture, horizontal, rough,	口	except 20% thin (1/16") organic (dark	R9: 9 minutes
95	95.0			undulating, open 93.0' - Mechanical break	╁	 brown to black) laminae 92.5-94.75' - Same as 90.0-92.3' 	1
-52.5	90.0		NR	93.7-94.2' - Fracture zone	F	except single cavity at 93.5':	
-			2	94.2-94.3' - Fracture, 45 deg, rough,	Ħ	2"x1-3/16" No Recovery 94.75-95.0'	1
-				undulating, open 95.1-95.3' - Fracture, 60 deg, smooth,	₩	Limestone	1
-			0	undulating -	厂	95.0-97.3' - Same as 90.0-94.75' except pale yellowish brown to	1
-	R10-NQ			95.75' - Fracture, horizontal, rough, undulating, open	世	moderate yellowish brown, (10YR 6/2	-
-	5 ft	57	5	97.05' - Fracture, horizontal, rough,	╁╌	_ to 10YR 5/4)	-
-	80%			undulating, tight 97.5, 97.5-97.6, 97.6' - Mechanical break (3)		97.3-98.15' - pale yellowish brown to moderate yellowish brown, (10YR 6/2	1 -
-			>10	97.85' - Fracture, horizontal, rough,		to 10YR 5/4), fine grained, mild HCl	-
-				undulating, open 98.25' - Fracture, 5 deg, smooth, planar,	₽	reaction, medium strong (R3), 10-15% voids up to 3/16", 10%	P40: 40
-			NR	open, 25% black staining on surface	ш	cavities up to 9/16"x3/8", trace black	R10: 12 minutes
100_	100.0			98.4' - Fracture, horizontal, smooth, planar,	世	pyrite infilling of cavities — 98.15-99.0' - Same as 90.0-94.75'	_
-57. 5			>10	open 98.6-98.7' - Fracture, 45 deg, rough,	╁┼	except no visible cavities	
-				undulating, open	F	No Recovery 99.0-100.0' - Limestone	
-			>10	98.7-99.0' - Fracture zone 100.0-100.3' - Fracture zone		_ 100.0-103.75' - pale yellowish brown	
l _			- 10	100.3' - Fracture, 10 deg, rough, undulating,	⊬	to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine grained, mild	
l _	R11-NQ 5 ft	20	0	open 100.55, 100.65' - Fractures (2 parallel), 20	厂	HCl reaction, weak to medium strong	
l _	75%	20	U	deg, rough, undulating, open	厂	(R2 to R3), 10% voids up to 1/8", - 10% casts/cavities up to 3/8"x3/4" at	SC-2 collected at 102.0- 103.0'
			7	100.55-100.65' - Fracture, 40 deg, rough, undulating, open, running between above	Н	100.36-100.65', 101.7-101.9', and	103.0
1 -				fractures	H	103.2-103.75' - No Recovery 103.75-105.0'	1
1 -			NR	100.65-100.9, 100.9-101.1, 101.1-101.3' - Fractures (3), 60 deg, rough, undulating,		- No Recovery 103.75-105.0	R11: 9 minutes
105	105.0			open, some fragments associated with			1
-62.5			, .	fractures — 101.3-101.4' - Fracture, 50 deg, rough,	$oxed{\Box}$	Limestone	
1 -			>10	planar, open	口	 105.0-109.5' - pale yellowish brown to moderate yellowish brown, (10YR 	1
-				101.55-101.7' - Fracture zone 102.0, 103.0' - Fractures (2), horizontal,	╆	6/2 to 10YR 5/4), fine grained, mild	Driller's Remark: 106-107'
1 -			4	rough, undulating, open	\vdash	 HCl reaction, weak to medium strong (R2 to R3), 10% voids to 1/16" 	Soft drilling - "Pushed right through"
-	R12-NQ			103.2-103.3' - Fracture, 45 deg, rough,	岸	throughout run, 25% casts/cavities	- danca right tillough
-	5 ft 90%	43	5	undulating, open 103.65-103.75' - Fracture zone	ᡛ	 up to 9/16"x3/8" at 105.0-105.2', trace casts/cavities, up to 9/16"x3/8" 	
-	90%			105.35-105.85' - Fracture zone	F	throughout entire run.	-
-			9	105.85-105.95' - Mechanical break, vertical 105.85, 105.95, 106.1, 106.35' - Mechanical	仜	-	-
-				break (4)	\vdash	-	R12: 9 minutes
1 -			4 ND	106.55' - Fracture, horizontal, rough, undulating, open	F	No Recovery 109.5-110.0'	-
110	110.0		NR		⊭	1.0 1.0001019 100.0-110.0	_
1							
					_		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-25	SHEET	7	OF	9	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722845.8 N, 458024.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 240; CME 55 S/N 299205, mud rotary, NQ tools, HW casing

				MEINT : Diethor D-30 3/10 240, OME 33 3/10 293203, Midd		,,	
WATER	LEVELS: 2.3	ft bg	s on 6	/30/07 START : 4/19/2007 END : 4/	23/20	D7 LOGGER : D. Roraback	,
	_			DISCONTINUITIES	ניז	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	BOCK TYPE COLOR	
트 H H N O	N E E	(9)	FRACTURES PER FOOT	2200.411014	닉익	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
H A A	문문	(%) Q		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	屃	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
민류년	S S S S S S S S S S S S S S S S S S S	Ø	A R	PLANARITY, INFILLING MATERIAL AND	Įξ	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
	SES	22	E 5	THICKNESS, SURFACE STAINING, AND TIGHTNESS	လ်	CHARACTERISTICS	, , , , , , , , , , , , , , , , , , , ,
-67.5				106.75' - Fracture or mechanical break, 40	ш	Limestone	
-			>10	deg, rough, undulating, open	Н	- 110.0-113.3' - moderate yellowish	1
I -				107.5' - Mechanical break	+	brown, (10YR 5/4), fine grained, mild	-
l _			3	107.6' - Fracture, horizontal, rough, undulating, open	Ш	HCl reaction, very weak (R1) from – 110.0-110.5', weak (R2) from	
			ا	107.6-108.05' - Fracture zone	Н	110.5-113.5', weak (132) from 110.5-113.5', 10% voids up to 1/16",	
-	R13-NC	l)		107.6-108.1' - Mechanical break, >80 deg,	\mathbf{H}	trace casts/cavities up to 9/16"x2",	-
-	5 ft	50	2	one face fractured as described above	ш	 trace thin dark organic inclusions 	-
l _	66%			108.25' - Mechanical break	Щ	(3/4" x 1-3/16") at 112.6'	
1			2	108.8' - Fracture, 20 deg, smooth, undulating,	Н		
-				open	ш	- No Recovery 113.3-115.0'	
-			NR	108.8-109.2, 109.1-109.5' - Fractures (2), 70 deg, rough, undulating, open	+	_	D13: 6 minutes
I -			INIX	109.05, 109.25' - Fractures (2), horizontal,	\mathbb{H}	_	R13: 6 minutes
115	115 0			rough, undulating, open]
-72.5	. 10.0			110.0-110.5' - Fracture zone		 Limestone	-
-			1	111.1' - Fracture or mechanical break,	╂┴┤	- 115.0-116.4' - Same as 110.0-113.3'	-
Ι.				horizontal, rough, undulating, open		except 10-15% voids up to 1/16", and	
1			.]	111.7-111.85, 111.95-112.05' - Mechanical		no visible casts/cavities]
1 -			1	break (2) 112.5' - Fracture, 10 deg, rough, undulating,	14	116.4-117.7' - moderate yellowish	1 1
-	D44 NO	l	\vdash	open	\Box	brown, (10YR 5/4), fine grained, mild	SC-3 collected at 116.4-
l _	R14-NQ 5 ft	! 58	1	113.1' - Fractures (2 separated by 1/4"), 15		HCl reaction, very weak (R1), trace	117.5'
1	97%	50	l '	deg, rough, undulating, open	Ш	voids up to 1/16", no visible casts/cavities	117.5
_				115.1-115.45' - Fracture, 75 deg, rough,	111	117.7-118.4' - Same as 110.0-113.3'	1
-			7	undulating, open, trace black (pyrite) staining		except very weak (R1) at	-
l -				<1/16" thick on surface 116.4' - Fracture, horizontal, smooth,	ш	_ 118.0-118.15' and trace voids up to	
			>10	undulating, open	Н	1/16", no visible casts/cavities	R14: 7 minutes
120	120.0			117.75, 118.05' - Mechanical break (2)		throughout	1
-77.5	120.0		NR	118.5, 118.6' - Fractures (2), horizontal, —	╂┴┤	118.4-118.95' - Same as 116.4-117.7'	-
-			5	rough, undulating, open, some fragments	+	- 118.95-119.85' - Same as	-
			Ĺ	118.55, 118.65' - Mechanical break (2)		116.4-117.7' except very weak (R1)	
				118.8, 118.95' - Fractures (2), horizontal, rough, undulating, open	Ш	at 119.33-119.65'	1
1 -			>10	119.35-119.65' - Fracture zone	+	No Recovery 119.85-120.0'	-
-	.	l	L .	120.4' - Mechanical break	\Box	Limestone	-
	R15-NQ 5 ft	1 11	1	120.6' - Fracture, horizontal, rough,	Щ	120.0-122.4' - pale yellowish brown - to moderate yellowish brown, (10YR	
1 -	5 π 48%	' '		undulating, open	Н	6/2 to 10YR 5/4), fine to medium	1
1 -	1070			120.85-120.95' - Fracture zone, 4 fragments		(coarser with depth) grained, mild	Driller's Remark: "Soft at
-				121.2-121.3' - Fracture zone 121.5' - Fracture, 5 deg, rough, undulating,	Ш	 HCl reaction, medium strong (R3), 	123.5 to 124 feet"
Ι.			NR	open, associated with large cavity	\mathbb{H}	trace voids to 1/16", trace	
1				121.7' - Fracture, horizontal, rough,		casts/cavities to 3/8"x3/8" except at	R15: 11 minutes
105	405.0			undulating, open	Ш	 120.5-120.7' and 121-121.7': with 15-20% casts/cavities, up to 2" x 3/4" 	1 1
125_ -82.5	125.0			121.9-122.4' - Fracture or mechanical break, —	+	x 3/4" "deep", partially infilled with	-
-02.3			>10	60 deg		recrystalized carbonate material]
1			10	125.0-125.3' - Fracture zone 125.4' - Mechanical break	Ш	moderate yellowish brown (10YR	
1 -				125.4 - Mechanical break 125.65, 125.9' - Fractures (2), horizontal,	1-1	5/4), weak, poorly fossiliferous, trace	1 1
-			2	rough, undulating, open	世	dark gray pyrite or organic material	1 -
1 -				126.1-126.15' - Fracture, 25 deg, rough,	ш	mottling at 121.9-122.0']
1	R16-NG			undulating, tight	H	No Recovery 122.4-125.0'	
1 -	5 ft 76%	30	4	126.25-126.3' - Mechanical break, 25 deg,	Ш		1
1 -	7070		-	healed	Ш	-	1 -
1 -			3	127.225, 127.25, 127.5' - Fractures (3), horizontal, rough, undulating, open	H	_]
1				127.6' - Fracture, horizontal, rough, planar,			
I -				open to tight	Ш		R16: 13 minutes
			NR	127.85' - Fracture, horizontal, rough, planar,	╂┼┤	-	-
130	130.0			open	\blacksquare		

APPENDIX 2BB-620 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-25	SHEET	8	OF	9	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722845.8 N, 458024.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 240; CME 55 S/N 299205, mud rotary, NQ tools, HW casing

WATER	LEVELS : 2.3			30/07 START : 4/19/2007 END : 4/			
₽Q₽	(%			DISCONTINUITIES	[g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-87.5 _			1	128.2' - Fracture, 20 deg, rough, undulating, open 128.3-128.45' - Mechanical break, 45 deg,		Limestone 125.0-128.8' - moderate yellowish brown, (10YR 5/4), fine grained, mild	-
_			1	tight 128.45-128.5' - Mechanical break, 30 deg, tight		HCl reaction, weak to medium strong (R2 to R3), 20% voids <1/32", trace voids to 1/16", trace spherical casts	SC-4 collected at 130.3- 131.4'
_	R17-NQ 5 ft 61%	23	>10	130.3' - Fracture, horizontal, rough, undulating, open 131.4' - Fracture, 25 deg, rough, undulating,	Ė	3/16"-1/4", 3/8" spherical casts at - 126.0, 126.8, 127.1', larger (2"x3/4") cavities at 127.8' and 130.1',	-
_			_1_/ NR	open 131.7' - Fracture, horizontal, rough, undulating, open 131.95-132.05' - Fracture, 45 deg, rough,		moderately fossiliferous, partial infilling (carbonate, very weak to weak, medium grained) with recrystalized material	R17: 11 minutes
135 <u> </u>	135.0		>10	undulating, open, likely due to cavity 132.2, 132.4, 132.5' - Fractures (3), horizontal, rough, undulating, open 132.5-132.7' - Fracture, vertical, rough,		No Recovery 128.8-130.0' Limestone 130.0-133.05' - pale yellowish brown to moderate yellowish brown, (10YR	- -
-			>10	undulating, open 132.6-132.65' - Fracture, 30 deg, rough, undulating, open 132.9-133.05' - Fracture zone		6/2 to 10YR 5/4), fine grained, mild HCl reaction, weak (R2), trace voids up to 1/16", trace cavities up to 1-3/16" by 3/16", well-formed casts to	-
- - - -	R18-NQ 5 ft 44%	7	NR	135.15-135.35' - Fracture zone 135.45' - Fracture, horizontal, smooth, planar to undulating, open 135.65, 135.7, 135.75, 135.85, 136.05, 136.2, 136.4, 136.45, 136.5' - Fractures (9), horizontal, rough, planar to undulating, open 136.7-136.8' - Fractured rock fragments (3), horizontal, rough, planar to undulating, open		3/4" x 3/4" x 3/8" "deep" at 132.8' No Recovery 133.05-135.0' Limestone 135.0-135.65' - pale yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, medium strong (R3), <2% voids up to 1/16", single cavity 2-3/4" by 9/16" at 135.45-135.5', infilled with	- - R18: 7 minutes
140 <u> </u>	140.0		1	_	Ħ	material similar to 130.0-133.05' 135.65-137.2' - pale yellowish brown to moderate yellowish brown, (10YR	_
-			1	140.8' - Fracture, <10 deg, rough, undulating, open 141.6' - Fracture, horizontal, rough,		6/2 to 10YR 5/4), fine grained, mild HCl reaction, weak to medium strong (R2 to R3), voids (1/16") over 10% of surface, scattered (<5%) larger voids	-
- - _	R19-NQ 5 ft 76%	48	8	undulating, open 142.4-142.5' - Fracture zone 142.65-142.75' - Fracture zone		up to 3/16", trace cast/cavities up to 9/16"x3/16", 5-10% gray shell fragments inclusions at 136.85-137.2'. mottled dark brown at	- -
-			1	143.6' - Fracture, 10 deg, rough, planar, open		136.4-136.45' No Recovery 137.2-140.0' Limestone	-
- 145_ -102.5	145.0		NR	_		140.0-141.3' - pale yellowish brown to moderate yellowish brown, (10YR — 6/2 to 10YR 5/4), fine to medium	R19: 14 minutes -
-			2	145.45' - Fracture, horizontal, rough, undulating, open 145.7' - Mechanical break		grained, mild HCI reaction, weak to medium strong (R2 to R3), voids (1/16") over 10% of surface, trace casts/cavities up to 1-3/16" by 3/8",	-
_	R20-NQ		>10	146.7 - Mechanical break 146.15-146.3' - Fracture zone, 50% dark brown staining on surfaces 146.95' - Mechanical break		partially infilled with similar material to matrix, black pyrite staining at 141.15-141.2' and 142.3-142.35'	-
_	5 ft 82%	60	5 1	147.5-147.6' - Fracture, 70 deg, rough, undulating, open 148.2-149.1' - Mechanical break, 80 deg		141.3-141.6' - light gray, (N7), fine grained, moderate HCl reaction, medium strong (R3)	- -
_			NR	149.1-150.0' - Mechanical break		141.6-142.4' - Same as 140.0-141.3' - -	R20: 17 minutes
150	150.0				H		

APPENDIX 2BB-621 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-25	SHEET	9	OF	9	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1722845.8 N, 458024.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani; Cathead Operator: S. Hutchinson

ORIENTATION: Vertical CORING METHOD AND EQUIPMENT: Dietrich D-50 S/N 240; CME 55 S/N 299205, mud rotary, NQ tools, HW casing WATER LEVELS: 2.3 ft bgs on 6/30/07 START: 4/19/2007 END: 4/23/2007 LOGGER : D. Roraback DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 142.4-143.8' - very pale orange, (10YR 8/2), very fine grained, mild HCI reaction, medium strong to strong (R3 to R4), trace voids to 1/16", trace casts up to 1"x3/16" across unit; large (50% volume of core) cavity at 143.15-143.2', mottled light gray (N7) at 142.8-143.3' No Recovery 143.8-145.0' Limestone 145.0-145.7' - very pale orange (10YR 5/2), fine grained, mild HCI reaction, medium strong (R3), poorly fossiliferous, 5% voids up to 1/16", trace casts/cavities up to 1"x3/16". poorly infilled with black fine grained "powdery" material 145.7-146.3' - Same as 145.0-145.7' except mottled yellowish gray, (5Y 7/2)146.3-146.45' - moderate yellowish brown, (10YR 5/4), medium grained, mild HCI reaction, weak to medium strong (R2 to R3), 25-30% voids up to 1/16", moderately fossiliferous, sharp contacts above and below 146.45-147.5' - pale yellowish brown, (10YR 6/2), fine grained, moderate HCl reaction, thin (<1/8") planar to irregular dark brown laminae, no voids, trace casts 147.5-147.8' - moderate yellowish brown, (10YR 5/4), medium grained, moderate HCI reaction, medium strong (R3), trace voids up to 1/16", no casts, poorly fossiliferous 147.8-148.2' - Same as 146.45-147.5' except grades into unit below 148.2-149.1' - Same as 147.5-147.8' except highly fossiliferous and 25% casts up to 9/16"x9/16" at 148.8-149.2' No Recovery 149.1-150.0' Bottom of Boring at 150.0 ft bgs on 4/23/2007



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-25A

SHEET 1 OF 3

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722853.0 N, 458017.4 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND FOUIPMENT: CME 550, S/N 186073, mud rotary, cathead, AW, I rods

ORIENTATION · Vertical

DRILLIN	G METH	OD AND	<u>EQUIPM</u>	ENT : CME 550, S	/N 186073, mud rotary, cathead, AWJ rods ORIENTATION : Vertical
WATER	LEVELS	: 4.5 ft bo	gs on 11/2	27/08 S	TART : 11/27/2007 END : 11/27/2007 LOGGER : D. Thomas
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
BEL SPE		RECOVE	ERY (ft)	TEOT RECOETS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
PTH EVA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY DRILLING FLUID LOSS, 1ESTS, AND INSTRUMENTATION
SU ELE				(N)	
42.2	0.0			0.5.7	Limestone Fill \[0.0-0.2' - dark yellowish orange, (10YR 6/6), strong \] \[1000000000000000000000000000000000000
		1.5	SS-1	3-5-7 (12)	HCI reaction This borning is being difficulty from the first test HCI reaction HCI react
	1.5			(/	Topsoil
-					\[0.2-1.5' - grayish black, (N2), moist, medium stiff, nonplastic, no HCl reaction, trace very fine sand \]
-					increasing to 10% with depth, wood at 1.3'
-					11
-					1
-					1
-					1
	. .				1
5 37.2	5.0				
-		0.4	86.3	3-2-3	√ 5.0-5.1' - grayish black, (N2), wet, medium plasticity, /┌न
-		0.4	SS-2	(5)	\no HCl reaction, trace very fine sand
-	6.5				5.1-5.4' - dark yellowish orange, (10YR 6/6), wet,
-					loose, very fine to fine grained, 15% nonplastic fines,
_					5% fine organic particles
-					1 1
_					
_					<u> </u>
_]
10	10.0				
32.2					Fat Clay (CH) 10.0-10.1' - light greenish gray, (5G 8/1), moist to wet,
		1.0	SS-3	1-1-2 (3)	soft, high plasticity, no dilatancy, no HCl reaction,
	11.5			(0)	trace very fine silica sand
					Silty Sand (SM) 10.1-10.3' - light olive gray, (5Y 6/1), wet, very loose,]
-					very fine to fine grained, no HCl reaction, 20% low
-					plastic fines
-					10.3-10.95' - Same as 10.0-10.1' except 15% very
-					fine silica sand
-					1
15	15.0				1
15 <u> </u>	15.0				Fat Clay (CH) Changed to 2-7/8" drag bit
-		1.3	SS-4	3-5-5	1 15.0-15.3' - light greenish gray. (5G 8/1), wet. stiff.
-	46 -	1.5	00-4	(10)	high plasticity, no dilatancy, trace fine to coarse sand that can be crushed, no HCl reaction with silty/clay
-	16.5				matrix, strong HCl reaction for sand material -
-					Silty Sand (SM) 15.3-15.4' - light olive gray, (5Y 6/1), wet, loose, no
-					HCI reaction, 20-25% low plastic fines
-					Fat Clay (CH)
_					15.4-15.9' - Same as 15.0-15.3'
-					15.9-16.25' - Same as 15.3-15.4'
_					
20					



PROJECT NUMBER:

338884.FL

B-25A

SHEET 2 OF 3

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722853.0 N, 458017.4 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND FOUIPMENT: CME 550, S/N 186073, mud rotary, cathead, AW, I rods

ORIENTATION : Vertical

DRILLIN	G METH	OD AND	<u>EQUIPM</u>	ENT : CME 550, S	S/N 186073, mud rotary, cathead, AWJ rods		ORIENTATION : Vertical
WATER	LEVELS	: 4.5 ft bo	gs on 11/2	27/08 S	TART : 11/27/2007 END : 11/27/2007 LOGGER :	: D. 1	Thomas
				STANDARD	SOIL DESCRIPTION	₀ [COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		SYMBOLIC LOG	
L BE		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT. RELATIVE DENSITY OR	<u> </u>	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTF PRFA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	/MB	INSTRUMENTATION
SUS				(N)		ς S	
22.2	20.0			3-4-4	Fat Clay (CH) ─ 20.0-20.4' - Same as 15.0-15.3' /=[Driller's Remark: Continue to lose circulation
-		1.1	SS-5	(8)	Silty Sand (SM)		
_	21.5				\\\\20.4-20.7' - Same as 15.3-15.4'		Fat clay and silty sand alternating from 10' (if not from 5')
_					Fat Clay (CH) 20.7-21.1" - Same as 15.0-15.3' and 20.0-20.4'		_
_							_
_							_
_							
25	25.0						
17.2					Fat Clay (CH) 25.0-25.3' - light greenish gray, (5G 8/1), wet, soft,	4	7
		1.3	SS-6	4-3-2 (5)	high plasticity, no dilatancy, mild HCl reaction, trace		1
	26.5			(-)	fine to coarse carbonate sand/fragments with strong HCl reaction, (predominantly carbonate fragments)		
					Silty Sand (SM)		
					25.3-26.0' - yellowish gray to light olive gray, (5Y 7/2		
					to 5Y 5/2), wet, loose, very fine grained, no HCl reaction, 25-30% low plastic fines		
					Clavev Sand (SC)		
					26.0-26.3' - light greenish gray to light olive gray, (5G 8/1 to 5Y 5/2), wet, loose, very fine to fine grained,		1
					35% low to medium plastic fines		1
30	30.0						1
12.2					Fat Clay With Sand (CH)		٦
-		1.5	SS-7	5-7-8 (15)	30.0-30.4' - light greenish gray to light bluish gray, (6G / 8/1 to 5B 7/1), moist, soft, medium plasticity, no HCl	Ш	1
-	31.5			(13)	reaction, 20% very fine silica sand		1
-					Silty Sand (SM) 30.4-31.5' - yellowish gray, (5Y 7/2), wet, medium		1
-					dense, very fine grained, no HCl reaction, 25%		1
-					nonplastic fines, irregular shaped lens of fat clay (CH) -		1
-					1011101.001.0		1
-					1		1
-					1		1
35	35.0				1		1
7.2	55.0				Fat Clay (CH)		Driller's Remark: Continuing to lose
-		1.5	SS-8	5-4-4	35.0-35.4' - Same as 30.0-30.4'	\prod	circulation/ water since 15-20' bgs (about 25 – gallons per 5 foot run)
-	36.5			(8)	Silty Sand (SM) 35.4-36.5' - Same as 30.4-31.0 except loose	$\ \ $	gailoris per o looctuit)
-	30.5					ш	-
-					+		
-							
-					4		4
-							-
-							-
-							-
40					_	\dashv	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-25A	SHEET	3	OF	3	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722853.0 N, 458017.4 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550, S/N 186073, mud rotary, cathead, AWJ rods

ORIENTATION: Vertical

					S/N 186073, mud rotary				_	ORIENTATION : Vertical	
WATER	<u>LEVELS</u>	: 4.5 ft bo	as on 11/2	27/08 5	START : 11/27/2007	END : 11/27/2007	LOGG	ER:	: D.	Thomas	\neg
} <u>@</u> @	044:5:		1 (0)	STANDARD PENETRATION		SOIL DESCRIPTION		\dashv	90	COMMENTS	\dashv
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	. ,	TEST RESULTS	SOII NAME	USCS GROUP SYMBOL, C	OLOR		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,	
H B		RECOVE	RY (ft)		MOISTURE C	ONTENT, RELATIVE DENS	SITY OR		BOL	DRILLING FLUID LOSS, TESTS, AND	
EPI FILEV			#TYPE	6"-6"-6" (N)	CONSISTENCY	, SOIL STRUCTURE, MINE	RALOGY		SYM	INSTRUMENTATION	
2.2	40.0			(14)	Silt With Sand (N	ML)		╅	Ш	SS-9 has an organic rich appearence	┥
-		1.3	SS-9	4-2-4	40.0-40.4' - light o	olive gray, (5Y 5/2), moist	, medium	/ †	Ш	· · · · · · · · · · · · · · · · · · ·	\exists
-		1.5	00-3	(6)	20% very fine silic	/, rapid dilatancy, no HCl r ca sand	eaction,	/			\exists
-	41.5				Silt With Sand (N	ML)		Æ			┨
-					40.4-41.3' - light o	olive gray transitioning to only moist to wet, medium st	olive gray,	H			┨
-					medium plasticity	, 25% very fine silica san	d, organic	-			┨
-					soil (OL/OH) sear	ms 1/4" thick		1			\exists
-								\exists			\exists
-								\exists		Driller's Remark: Rocky, chatter at 44'	\exists
								Ⅎ		2 mar o r tornarmi r toorly, ornamor at r r	\exists
45 -2.8	45.0 45.4	0.4	SS-10	50/4.5	Silt (ML)			+	Ш	Driller's Remark: Changed back to tricone	\dashv
-	-10.			(50/4.5")	√ 45.0-45.4' - dusky	y yellow, (5Y 6/4), moist, h	nard,	/ 丰	Щ	bit	4
-					I nonplastic, rapid (dilatancy, mild HCl reaction of the control of the	on, trace material	/ -		For SS-10, 0.7' of soil in spoon; top 0.3'	\exists
-						•		\exists		apparently slough. Material appears to be	┨
-								┨		organic soil (OL), olive gray (5Y 3/2), wet, soft, low to medium plasticity, rapid	\exists
-								┨		dilantancy, no HCl reaction, 10% fine silica	\exists
-								┨		sand	\exists
-								┨			\exists
-								Ⅎ		Driller's Remark: Firm drilling from 44-49',	\exists
	E0.0							+		soft again from 49-50'	┨
50 <u> </u>	50.0				Silty Sand And L	imestone (SM)		+	П	For SS-11, 2.1' of soil in spoon; top 0.6'	Ⅎ
-		1.5	SS-11	15-25-36	50.0-51.5' - light o	olive gray, dusky yellow, a rown, (5Y 5/2, 5Y 6/4, and	ind	-1		apparently slough	┨
-	51.5			(61)	fine to coarse gra	ined, mild HCl reaction, 2	0-30% low	1			1
-	01.0					es in sample), fine to coar stone fragments, carbona			14.1		┪
-					\materials		,	/ 👖		11/27/2007 at 17:00 water level = 4.5' bgs	1
-					Bottom of Boring	at 51.5 ft bgs on 11/27/20	007	1		11/28/2007 at 08:00 water level = 4.0' bgs	1
-								1			1
-								1			1
-								1			1
55								1			1
-12.8								┨			ᆌ
-								1			1
-								1			1
-								1			1
1 7								1			1
								1			1
								1			1
								1			1
60											
	-						·	T			
											┙



PROJECT NUMBER:

33884.FL

B-26

SHEET 1 OF 9

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723010.2 N, 458111.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit

ORIENTATION : Vertical

	<u> </u>	02712				ary, cameau, Avvo rous, 5-7/			ONIENTATION : Vertical
WATER	LEVELS	: 4.41 ft k	ogs on 3/	06/07	START : 2/21/2007	END: 2/23/2007	LOGGEF	? : C.	
1				STANDARD		SOIL DESCRIPTION		(n	COMMENTS
≳5€	SAMPLE	INTERVA	L (ft)	PENETRATION				ŏ	
O A A	_			TEST RESULTS	SOIL NAME	E, USCS GROUP SYMBOL,	COLOR,	일	DEPTH OF CASING, DRILLING RATE,
ASE		RECOVE	=RY (ft)		MOISTURE	CONTENT, RELATIVE DEN	NSITY OR	反	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	CONSISTEN	CY, SOIL STRUCTURE, MIN	NERALOGY	SYMBOLIC LOG	INSTRUMENTATION
				(N)				S	
42.4									Start drilling at 15:00 on 2/21/07
_							-	1	"Water level is based on Ground Water - Monitoring at LNP site (FSAR Table
-							-	1	2.4.12.08)"
l -							-		18" of topsoil at ground surface
_							_		_
-							-	1	-
-							-	1	-
_							-		_
I -							-		7
	. .						-	1	-
5 37.4	5.0				Poorly Crosted	I Cand (CD)			
37.4				200	Poorly Graded	rellowish brown to modera	te vellowish -		SS-1 sampled at 15:10
		0.5	SS-1	3-2-2 (4)	\ brown, (10YR 6	6/2 to 10YR 5/4), wet, very	loose, fine		
I -	6.5			(+)	grained, no HC	I reaction, silica sand, trac	ce nonplastic /	1	7
-	0.5				fines, trace fine	organics		1	-
-							-	1	-
_							_		
-							=		-
-							-		-
l -							-		_
10	10.0						-	1	_
32.4	10.0				Silty Sand With	h Limestone Fragments (SM)	1111	SS-2 sampled at 15:25
				2-2-8	10.0-11.4' - vell	lowish grav. (5Y 8/1), wet.	loose, fine to -		
l _		1.4	SS-2	(10)	coarse grained.	, strong HCl reaction, 26%	nonplastic		_
	11.5			` '	to low plasticity	fines, 15-20% gravel-size	ed		
_					tossiliterous lim	nestone fragments, all carl	oonate /-		_
-							-		-
-							-		_
_							_		
							_		
-							-	1	-
-							-		-
-							_		_
15	15.0								
27.4					Silty Sand With	h Limestone Fragments (SM)	Π	_
-		1.0	SS-3	17-19-5	15.0-16.0' - Sar	me as 10.0-11.4'	-		-
-		1.0	33-3	(24)					-
_	16.5								_
1									
I -							-]	1
-							-	1	-
-							-		-
I -							_		
-							-	1	1
-							-	1	-
20								_	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-26

SHEET 2 OF 9

SOIL BORING LOG

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723010.2 N, 458111.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit

WATER	LEVELS	: 4.41 ft b	ogs on 3/0	06/07 5	START : 2/21/2007 END : 2/23/2007 LOGGER : C. LeBlanc
300				STANDARD	SOIL DESCRIPTION COMMENTS
AND N (ft)	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY
H BE		RECOVE			MOISTURE CONTENT, RELATIVE DENSITY OR MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
22.4	20:9	0.4	SS-4	50/6	Silt (ML)
]				(50/6")	20.0-20.4' - yellowish gray, (5Y 8/1), wet, hard, nonplastic, very rapid dilatancy, mild HCl reaction, all
_					\carbonate, 5-10% fine to medium sand-sized
-					
-					
-					
-					
-					
25	25.0				
17.4					Silty Sand (SM) 25.0-26.4' - grayish orange, (10YR 7/4), moist to wet,
 _		1.4	SS-5	40-47-44 (91)	very dense, fine to coarse grained, moderate HCl
_	26.5			` ′	reaction, all carbonate, 35-40% nonplastic fines
-					
-					
-					
-					
-					
30	30.0				
12.4		1.0	SS-6	47-50/6	Silt (ML) 30.0-31.0' - dark yellowish orange, (10YR 6/6), moist -
_	31.0	1.0	33-0	(97/12")	to wet, hard, nonplastic, very rapid dilatancy, mild to
-					moderate HCl reaction, 10-15% very fine grained /-
-					-
-					
-					
-					
-					
35	35.0]]
7.4				00.00.50	Sandy Silt (ML) 35.0-36.3' - moderate yellowish brown, (10YR 5/4),
_		1.3	SS-7	23-33-50 (83)	moist, hard, nonplastic, very rapid dilatancy, mild HCl
-	36.5				reaction, 40% fine to medium grained sand-sized, carbonate materials
-					
-					
-					
-					
-					
40					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-26	SHEET	3	OF	9	

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723010.2 N, 458111.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit

WATER	LEVELS	: 4.41 ft b	gs on 3/0	06/07	TART : 2/21/2007	:
				STANDARD	SOIL DESCRIPTION	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	EDTH OF CASING DOILLING DATE
H BE ACE		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR D	EPTH OF CASING, DRILLING RATE, RILLING FLUID LOSS, TESTS, AND
SURF			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	INSTRUMENTATION
2.4	40.0 40.6	0.3	SS-8	46-50/1	Silty Sand And Limestone Fragments (SM)	sampled at 16:41
_	40.0			(96/7")	40.0-40.25' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), wet, very	_
					dense, fine to coarse grained, mild HCl reaction, 20% nonplastic fines, 50% fossiliferous limestone	
_					fragments	_
_					4 1	_
-					- Drillor	's Remark: Rig chatter at 43.0'
-						's Remark: Lost circulation at 43.0'
-					-	- Tierranic 2001 Girdulation at 40.0
45	45.0				1	-
-2.6	45.0		00.5	36-50/5	Sandy Silt (ML) SS-9	sampled at 17:05
-	45.9	0.7	SS-9	(86/11")	45.0-45.7' - pale yellowish brown to moderate \tag{\text{\congress}} yellowish brown, (10YR 6/2 to 10YR 5/4), wet, hard,	=
-					nonplastic, very rapid dilatancy, mild to moderate HCI reaction, all carbonate, 35-40% fine to medium	-
					sand-sized	
_						_
_					1 1	_
-					4 1	_
-					4 1	-
						-
50 -7.6	50.0 50.3	0.3	SS-10	50/4	Sandy Silt (ML)	sampled at 17:30
-				(50/4")	\50.0-50.25' - Same as 45.0-45.7'	· -
-					1	-
-					1	-
_					11	_
]	
_]	_
_					4 1	_
-					4 1	=
55 <u> </u>	55.0 55.3	0.1	SS-11	50/4	☐ Limestone Fragments	_
-	00.0			(50/4")	\ 55.0-55.1' - pale vellowish brown to moderate	-
-					yellowish brown, (10YR 6/2 to 10YR 5/4), mild HCl reaction, fossiliferous	-
-						-
-					1	-
-					1	7
					1	-
]	
]	
60_						



PROJECT NUMBER: BORING NUMBER: B-26

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723010.2 N, 458111.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit

ORIENTATION : Vertical

SHEET 4 OF 9

						y, cathead, AWJ rods, 3-7/8"			ORIENTATION: Vertical
WATER	LEVELS	: 4.41 ft l	ogs on 3/0	06/07	START : 2/21/2007	END : 2/23/2007	LOGGEF	? : C. I	
30≎				STANDARD PENETRATION		SOIL DESCRIPTION		g	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	` '	TEST RESULTS					DEPTH OF CASING, DRILLING RATE,
TH B		RECOVE	<u> </u>		MOISTURE C	CONTENT, RELATIVE DENS	SITY OR	SYMBOLIC LOG	DRILLING FLUID LOSS, TESTS, AND
CEVEN SURF			#TYPE	6"-6"-6" (N)	CONSISTENCY	Y, SOIL STRUCTURE, MINE	RALOGY	SYM	INSTRUMENTATION
-17.6	60:4	0.3	SS-12	50/5	_ Silty Sand (SM)				SS-12 sampled at 08:00 on 2/22/07
-				(50/5")	√ 60.0-60.3' - mode	erate yellowish brown, (10 fine to coarse grained, mi	YR 5/4),	1	-
-					reaction, 20% no	onplastic fines, 15% organi		1	-
-					carbonate excep	t organics		ı	-
-							-	ı	-
-							-	t	-
-							-	ł	-
-							-	ł	-
-							-	1	-
65	65.0						-	1	-
-22.6	65.0				Sandy Silt (ML)			Ш	SS-13 sampled at 08:20
-		1.5	SS-13	15-29-47	65.0-66.5' - Sam	ie as 45.0-45.7'	-	1	-
-	66.5		00 .0	(76)			-	lIII	-
-	00.3							╁	-
-							-	1	-
-							-	1	-
-							-	1	-
-							-	1	-
-							-	1	-
70	70.0						-	1	-
-27. 6	70.0			19-50/6	Silt With Sand (I			Ш	
-	71.0	1.0	SS-14	(69/12")		e as 65.0-66.5' except mile action, 20% fine to medium		1	-
-	71.0				sand-sized	action, 20 % fine to media	" /	╫	-
-							-	l	-
-							-	l	-
-							-	1	-
-							-	1	-
-							-	1	-
-							-	1	SS-15 sampled at 08:50
75	75.0						-	1	Switch to rock coring at 75.0'
-32.6	75.1	0.0	SS-15	50/1 (50/1")	Limestone Fragi	ments limestone fragments recov	varad mild T	Г	
_				(50/1)	HCI reaction	_	erea, mila		-
_					Begin Rock Cori	ng at 75.0 ft bgs			-
_					See the next she	eet for the rock core log	-		-
_							-	1	-
-							-	1	-
							-	1	_
					1		-	1	_
							-	1	_
80							-	1	_



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-26	SHEET	5	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723010.2 N, 458111.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION : Vertical

WATER	LEVELS: 4.4	1 ft b	gs on :	3/06/07 START : 2/21/2007 END : 2/2	23/20	07 LOGGER : C. LeBlanc	
≥ ∩ ⊙	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-32.6 - - - -	75.0 R1-NQ 1.5 ft 73% 76.5	73	0 1 NR	76.15' - Fracture or bedding plane, horizontal, rough, undulating, open, loose		Limestone 75.0-76.3' - dusky yellow, (5Y 6/4), very fine to fine grained, moderate to strong HCI reaction, weak (R2), voids (1/16") over 15% of surface, <1/16" thick laminations at 76.0-76.1', oval 3/8" fossil at 75.1' No Recovery 76.3-76.5' No Recovery 76.5-81.5'	R1: Run time not recorded Driller's Remark: Rig chatter at 76.0' Driller's Remark: Soft drilling, possible unconsolidated material
80 -37.6	R2-NQ 5 ft 0% 81.5	0	NR	- - - -	-	- - - -	R2: Run time not recorded
- - - 85_ -42.6	R3-NQ 5 ft 0%	0	NR	- - - -	-	No Recovery 81.5-86.5'	- - - - -
- - -	86.5			- - -	-	- - No Sample 86.5-88.0' -	R3: Run time not recorded Switch back to SPT sampling at 86.5', blind drill without sampling from 86.5-88.0'
9047.6			0		-	Limestone Fragments 88.0-88.2' - moderate yellowish brown, (10YR 5/4), fine grained, fine to coarse gravel-sized fragments, voids present on fragment surfaces No Sample 88.2-94.5'	Split spoon sample SS-16 advanced 88.0-88.4', 0.2' recovery, N=50/5" Installed casing to 88.5'
95_	94.5			-		Limestone Fragments 94.5-94.6' - coarse grained sand-size rock fragments recovered	Split spoon sample SS-17 advanced 94.5-94.7', 0.1' recovery, N=50/2"



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-26	SHEET	6	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723010.2 N, 458111.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION : Vertical

COMING	IVIL IT IOD AI	ND L	ZOIFIV	IENT: CME 550 S/N 186073, mud rotary, NQ tools, NW	Casing	<u> </u>	ORIENTATION : Vertical
WATER	LEVELS: 4.4	11 ft b	gs on 3	3/06/07 START : 2/21/2007 END : 2/	23/200	7 LOGGER : C. LeBlanc	
				DISCONTINUITIES	(0	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		(n	DESCRIPTION	SYMBOLIC LOG		
O P E P	Z Z Z	<u></u>	FRACTURES PER FOOT	DESCRIPTION	힐	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
ASE	KE	R Q D (%)	ĪΞĞ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	፬	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
F F 문 및	8885	2	AC R F	PLANARITY, INFILLING MATERIAL AND	₩	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
교8교	8 발표	Ω.	HH	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Š	CHARACTERISTICS	BROI G, TEGT REGGETG, ETG.
-52.6	R4-NQ		>10	94.8, 94.9' - Fracture, 10 deg, rough,		Limestone	Resume rock coring at
-	2 ft	50	NR	undulating, open	Н	 94.5-94.9' - yellowish gray, (5Y 7/2), 	94.5'
l -	85%			94.9-95.85' - Fracture zone, angular to	Н	fine grained, moderate HCl reaction,	R4: 4 minutes
	96.5		1	subangular fragments		extremely weak to very weak (R0 to	
-				96.5' - Mechanical break, 50 deg	Ш	 R1), no voids No Recovery 94.9-95.2' 	Because of fracture
l -			1	96.95' - Mechanical break	Н	Limestone	surface at bottom end of -
I -				97.3' - Fracture, 65 deg, smooth, undulating,	Н	- 95.2-96.5' - moderate yellowish	core R4 matching top end
			١. ا	tight		brown, (10YR 5/4), moderate HCI	of core R5, core loss for
-			1		ш	reaction, weak to medium strong (R2	R4 is interpreted to be -
-	DE NO			98.15' - Fracture, 50 deg, rough, undulating	Н	 to R3), begins in fracture zone with 	within fracture zone at 94.9'
l _	R5-NQ 5 ft	24	3	98.8, 99.3, 99.8, 100.4, 100.7, 101.1' -		many deep cavities, below 95.8'	_
	94%			Fractures (6), 60-80 deg, rough, undulating,	Ш	voids increase from 0% to 20%,	
400				significant fragmentation throughout,	H	cavities up to 1" at 95.2'96.5-98.4' - moderate yellowish	
100 <u> </u>			2	fragments 1/2"-3", elongate to angular —		brown, (10YR 5/4), fine grained,	
-57.6				99.4' - Fracture, horizontal, rough, stepped,	Ш	moderate HCl reaction, medium	
1			2	open	\square	strong (R3), 15-20% fine voids	R5: Run time not recorded
1 -	404.5			•	╁┼┤	(1/16"), few small (1/4")	-
l -	101.5		NR	101 F 102 OL Frankura Tana aubangular	ш	_ cavities/fossils	-
I _			>10	101.5-102.0' - Fracture zone, subangular rock fragments 1/2"-2"	H	98.4-99.3' - moderate yellowish	
			- 10	Tock fraginerits 1/2 -2	Н	brown interbedded with yellowish	
-				102.35' - Fracture, 80 deg, smooth,	ш	gray, (10YR 5/4 with 5Y 7/2), moderate to strong HCl reaction,	-
-			>10	undulating, terminates above at fracture zone	ш	very weak to medium strong (R1 to	_
l _				102.8' - Fracture, 30 deg, smooth, undulating 103.0-103.3' - Fractures (3), vertical, rough,	Н	R3)	
	R6-NQ			undulating, fragmented	ш	99.3-99.5' - yellowish gray, (5Y 7/2),	
-	5 ft	7	>10	103.3-104.5' - Fracture zone, rock fragments		strong HCl reaction, very weak (R1)	-
l -	60%			from silt-size to 2", friable	ш	99.5-101.2' - yellowish gray to dusky	-
105_				_	Ы	yellow, (5Y 7/2 to 5Y 6/4), fine — grained, strong (R4), voids (<1/16")	
-62.6						0-10% (intermittently), several	
-			NR		ш	1/4"-1/2" cavities and spiral fossil	R6: 8 minutes
-					Н	molds	-
I _	106.5				ш	No Recovery 101.2-101.5'	_
					Ш	Limestone	
I -			2	106.85' - Fracture, 55 deg, rough, stepped,	H	- 101.5-102.0' - Same as 99.5-101.2'	1
-				open with small fragments 107.15, 107.7' - Fractures (2), 25 deg, rough,	口	except fragmented 102.0-103.3' - Same as 99.5-101.2'	-
I -			3	undulating, fragmented, particularly at	Щ	- except medium strong (R3), core	
				107.15'	$\vdash\vdash$	intact until 102.8', several 1/4"-1/2"	
I -	R7-NQ			107.85, 107.95' - Fractures, 10 deg, rough,		cavities and molds	-
-	5 ft	64	2	undulating, tight to open	Ш	- 103.3-104.5' - Same as 99.5-101.2'	-
I -	89%			108.75' - Fracture or mechanical break, 50	H	except extremely weak to very weak	
110			[deg, healed	Н	(R0 to R1), friable	
-67.6			2	109.25' - Fracture, horizontal, rough, —	Ш	— No Recovery 104.5-106.5' Limestone	-
-			\vdash	undulating to planar, open 109.7' - Fracture, 30 deg, smooth, undulating,	+	106.5-106.8' - moderate yellowish	R7: 5 minutes
I _			1	tight with missing fragments	╁┼┤	brown to moderate olive brown,	IV. 3 minutes
	111.5		NR	109.95' - Fracture, 75 deg, rough, undulating,		(10YR 5/4 to 5Y 4/4), fine grained,	
I -				weathered, with slight infill	1]	moderate HCl reaction, weak to	1
-			3	110.7' - Fracture, horizontal, rough, stepped	₽	medium strong (R2 to R3), fine	SC 1 collected 112.0
I -				to undulating	Ш	(1/16") voids over 10-25% (variably),	SC-1 collected 112.0- 112.95' -
			[111.75' - Fracture, 80 deg, rough, stepped, second half of fracture is fragmented into		many 1/4" elongated cavities 106.8-107.3' - Same as 106.5-106.8'	112.00
I -			2	second hair of fracture is fragmented into angular 1"-2" pieces	14	except extremely weak to very weak	-
I -	D0 N0			112.0' - Fracture, 50 deg, smooth, undulating	+	(R0 to R1), friable	-
I _	R8-NQ 5 ft	64	3	112.95' - Fracture, horizontal, rough, planar	口	_ 107.3-109.25' - Same as	
	100%	U 4		113.15' - Fracture, 60 deg, smooth, stepped,	Ш	106.5-106.8'	
				tight, with weathered edges	1-1	109.25-109.7' - Same as	1
115					H	106.5-106.8' except very weak (R1)	
1							
					\Box		

APPENDIX 2BB-631 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-26	SHEET	7	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723010.2 N, 458111.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION: Vertical

			<u> </u>	MENT : CIVIE 330 3/N 186073, Mud Totally, NQ tools, NVV	ouo;		ORIENTATION : Vertical
WATER	LEVELS: 4.4	1 ft b	gs on	3/06/07 START : 2/21/2007 END : 2/	23/20	07 LOGGER : C. LeBlanc	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		T.,	 	SYMBOLIC LOG		
Π₹Z	z¥≿		FRACTURES PER FOOT	DESCRIPTION		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
표일은	S ř. 庐	(%) Q	158	DEDTH TYPE OPIENTATION POLICINIESS	7 🚊 [MINERALOGY, TEXTURE,	FLUID LOSS, CORING RATE AND
ΕÄŽ	<u> </u>	0	12.5	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	ΙğΙ	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
		a a	A H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	=	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	0716	I.	_		0)		
-72.6			1	113.7' - Fracture, horizontal, rough, planar,	ш	109.7-110.95" - Same as	
-				tight, with weathered edges	╆	- 106.5-106.8'	R8: 5 minutes
-			3	113.9' - Fracture or mechanical break, 70	+	No Recovery 110.95-111.5'	-
l	116.5		`	deg, rough, undulating, healed	П	Limestone	
-				114.35' - Fracture, horizontal, planar to		- 111.5-116.5' - dusky yellow to	1
l -			>10	slightly undulating 115.3' - Fracture, 70 deg, rough, undulating,	ш	moderate yellowish brown, (5Y 6/4 to	_
l				5/16" relief, terminates at a rough stepped	Н	10YR 5/4), fine grained, moderate HCl reaction, weak (R2), 20% fine	
-				fracture at 115.65', tight	${}^{+}$	(1/16") voids, few cavities up to 1/4"	
-			1	115.9' - Fracture, 70 deg, rough, undulating,	┲	116.5-116.7' - Same as 111.5-116.5'	SC 2 collected 119.0
_				tight, weathered	Щ	except medium strong (R3), with	SC-2 collected 118.0- 118.97' -
	R9-NQ			116.45' - Fracture, horizontal, rough,	ш	some weaker zones and rock	110.97
- 1	5 ft	19	2	undulating, 1/8" relief	+	fragments	-
I _	72%			116.7-117.0' - Fracture zone, subrounded	\mathbb{H}	- 116.7-117.0' - Same as 111.5-116.5'	
120			1	rock fragments 1/2"-2"		except fragmented	
-77.6			⊢ <u>·</u>	117.45' - Fracture, 10 deg, rough, undulating,	┰	117.0-119.2' - Same as 111.5-116.5'	-
I				tight, cuts across 80 deg fracture at 117.65'	Щ	except medium strong (R3), with	l
			NR	117.65' - Fracture, 80 deg, rough, undulating,	\vdash	some weaker zones and rock	R9: 5 minutes
I -				10 inches long, black staining (pyrite), tight,	+	fragments	-
-	121.5			weathered	┸	_ 119.2-120.1' - Same as 111.5-116.5'	_
l			_	118.0' - Fracture, 25 deg, smooth, stepped,		except no to mild HCl reaction, very	
-			0	voids and molds on fracture surface	ш	weak to weak (R1 to R2), sections of	1
-				118.97' - Fracture, 10 deg, rough, undulating,	+	_ increased voids	-
l			. 40	white crystalline infill, trace 1/16" voids on	Н	No Recovery 120.1-121.5'	
_			>10	cariaco	тп	Limestone	1
-	D40 NO			119.20' - Fracture, 10 deg, rough, stepped,		_ 121.5-122.5' - dusky yellow to	-
l _	R10-NQ 5 ft	19	>10	open, friable, infilling, increased voids		moderate yellowish brown, (5Y 6/4 to	
	58%	19	10	120.0 - Fracture, Horizontal, rough,	Ш	10YR 5/4), fine grained, moderate to strong HCl reaction, medium strong	H
-	3070			undulating 122.5' - Fracture, 15 deg, rough, undulating,	т	(R3), small (1/16") voids over	-
125				tight but weathered and friable —		20-25%, fossiliferous (numerous	
-82.6			l ND	122.7' - Fracture, 25 deg, smooth, stepped,	\vdash	molds/casts, small [1/4"] circular/oval	
-			NR	top of fracture zone	Н	voids, larger [1"] thin elongate	R10: Run time not
-				122.7-122.9' - Fracture zone, subangular 1"	┸	- cavities)	recorded
	126.5			fragments		122.5-122.85' - Same as	
_				123.15, 123.4' - Fractures or bedding plane,	Ш	121.5-122.5' except very weak to	
-			>10		+	weak (R1 to R2), secondary infilling	-
_				fragmentation	Н	of cavities, more friable] [
I -				123.25' - Fracture, 80 deg, rough, planar,	Ш	122.85-123.7' - Same as	
-			>10			- 121.5-122.5' except 5% coverage of	
I -				123.66' - Fracture, 20 deg, rough, undulating,	Ш	voids (1/16"), no fossils or cavities,	
	R11-NQ			top of unconsolidated zone	H	elongate molds 1/16" wide, sharp	
I -	5 ft	42	1	124.15' - Fracture, 10 deg, rough, undulating,	+	angular breaks	SC-3 collected 128.9-
I -	78%			bottom of unconsolidated zone	\Box	Silty Sand (SM)	129.92'
130			0	124.25' - Fracture, 70 deg, rough, undulating		123.7-124.15' - dark yellowish	
-87.6			١٠	126.8' - Fracture, 10 deg, rough, stepped, —	Щ	orange, (10YR 6/6), wet, fine	_
-				infilled 126.8-127.9' - Fracture zone, no clear	+	grained, nonplastic, mild HCl	D44: 5 minute
			NR		H	reaction, 10% coarse sand-sized,	R11: 5 minutes
I -	121 5		'''`	within zone		- 30% nonplastic fines, 10% fine	1
-	131.5			127.9' - Fracture, horizontal, rough,	口	gravel-size material, small fossil fragments, all calcareous material	-
I _			>10		Щ		
Ι -			1 10	128.05' - Fractures (2), horizontal and 30	\vdash	Limestone	1
-			-	deg, rough, undulating, tight to open, fit	+	_ 124.15-124.4' - Same as 122.85-123.7' except weak (R2)	-
I -			>10	together, weathered, slight infill		No Recovery 124.4-126.5'	
			1 10	128.50' - Fracture, 20 deg, rough, undulating		140 Necovery 124.4-120.5	
I -	R12-NQ			128.92' - Fracture, 10 deg, smooth,	ш	_	-
I -	5 ft	8		undulating	+	_	_
	42%	5		131.6-131.8' - Fracture zone, with angular	\vdash		
	,,			fragments 1/2"-2" in size, bounded by rough		_	-
135				and undulating horizontal fractures	\vdash		
							-

Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-26	SHEET	8	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723010.2 N, 458111.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

CORING	INETHOD A	ND EC	JUIPIV	MENT: CME 550 S/N 186073, mud rotary, NQ tools, NV	v cas	sing		ORIENTATION : Vertical
WATER	LEVELS: 4.4	11 ft b	gs on	3/06/07 START: 2/21/2007 END::	2/23/	200	7 LOGGER : C. LeBlanc	
				DISCONTINUITIES	T,	Ţ	LITHOLOGY	COMMENTS
MON (#)	9%		S	DESCRIPTION		ğ	DOCK TYPE COLOR	1
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(9)	FRACTURES PER FOOT	DESCRIPTION	- 2	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
ATE ATE		%)		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	3	ቨ ቨ	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
E SE	N N N N	Q D (%)	ER Z	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNES:	. 3	ŽI	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	こゴに	œ		, , , , , , , , , , , , , , , , , , ,	ا ر	S		· ·
-92.6			NR	132.05, 132.2, 132.45' - Fractures (3), 0-10	⊢	Н	Limestone	
-				deg, rough, undulating to stepped, open, increasing voids with depth	1	П	 126.5-126.8' - moderate yellowish brown to moderate olive brown, 	R12: 6 minutes
-				132.85' - Fracture, horizontal, rough, stepped	+	7	(10YR 5/4 to 5Y 4/4), fine grained,	-
-	136.5			to planar, open, cavity at break	+	Н	moderate HCl reaction, weak (R2),	-
_			>10	133.15' - Fracture, 10 deg, rough, undulating,	上		5-20% coverage of voids (1/16"), with	_
			10	soft, very weak rock material at fracture face,	\vdash	Н	infill of silty sand material similar to	
-				followed by rock fragments 133.15-133.60' - Fracture zone, angular rock	1	ᅪ	- 123.7-124.15' 126.8-130.4' - Same as 126.5-126.8'	-
-			3	fragments 1/2"-2" with horizontal fractures	-E	┰	except weak to medium strong (R2 to	-
_				within zone at 133.25' and 133.4'	\perp	\dashv	- R3), no infill	_
	R13-NQ			136.55, 136.6' - Fracture (2), horizontal,	\vdash	4	No Recovery 130.4-131.5'	
I 7	5 ft 62%	28	4	smooth, planar, along bedding planes	1	\Box	Limestone	I -
, , , -	JZ /0		<u> </u>	136.8 137.05, 137.2, 137.35' - Fractures (4),	+	一	- 131.5-132.2' - moderate yellowish	-
140 <u> </u>				0-10 deg, smooth, planar, fragmentation between fractures, slight infill, some black	十	╁	brown to moderate olive brown, (10YR 5/4 to 5Y 4/4), fine grained,	
J -91.0			NR	staining	\perp	Ц	moderate HCl reaction, strong (R4),	I
			INE	137.6' - Fracture, horizontal, rough,	\vdash	\dashv	20% fine (1/16") voids, elongate	R13: Run time not
-	1415			undulating to stepped, open	t	⇉	fossil molds 1/4"x1/2"	recorded -
-	141.5			138.0, 138.4, 138.55' - Fractures (3), 20-40	F	긔	132.2-132.9' - Same as 131.5-132.2'	-
-			3	deg, rough, undulating, tight to open with weathering at fractures	+	₼	except 30% voids (up to 1/8"), more fossiliferous with larger cavities	-
				139.1' - Fracture, 40 deg, rough, stepped, no	上	\Box	132.9-133.6' - Same as 131.5-132.2'	_
				matching face beneath	\vdash	Н	except grading to light olive gray, (5Y	
-			3	139.1' - Fracture, horizontal, rough, planar	1	T	5/2), 0-15% voids	-
_	R14-NQ			139.6' - Mechanical break, 10 deg	+	_	No Recovery 133.6-136.5'	-
_	5 ft	25	6	141.85' - Fracture, horizontal, rough, stepped, open	╁	щ	Limestone 136.5-137.6' - light olive gray grading	_
	69%			142.25' - Fracture, 10 deg, smooth,		П	to light olive brown with depth, (5Y	
145			3	undulating, open, with color change starting	\perp	\exists	5/2 to 5Y 5/6), very fine grained,	_
-102.6				at 141.95' and noticeable at 142.25'	┰	┰	moderate HCl reaction, medium	
-			ND	142.45' - Fracture or mechanical break, 40	上	다	strong to strong (R3 to R4), <5%	R14: 5 minutes
_			NR	deg, rough, planar, healed 142.6' - Fracture, smooth, undulating, open	\perp	┦	voids, laminated bedding, white recrystallization infilling	- INTA. S ITIIII IULES
	146.5		<u> </u>	and weathered/rounded faces coated with		\exists	137.6-139.1' - light olive gray to	
				lighter colored film of infill	T	Ц	moderate yellowish brown, (5Y 5/2 to	_
-			4	143' - Fracture, 20 deg, smooth, undulating,	+	\dashv	10YR 5/4), fine grained, moderate to	-
-				3/4" cavity, weathered, subangular 143.5' - Fracture, 20 deg, rough, undulating,	上	Ⅎ	strong HCl reaction, weak to medium strong (R2 to R3), 5-25% voids	-
_			4	tight	F	Д	- (1/16"), horizontal bedding and 0-5%	_
			~	143.55, 143.8, 143.95, 144.2, 144.4, 144.8' -	\vdash	\dashv	voids at 138.5-139.1', few cavities up	
	R15-NQ		2	Fractures (6), 0-25 deg, rough, undulating to	土	⇉	to 1/2", some dark infilling	_
-	5 ft	9		stepped, less weathered and rounded than at	+	나	- 139.1-139.6' - moderate yellowish	-
-	48%			143.0', subangular fragments at all fractures, all open, some fragments between fractures	+	H	brown, (10YR 5/4), fine grained, moderate to strong HCl reaction,	-
150_				146.6' - Fracture, horizontal, rough, planar,		\Box	— weak to medium strong (R2 to R3),	_
-107.6			NR	staining on upper face only	\vdash	4	5-10% fine (1/16") voids, some	
-				146.7' - Fracture or mechanical break,	t	ɒ	organic infilling	R15: Run time not
-				vertical, smooth, planar, healed, terminates	F	-}	No Recovery 139.6-141.5'	recorded -
_	151.5			at fractures at 146.6' and 146.5' 146.8' - Fracture, horizontal, rough, stepped	+	4	Limestone 141.5-141.95' - moderate yellowish	End of Dodge 1454 5
_				to planar, voids visible on fracture face			brown, (10YR 5/4), fine grained,	End of Boring at 151.5' on 2/23/07 -
				147.3, 147.6, 147.75, 148.3' - Fractures (4),		ſ	moderate HCl reaction, weak (R2),	
-				0-10 deg, rough, planar, tight with some		-	10% fine (1/16") voids, several	_
-				minor fragmentation, angular breaks	-	H	elongate (1/4"x1") cavities and 1/4"	-
_				147.7' - Fracture, 80 deg, rough, planar, terminated by fracture at 147.3', missing			round cavities, light gray infilling of some cavities, 1/8" thick black	_
				second half			laminations at top	
_				148.45' - Fracture, 70 deg, rough, planar	1	ı	la.i.iiidiloiio di top	_
-				148.6, 148.7' - Fractures (2), horizontal,	+	- 1	-	-
				undulating, open, weathered	+	\dashv		
						- 1		
						\perp		

APPENDIX 2BB-633 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					Т
338884.FL	B-26	SHEET	9	OF	9	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723010.2 N, 458111.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION : Vertical

CORING	INICITIODA	ND LC	ZUIFIV	1ENT: CME 550 S/N 186073, mud rotary, N	Q tools, INVV	asiii	y		ORIENTATION : Vertical
WATER	LEVELS: 4.4	11 ft bo	as on	3/06/07 START : 2/21/2007	END : 2/2	3/20	07	LOGGER : C. LeBlanc	
				DISCONTINUITIES			П	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	<u> </u>				SYMBOLIC LOG	\vdash	LITIOLOGI	CONNICION
S ≤ S	ŽA ŽNZ ŽNZ		FRACTURES PER FOOT	DESCRIPTION) L	ı	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
	5. H	R Q D (%)	유	DEDTIL TYPE OBJECTATION BOULD		ΣĽ	ı	MINERALOGY, TEXTURE,	FLUID LOSS, CORING RATE AND
±₹,₹	GT GT SOV) Q	PF	DEPTH, TYPE, ORIENTATION, ROUG PLANARITY, INFILLING MATERIAL		IBC	ı	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
989	RAN	Ø	RA	THICKNESS, SURFACE STAINING, AND		>	ı	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
Δош	0 1 8	œ	шД	THIORITE CONTROL CONTROL CONTROL	попписос	S			
								141.95-144.95' - yellowish gray, (5Y	
-					-		H	7/2), very fine to fine grained, strong	-
					_		L	HCl reaction, strong (R4), 5-15% fine	_
							П	(1/16") voids, many 1/4"-1/2" cavities,	
1 1					_			often infilled with weaker rock,	-
-					_		H	increased voids and more	_
								resemblance to rock at 141.5-141.95' at 144.8-144.9' (possible start of	
1 7					_			transition sequence)	-
-					-		H	No Recovery 144.95-146.5'	-
					_		L	Limestone	_
								146.5-148.6' - repeated transitions	
-					-		F	from dusky yellow to light olive gray	-
-					_		F	or light olive brown, (5Y 6/4 to 5Y 5/2	-
							1	or 5Y 5/6), very fine to fine grained,	1
1 7								moderate to strong HCl reaction,	
-					-		H	strong (R4), <3% voids (1/16") but	-
					_		L	with increased voids at 146.5-146.6'	1 -
							1	(5%), 148.1-148.2' (10%), and 148.6-148.9' (40%)	
1 7					-		r	148.6-148.9' - Same as	-
-					-		F	141.5-141.95' except darker brown	-
								color, increased voids	_
							Γ	No Recovery 148.9-151.5'	
-					-		⊦	Bottom of Boring at 151.5 ft bgs on	-
_					_		L	2/23/2007	_
							ı		
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-27	SHEET	1	OF	9

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722971.1 N, 458154.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit

					·	lary, carriedu, Avvo rous, c			OHENTATION: Vertical
WATER	LEVELS	: 4.41 ft k	ogs on 3/	06/07	START : 2/8/2007	END: 2/10/2007	LOGGE	R : A.	Teal
1				STANDARD		SOIL DESCRIPTION		(D	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION				SYMBOLIC LOG	
ON ELC				TEST RESULTS	SOIL NAM	ME, USCS GROUP SYMB	OL. COLOR.	$\overline{\circ}$	DEPTH OF CASING, DRILLING RATE,
A S E		RECOVE	ERY (ft)			E CONTENT, RELATIVE		ď	DRILLING FLUID LOSS, TESTS, AND
F F F			#TYPE	6"-6"-6"		NCY, SOIL STRUCTURE,		β	INSTRUMENTATION
SC			"	(N)				Š	
42.4								1	"Water level is based on Ground Water
-								4	Monitoring at LNP site (FSAR Table -
_								4	2.4.12.08)"
-								1	<u>-</u>
-								+	Water levels not recorded during drilling
I -								4	- water levels not recorded during drilling
_								1	<u>-</u>
-								-	-
l _									_
	4.5								
-					Poorly Grade	d Sand With Silt (SP-SI	M)	1,1	SS-1: Weight of hammer drove split spoon
5 37.4		, ,	00.4	1-1-0	4.5-5.5' - mode	erate yellowish brown, (10YR 5/4), wet, -	出出	the last 6" —
		1.0	SS-1	(1)	very loose, ve	ry fine to fine grained, 1	0-15%	للله	
1	6.0			l '	\nonplastic fine	es, silica sand, 10-12% o	organics /		
1 7					1			1	·
-				ĺ	l			1	-
I _									_
_								1	<u>-</u>
-								-	-
I _									_
-	0.5							1	<u>-</u>
-	9.5				Silty Sand (SI	\ <u>\</u>		111	-
10				0.00	9 5-9 8' - verv	pale orange, (10YR 8/2) verv wet verv =		i
32.4		0.3	SS-2	0-0-0 (0)	soft, very fine	to medium grained, stro	ng HCl reaction.		SS-2: Weight of hammer drove split spoon
-	11.0			(0)	\30% low to me	edium plastic fines, silica	a and carbonate	1	18", sample may be slough
-	11.0				sands, 5-10%	organics		-	-
I -								4	_
								1	<u> </u>
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1 7				ĺ	I			1]
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-	14.5			ļ	0:14.0	th 1 imagetor - 5	t- (CM)	+,,,,,	-
15				40.47.0	Slity Sand Wi	th Limestone Fragmen nite to yellowish gray, (N	1 S (SM) 10 to 5GV 9/2\		_
27.4		1.0	SS-3	10-17-9	wet medium o	dense, very strong HCl r	eaction 40%		
-	46.5		1	(26)	\ fine to coarse	gravel, 20% low to med	ium plastic /	╅╨	1 -
-	16.0	-			\fines, all carbo	onate materials	/	4	-
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-27	SHEET	2	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722971.1 N, 458154.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

WATER	LEVELS	: 4.41 ft b	gs on 3/0	06/07	START : 2/8/2007 END : 2/10/2007	LOGGEF	R : A.	Teal
				STANDARD	SOIL DESCRIPTION		ŋ	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOI	D	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H BE ATIO		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY (OR	BOLI	DRILLING FLUID LOSS, TESTS, AND
SURF			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALO	OGY	SYM	INSTRUMENTATION
22.4		0.8	SS-4	11-7-20 (27)	Silt (ML)	Г	ш	
_	21.0			(21)	\ 19.5-20.25' - very pale orange, (10YR 8/2), wet, \stiff, nonplastic, very rapid dilatancy, moderate I	, very / - HCl	1	_
					reaction, 5-10% very fine to fine grained sand]	
l _						_		_
_						-		_
_						-	ł	-
-						-	ł	-
-	24.5					-	ł	-
25	24.5				Silt With Sand And Limestone Fragments (ML	_)	Ш	-
17.4		0.8	SS-5	39-18-14 (32)	24.5-25.3' - Same as 19.5-20.25' except 15% ve fine to medium grained, 20% fine gravel-sized	ery —	Ш	_
_	26.0			(32)	\limestone fragments	/ -	1	_
_						-	1	_
_						-		_
-						-	-	-
-						-	ł	-
-	00.5					-	ł	-
30	29.5				Silt With Sand (ML)		Ш	-
12.4		1.3	SS-6	18-29-50/3 (79/9")	29.5-30.8' - Same as 24.5-25.3' except moderat yellowish brown, (10YR 5/4), moist to wet, hard,	te —	1	_
	30.8			, ,	nonplastic, rapid dilatancy, mild to moderate HC reaction, trace fine gravel, 20-25% very fine to	ĆI /	Ш	_
_					medium grained sand, all carbonate materials			
_						-		_
-						-	1	-
-						-	ł	-
-						-	ł	-
-	34.5					-	1	-
35	J 4 .U				Silty Sand (SM)			-
7.4		1.1	SS-7	31-18-22 (40)	34.5-35.6' - moderate olive brown, (5Y 4/4), wet dense, very fine to coarse grained, mild HCl rea	action.		
	36.0			(.0)	10-15% fine gravel, 20-25% low plastic fines, all carbonate materials]
_					jan sanata matanata	/		_
-						-		
-						-	-	-
-						-	1	-
-						-	1	-
-	39.5					-	1	-
40	39.8	0.1	SS-8	50/3	h	Γ	H	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-27	SHEET	3	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722971.1 N, 458154.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

WATER	LEVELS	: 4.41 ft k	ogs on 3/0	06/07	START : 2/8/2007	END: 2/10/2007	LOGGEF	R : A.	Teal
\ \ \ 				STANDARD		SOIL DESCRIPTION		ŋ	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	0011 11444	- LICOC OBOLID 0\##501	001.00	SYMBOLIC LOG	DEDTILOF CACINO DOUGLING DATE
ACE AT 10		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR				DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
FY-FY-			#TYPE	6"-6"-6"	CONSISTENC	CY, SOIL STRUCTURE, MIN	IERALOGY	YMB	INSTRUMENTATION
<u> </u>				(N) (50/3")	Limestone Frag	amonte	I	S	
2.4 -				(00,0)	│ \39.5-39.6' - ligh	it olive gray, (5Y 5/2), mild	HCI /-	1	-
-					reaction, poor re	ecovery			-
-							-		=
-							-		=
-							-		=
-							-		_
-	44.5	0.0	\ SS-9 /	50/1	\tag{Limestone Frage}	amonto	_		
-	44.6	(_33-9_/	(50/1")	44.5-44.6' - Sar	me as 39.5-39.6' except po	oor recovery		Encountered rock from 37.0-46.0' switched to NQ coring
-					Begin Rock Co	ring at 44.0 ft bas			Terminate soil sampling at 44.6' Set 35.0' NW casing
45 <u> </u> -2.6					See the next sh	neet for the rock core log			Set 35.0' NW casing
-2.0							-		_
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PROJECT NUMBER:

338884.FL

B-27

SHEET 4 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722971.1 N, 458154.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

CORING	INLITIODA	AD E	אורוע	IENT: CME 550 S/N 186073, mud rotary, NQ tools, NW	Casii	ıy		ORIENTATION : Vertical
WATER	LEVELS: 4.4	1 ft b	gs on	3/06/07 START: 2/8/2007 END: 2	/10/20	007	LOGGER : A. Teal	
			.,	DISCONTINUITIES	Т	T	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)			 	SYMBOLIC LOG	Н	2111102001	CONNICTIO
N A S	ŽA∑ NZ		FRACTURES PER FOOT	DESCRIPTION] [ı	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
표병은	S H 변	(%) Q	158	DEDTIL TYPE OPIENTATION POLICINIESS	٦ž	П	MINERALOGY, TEXTURE,	FLUID LOSS, CORING RATE AN
F A A	#P200	0	25	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	Įβ	П	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
		S,	5.7	THICKNESS, SURFACE STAINING, AND TIGHTNESS	₹	П	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
					1 "	╄		
	44.0		2	44.1' - Fracture, 10 deg, smooth, undulating,	\bot	Ł	Limestone 44.0-45.1' - light olive gray, (5Y 5/2),	
45	R1-NQ		-	open	\top	T	fine grained, moderate HCl reaction,	
-2.6	2 ft	45		44.2' - Fracture, 20 deg, smooth, undulating, _	-	₽	weak (R2), voids <1/16" on 50% of	R1: 13 minutes
	85%		1	open	4111	L	surface, trace voids to 3/16"	/
	46.0		NR	45.1' - Fracture, 5 deg, smooth, undulating, sandy infilling, open	Ш	ı	Silt (ML)	18:06 End day 2/8/07 at
-	10.0		····	, , ,		T	45.1-45.7' - moderate olive brown,	46.0'
-			2	46.25' - Fracture, 50 deg, rough, planar	+	Н	(5Y 4/4), wet, stiff, moderate HCI	
				46.5' - Fracture, 20 deg, rough, undulating		L	reaction, trace fine sand	11
						П	No Recovery 45.7-46.0'	
-			0		-	F	Limestone	
_					4111	L	46.0-46.5' - moderate olive brown,	
	R2-NQ	_	_			L	(5Y 4/4), fine grained, moderate to	
]	5 ft	0	0		1111	r	strong HCl reaction, weak (R2),	
-	66%		_		-	F	voids <1/16" on 40% of surface,	
			0			l	moderately fossiliferous (molds to	
50					1111	Γ	3/16")	
-7.6			NR	-	-	Н	_ Silt (ML)	R2: 7 minutes
_ ′.۰			' ' '		4111	L	46.5-49.3' - Same as 45.1-45.7'	IVE. 7 Illinutes
	51.0				Ш	ı	except trace limestone fragments to 1/16"	
-						力	No Recovery 49.3-51.0'	Section appears competent
-			5	51.25' - Fracture, 5 deg, smooth, undulating	+-	₽	Limestone	but breaks into sandy silt
I _				51.3' - Fracture, 15 deg, smooth, undulating	\bot	Ł	51.0-52.5' - moderate olive brown,	sized particles when
			١.	51.8' - Fracture, 10 deg, rough, undulating 52.0' - Fracture, 25 deg, smooth, undulating,		1	(5Y 4/4), fine grained, strong HCI	pushed on with 2 fingers
-			1	tight		1	reaction, extremely weak (R0), trace	
_				ugnt	\bot	₽	organics, friable	
	R3-NQ	40	0	50.05 50.01 Marchanical basely (0)	\vdash	1	52.5-54.7' - moderate yellowish	
	5 ft 97%	43	"	53.35, 53.8' - Mechanical break (2)	7	T	brown, (10YR 5/4), fine grained,	
-	31 70				$-\Box$	1	moderate HCl reaction, very weak to	
I -			0		\perp	╁	weak (R1 to R2), voids <1/16" on 40% of surface, trace voids to 3/16"	
55			•		Ш	ተ	(fossils) on <5% of surface, trace	
-12.6				_	1111	Г	organics	R3: 4 minutes
-			0		-	ŀ	Silt (ML)	
I _	56.0		NR.		Щ	\perp	54.7-55.85' - moderate yellowish	4
			-		\vdash	┨`	brown, (10YR 5/4), moderate to	/
-			>10		1	丰	strong HCl reaction, trace limestone	
-			-	56.9, 57.3, 57.4' - Mechanical break		1	fragments to 1/16"	` I
_			>10		\coprod	Ł	No Recovery 55.85-56.0'	
			'		\vdash	1	Limestone	
1 -	R4-NQ					t	56.0-56.7' - moderate yellowish	
-	5 ft	46	1		+	ŀ	brown, (10YR 5/4), fine grained, moderate HCl reaction, extremely	
	100%		<u> </u>	58.75' - Fracture, 60 deg, rough, undulating,	ᅪ	Ł	weak to very weak (R0 to R1),	
				1/8" clay infilling	\vdash	ſ	56.4-56.7' extremely weak (R0) zone	
			5	59.1' - Fracture, horizontal, smooth,	世	1	56.7-61.0' - moderate yellowish	
60				undulating, 1/8" clay infilling	+-	╀	 brown, (10YR 5/4), fine grained, 	DALE INTO
-17.6			0	59.1-59.5' - Fracture, 80 deg, rough, planar,	\perp	+	moderate HCl reaction, weak (R2),	R4: 5 minutes
	61.0		١٠	open	1	Ł	voids <1/16" on 50% of surface in	
-	61.0		\vdash	59.3' - Fracture, 10 deg, smooth, undulating,		1	two zones from 58.2-61.0', trace	
-			4	open 59.5' - Fracture, 5 deg, smooth, undulating,	\perp	Ł	voids to 3/8" are <5% of surface on	
			Ι΄.	open	\vdash	1	58.2-61.0', zones of very weak rock 57.3-57.8' and 58.8-59.3'. moderately	
]				59.6' - Fracture, 50 deg, rough, undulating,	T	Ţ	fossiliferous (molds) below 60.0'	
-			1	open	\perp	1	iscomicious (moids) below 00.0	
				60.35' - Mechanical break	\bot	Ł		
	R5-NQ			60.8' - Mechanical break	\vdash	ſ		
-	5 ft	71	1	61.5' - Fracture, 10 deg, rough, undulating,		1		
	88%		\vdash	20% coverage clay infilling, tight	+	╀		
						L		
						L		



FRACTURES PER FOOT

2

1

NR

4

2

NR

2

>10

NR

>10

1

1

0

NR

0

1

48

tiaht

infilling

open

open

open

open

open

open

open

open

from 3/8" to 4"

fragments 3/16" to 1-1/2"

30% coverage clay infilling, open

30% coverage clay infilling, open

20-25% coverage clay infilling

82.4' - Mechanical break

to open up to 3/16"

RQD(%)

WATER LEVELS: 4.41 ft bgs on 3/06/07

CORE RUN, LENGTH, AND RECOVERY (%)

DEPTH BELOW SURFACE AND ELEVATION (ft)

65

-22.6

70

-27.6

75

 $-32\overline{6}$

80

-37.6

81.0

76.0

71.0

66.0

R6-NQ

5 ft

34%

R7-NO

5 ft 29 >10

R8-NQ

5 ft

76%

R9-NQ

5 ft 88%

40 4

16

PROJECT NUMBER: BORING NUMBER: 338884.FL **B-27** SHEET 5 OF 9

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1722971.1 N, 458154.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) $DRILLING \underline{\ CONTRACTOR: Universal\ Engineering\ Sciences,\ Gainesville,\ FL;\ Driller:\ M.\ Boatright;\ Cathead\ Operator:\ M.\ Griffinnes and Contractor$

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

DISCONTINUITIES

61.75, 62.0' - Mechanical break

10% coverage clay infilling, tight

64.3' - Mechanical break

START: 2/8/2007

DESCRIPTION

DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND

62.3' - Fracture, 20 deg, smooth, undulating

64.5' - Fracture, 40 deg, rough, undulating,

64.7' - Fracture, 60 deg, rough, undulating,

65.2' - Fracture, 20 deg, smooth, planar, clay

66.1' - Fracture, 10 deg, smooth, undulating,

66.5' - Fracture, 15 deg, smooth, undulating,

66.65' - Fracture, 5 deg, smooth, undulating,

66.8' - Fracture, 15 deg, smooth, undulating,

67.2' - Fracture, 25 deg, smooth, undulating,

67.75' - Fracture, 10 deg, smooth, undulating,

71.6' - Fracture, 20 deg, rough, undulating,

72.1' - Fracture, 15 deg, rough, undulating,

72.1-73.3' - Fracture zone, horizontal and

vertical, rough, undulating, open, fragments

73.3' - Fracture, 30 deg, rough, undulating,

73.75' - Fracture, 10 deg, rough, undulating, tight to open up to 9/16"

74.1' - Fracture, 30 deg, rough, undulating,

76.8' - Fracture, 10 deg, rough, undulating,

77.1' - Fracture, 30 deg, rough, undulating,

78.5' - Fracture, 10 deg, rough, undulating,

83.25' - Fracture, 60 deg, rough, planar, tight

76.0-76.6' - Fracture zone, rough, undulating,

20% coverage clay infilling, open to 3/8"

15% coverage clay infilling, open to 3/8" 63.9' - Fracture, 5 deg, smooth, undulating, 10% coverage clay infilling, open

ORIENTATION : Vertical END: 2/10/2007 LOGGER: A. Teal LITHOLOGY COMMENTS 90 ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS Limestone 61.0-65.4' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCI reaction, medium R5: 12 minutes strong (R3), very fossiliferous on 61.0-63.0', voids <1/16" over 40% of same surface and over 10% of surface elsewhere, from 61.0-63.0' extremely fossiliferous zones with voids <1/16" on 40% of surface, molds and casts up to 3/8"x3/4" on 5% of surface, trace organics No Recovery 65.4-66.0' Limestone 66.0-67.7' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, very weak (R1), voids <1/16" on 40 % of surface, trace voids to 3/16", trace R6: 12 minutes organics, 67.2-67.7' rock appears brecciated and more fossiliferous fewer voids and medium strong to strong rock (R3 to R4) No Recovery 67.7-71.0' Limestone 71.0-74.1' - Same as 66.0-67.7' except voids <1/16" below 72.0' on 25% of surface, moderately fossiliferous No Recovery 74.1-76.0' R7: 8 minutes Limestone 76.0-79.8' - moderate vellowish brown to pale yellowish brown, (10YR 5/4 to 10YR 6/2), fine grained, moderate HCI reaction, medium strong (R3), voids <1/16" on 50% of surface decreasing with depth to 25% by 79.0', trace voids to 3/16", moderately fossiliferous No Recovery 79.8-81.0' R8: Run time not recorded SC-1 collected at 81.0-Limestone 81.0-85.4' - moderate yellowish 82.0' brown, (10YR 5/4), fine grained, mild HCl reaction, weak to medium strong (R2 to R3), voids <1/16" on 20% of surface, trace voids and fossil molds to 3/16"x3/8", trace organics



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-27	SHEET	6	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722971.1 N, 458154.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

WATER	LEVELS: 4.4	1 ft bo	gs on (3/06/07 START : 2/8/2007 END : 2/	10/20	07 LOGGER : A. Teal	
> 0 0	(9)			DISCONTINUITIES	ڻ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SLOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H H H	P.F.R.	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FF.F.	NG NG	οD	AC-	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	SHR	ŭ	R R	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Sγ	CHARACTERISTICS	BROFO, FEOT REGGETO, ETC.
				83.4' - Fracture, 20 deg, smooth, undulating,	\mathbf{H}		
85			4	tight 83.65' - Fracture, 30 deg, rough, undulating,	世	_	1
-42.6			2	open	╁	_	R9: Run time not recorded
-	06.0		NR	83.8' - Fracture, 20 deg, rough, undulating,	仁	No Recovery 85.4-86.0'	-
-	86.0			open 84.0' - Fracture, 70 deg, rough, planar, tight	╁	_ Limestone	-
-			>10	84.1' - Fracture, 10 deg, rough, undulating,	ш	- 86.0-86.8' - moderate yellowish	-
-				open 84.5' - Fracture, 10 deg, rough, undulating,	世	brown, (10YR 5/4), fine grained, mild HCl reaction, medium strong to	-
-			>10	tight to open up to 3/16"	╁	strong (R3 to R4), trace voids <1/16",	-
-				84.75' - Fracture, 50 deg, rough, undulating,		laminated subhorizontal bedding	_
l _	R10-NQ 5 ft	50	>10	open 85.0' - Fracture, 50 deg, rough, planar, tight	╨	from 86.0-86.4' - 86.8-87.0' - moderate yellowish	_
Ι.	94%		. 10	85.3' - Fracture, 50 deg, smooth, planar,	厂	brown, (10YR 5/4), fine grained,	_
			0	open 86.65' - Fracture, 20 deg, rough, undulating,		moderate HCl reaction, very weak to weak (R1 to R2), voids <1/16" on	
90			"	open	\vdash	20% of surface]
-47.6			>10	86.85-87.05, 87.4-87.5, 88.0-88.3, 90.4-90.7'	1	87.0-90.7' - moderate yellowish	R10: Run time not
-	91.0		NR	 Fracture zone (4), rough, undulating, fine gravel sized limestone fragments 	╨	 brown, (10YR 5/4), fine grained, mild HCl reaction, medium strong to 	recorded -
-	91.0		INIX	87.05-87.5' - Fracture (2), 45 deg and 80	口	strong (R3 to R4), zone of weak (R2)	-
-			>10	deg, rough, undulating, open, tight-open respectively		 rock from 87.5-88.5', voids <1/16" on 25% of surface, trace voids to 	-
-				91.0-92.2' - Fracture zone, 0-75 deg, rough,	\vdash	3/16"x3/8", moderately fossiliferous	-
-			1	undulating, fragments 1/2"-2", trace		No Recovery 90.7-91.0'	-
-				bi-directional drill marks 92.4, 92.6' - Mechanical break (2)	₽	Limestone □ 91.0-93.5' - Same as 87.0-90.7'	-
-	R11-NQ 5 ft	27	0		ш		_
l -	50%					No Recovery 93.5-96.0'	_
l _					┢	_	_
95			NR	_			
-52.6							R11: Run time not
	96.0				Ш		recorded -
_				96.0-96.3' - limestone fragments gravel to	世	Limestone	1
-			>10	cobble sized 96.4' - Fracture, 10 deg, rough, undulating,	╁	 96.0-99.3' - moderate yellowish brown, (10YR 5/4), fine grained, mild 	1
-				open	广	HCl reaction, weak to medium strong	
-			3	96.7' - Fracture, 15 deg, rough, undulating,		- (R2 to R3), voids <1/16" on 40% of	-
-	R12-NQ			open 97.0' - Fracture, 25 deg, rough, undulating,	oxdappi	surface, voids to 3/16" on 5% of surface, cavities to 3/8"x3/4" from	-
-	5 ft	34	2	open	世	 96.0-97.3', moderately fossiliferous 	-
-	66%		0	97.5' - Fracture, 10 deg, smooth, undulating 97.6' - Fracture, 50 deg, smooth, planar, tight	\vdash	(casts, molds)	-
-				98.0' - Fracture, 15 deg, rough, undulating		- No Recovery 99.3-101.0'	-
100			ND	98.2' - Fracture, 20 deg, rough, undulating,		_	D40: Dura times
-57.6			NR	open 99.3' - Fracture, 40 deg, smooth, planar	$oxed{\square}$	_	R12: Run time not recorded –
l -	101.0				厂	_	
			2	101.05' - Fracture, 40 deg, smooth,	\vdash	Limestone	
I -			3	undulating, tight 101.3' - Fracture, 40 deg, smooth, planar,	H	- 101.0-104.5' - Same as 96.0-99.3' except weak (R2)]
-				charcoal gray staining, tight	世		1
-			2	101.8' - Fracture, 35 deg, rough, undulating,	oxdappi	-	
-	R13-NQ			open 102.4, 102.65' - Fracture (2), 40 deg, rough,	世	-	<u> </u>
-	5 ft	68	1	undulating, tight	+	-	-
	100%			103.0' - Mechanical break			-
					1		<u> </u>

APPENDIX 2BB-640 Rev. 7



PROJECT NUMBER:

338884.FL

B-27

SHEET 7 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722971.1 N, 458154.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION : Vertical

00.1	J WETTIOD 7	,,,	2011 11	MENT . CIVIE 330 3/N 1860/3, Mud rolary, NQ 1001S, NVV	odoni		ORIENTATION . Vertical
WATER	LEVELS: 4.4	1 ft b	gs on	3/06/07 START: 2/8/2007 END: 2	/10/20	D7 LOGGER : A. Teal	
				DISCONTINUITIES	П	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)			 	SYMBOLIC LOG		
I N ≤ Z	ZZZ ≿		FRACTURES PER FOOT	DESCRIPTION		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
불병은	5.fb	(%) _Q	SEL SEL	DEDTIL TYPE OBJECTATION BOLIOUNESS	ן בֻׂ ן	MINERALOGY, TEXTURE,	FILLID LOSS CORING RATE AND
₽₩¥	<u> </u>	<u> </u>	PE	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	1 M	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
유용교	뜻없었	Ø	RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
Δош	078	œ	шФ	THICKNESS, SOLUTION TO THE TOTAL CO	S	OHAIVAOTERIOTIOO	
				103.5' - Fracture, 30 deg, rough, undulating,	ш		
-	1		4	yellowish brown staining on 20% of surface,	+	_ Limestone	SC-2 collected at 104.5-
105				tight	┸	— 104.5-106.0' - pale yellowish brown,	105.45'
-62.6				103.6-103.9' - Fracture, 60 deg, rough,	ш	(10YR 6/2), fine grained, mild HCI	R13: 10 minutes
-	1		2	undulating, tight		reaction, very weak to weak (R1 to	-
-	106.0			104.1' - Fracture, 25 deg, rough, undulating,	\bot	- R2), voids <1/16" on 15% of surface,	-
				charcoal gray staining, open to 3/16"	\mathbf{H}	trace fossil molds and casts to 3/16"	
-	1		>10	104.15' - Fracture, 60 deg, rough, planar,	╫	106.0-107.3' - Same as 104.5-106.0'	1
-	-			open to 1/16"	╂	-	-
				104.4' - Fracture, 15 deg, rough, undulating,		107.0. 100.01	
_	1		6	charcoal gray staining, open to 3/8" 104.5' - Fracture, 50 deg, rough, planar,		- 107.3 -109.0' - moderate yellowish	1
-	ا ا				╁	brown, (10YR 5/4), fine grained, mild	-
1	R14-NQ		_40	charcoal gray staining, tight 105.45, 105.7' - Fracture (2), 70 deg, rough,	$\vdash \vdash$	HCl reaction, weak (R2), voids <1/16" on 25-30% of surface, trace 	
	5 ft 60%	24	>10	planar, charcoal gray staining, open	1 + 1	fossil molds and casts to 3/8"x3/8" on	1
1 -	00%		<u> </u>	106.15' - Fracture, 50 deg, rough, planar,	┦┤┤	1055ii moids and casts to 3/6 x3/6 on <5% of surface	-
1	j l			charcoal gray staining	Ш	No Recovery 109.0-111.0'	
110	1			106.15-106.5' - Fracture, 30 deg, rough,	ЪЦ	- No Necovery 100.0-111.0	1
110_ -67.6	- 1		NR	undulating, tight	╨		D44. 7 minutes —
-07.0				106.15-106.5' - limestone fragments 2"x2"	\mathbf{H}		R14: 7 minutes
-	1,,,,			107.0' - Fracture, 15 deg, rough, undulating,	1-		1
-	111.0			open	╂	_ Limestone	-
l _]		1	107.2' - Fracture, 30 deg, rough, undulating,		- 111.0-111.9' - moderate yellowish	
			'	open	ш	brown, (10YR 5/4), fine grained, mild	
-	1 1			107.6' - Fracture, 30 deg, rough, undulating,	╂┯┤	HCl reaction, medium strong (R3),	Recovery loss assumed to
l .]		1	open	Н	voids <1/16" on 20% of surface,	be from bottom of run
			' '	108.3-108.8' - limestone fragments from		voids and fossil (casts, molds) to	be from bottom or run
-	R15-NQ			3/16" to 1"x2"		3/8"x1" on 15% of surface, trace	1
l -	5 ft	45	2	111.9' - Fracture, horizontal, rough, stepped	ш	organics, at 111.3' clasts of gray	
	55%	40		113.0' - Fracture, 5 deg, smooth, undulating,	Н	limestone 1/4"x1"	
-	1 1			brown staining, tight	╂┴┤	111.9-113.75' - moderate olive brown	1
-				113.4-113.8' - Fracture zone, fragments to	┸	 with very pale orange and olive gray, 	-
115			NR	1-1/2" subangular to subround		(5Y 4/4 with 10YR 8/2 and 5Y 4/1),	
-72.6	1		INIX	_	ш	fine grained, moderate HCl reaction,	R15: Run time not
-	-				+	weak (R2), voids <1/16" on 15% of	recorded -
	116.0				\vdash	surface, fossil molds	
_				116.1, 116.35, 116.85, 117.0, 117.1' -	1—	1/16"x3/16"x3/4" 10% of surface, 2"	1
-	-		5	Fracture (5), horizontal and 5 deg, rough,	-	 band of olive gray (5Y 4/1) mottling at 	-
				undulating		113.2'	
1 -	1			undulating	1_	No Recovery 113.75-116.0'	1
1 -	- I		2		╁┸┤	_ Limestone	-
1	j l				\mathbb{H}	116.0-117.1' - dusky yellow, (5Y 6/4),	
1 7	R16-NQ			118.0-119.5' - Fracture zone or mechanical		fine grained, mild HCl reaction, weak	1
1 -	5 ft	42	3	break (5)	┲	(R2), voids <1/16" on 15% of	-
l _	76%					surface, at 116.1' rock fragment	
					ш	dusky yellow with light olive gray (5Y	
1 -	₁		2		╂┼┤	_ 6/4 with 5Y 6/1) material	-
120_	j l			_	\mathbb{H}	117.1-119.8' - moderate yellowish	
-77.6			ND	_	Ш	brown, (10YR 5/4), fine grained, mild HCl reaction, weak to medium strong	R16: Run time not
-	1 1		NR			(R2 to R3), voids <1/16" over 25% of	recorded -
Ι -	121.0				Щ	- surface, trace voids (fossil molds)	
1				121.0-126.0' - recovery too low to accurately	H	from 3/16"-3/8" <5%, very weak to	
1 -	† I		>10	identify fracture depths	╁┼┤	weak (R1 to R2) rock zone from	-
Ι -	. 1				47	- 117.9-118.3'	1
1						No Recovery 119.8-121.0'	Low recovery
1 -	1 1				Ш	Limestone	-
I -			NR		\bot	- 121.0-122.1' - Same as 117.1-119.8'	_
1	R17-NQ		INIC		H	No Recovery 122.1-126.0'	
1 -	5 ft	0			1		-
<u> </u>	22%				一		
1							
1							
_			_		_		



PROJECT NUMBER:

338884.FL

B-27

SHEET 8 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722971.1 N, 458154.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION : Vertical

PLANARITY INFILLING MATERIAL AND SET OF THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS PLANARITY INFILLING MATERIAL AND SET OF THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS PROPS, TEST RESULT			D7 LOGGER : A. Teal	0/200	/06/07 START: 2/8/2007 END: 2/	ft bgs on	LEVELS: 4.41	WATER
125		COMMENTS	LITHOLOGY	ပ္ခ	DISCONTINUITIES		- ©	>∩≎
125	CASING	SIZE AND DEPTH OF CAS		C LO	DESCRIPTION	SH	AND ≪ (%	PILO N (FILO)
125	RATE AND	FLUID LOSS, CORING RAT		SOLIC	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	8 F8	TH, OVER	H BE ATIC
125	TS, ETC.	DROPS, TEST RESULTS,	AND ROCK MASS	YMB	PLANARITY, INFILLING MATERIAL AND	RAC BR	ORE	트움의 교육의
126.0 126.0 126.0 126.0 126.0 126.0 126.0 126.5 Fracture zone 126.0 126.8 126.0 126.8 126.0 126.8 126.0 126.8 126.0 126.8 126.0 126.8 126.0 126.8 126.0 126.8 126.0 126.8 126.0 126.8 126.0 126.8 126.0 126.8 126.0 126.8 126.0 126.8 126.0 126.			OHAINOTERIOTICO	S	THIOTALESS, SOLATION TO THE HOLLING	<u>к г. г.</u>	0 1 2 1	ООШ
126.0 126.0 126.0 126.0 126.0 126.0 126.0 126.5 Fracture zone 126.0 126.8 126.0 126.8 126.0 126.8 126.0 126.8 126.0 126.8 126.0 126.8 126.0 126.8 126.0 126.8 126.0 126.8 126.0 126.8 126.0 126.8 126.0 126.8 126.0 126.8 126.0 126.8 126.0 126.	-		_	Ħ				-
126.0 126.0-126.5' - Fracture zone 126.0-126.5' - Fracture zone 126.0-126.6' - Fracture, horizontal, rough, stepped, tight 127.1' - Fracture, 5 deg, rough, undulating, open 127.4-127.9' - Fracture zone 128.0-126.6' - pale yellowish brown, (10YR 6/2), fine grained, mid HCI reaction, meak to medium strong (R3), voids <1/16' over 10% of surface, trace voids to 3/16' over 20% of core, voids 4/16' over 20% of core, voids 4/16' over 20% of core, voids 4/16' over 20% of core, voids and fossil molds to 3/16' over 20% of core, voids and fossil molds to 3/16' over 20% of core, voids and fossil molds to 3/16' over 20% of core, voids and fossil molds to 3/16' over 20% of core, voids 3/16' over 20% of core, voids 3/16' over 20% of core, voids 3/16' over 20% of core, voids 3/16' over 20% of core, voids 3/16' over 20%		D17: Dun time not		Ш	_	NR		
126.0-126.5' - Fracture zone 126.0-126.5' - Fracture zone 126.0-126.5' - Fracture, horizontal, rough, stepped, tight 127.1' - Fracture, 5 deg, rough, undulating, open 131.0 NR 2 131.0' - Fracture, 10 deg, rough, undulating, open 131.7' - Fracture, 30 deg, rough, undulating, open 131.7' - Fracture, 30 deg, rough, undulating, open 132.4, 132.75, 133.2' - Fracture, 10 deg, rough, undulating, open 133.4' - Fracture, 20 deg, rough, undulating, open 133.4' - Fracture, 10 deg, rough, undulating, open 133.4' - Fracture, 20 deg, rough, undulating, open 133.4' - Fracture, 10 deg, rough, undulating, open 133.4' - Fracture, 20 deg, rough, undulating, open 133.4' - Fracture, 10 deg, rough, undulating, open 133.4' - Fracture, 20 deg, rough, undulating, open 133.5' - Fracture, 30 deg, rough, undulating, open 133.6' - Fracture, 30 deg, rough, undulating, open 136.5' - Fracture, 30 deg, rough, u	-		_	Н				-02.0
126.8' - Fracture, horizontal, rough, stepped, light 127.1' - Fracture, 5 deg, rough, undulating, open 127.4-127.9' - Fracture zone 129.4-130.2' - Fracture, 10 deg, rough, undulating, open 131.7' - Fracture, 45 deg, rough, planar, open 131.7' - Fracture, 45 deg, rough, planar, open 131.7' - Fracture, 20 deg, rough, undulating, open 132.2, 132.5, 133.4' - Fracture, 20 deg, rough, undulating, open 133.4' - Fracture, 20 deg, rough, undulating, open 133.4' - Fracture, 20 deg, rough, undulating, open 133.4' - Fracture, 20 deg, rough, undulating, open 133.4' - Fracture, 20 deg, rough, undulating, open 133.4' - Fracture, 20 deg, rough, undulating, open 133.4' - Fracture, 20 deg, rough, undulating, open 133.4' - Fracture, 20 deg, rough, undulating, open 133.4' - Fracture zone, rough, undulating, open 136.0' - Fracture, 30 deg, rough, undulating, open 136.7' - Fracture, 10 deg, rough, undulating, open 136.8' - Fracture, 30 deg, rough, undulating, open 136.5' - Fracture, 30 deg, rough, undulating, open 136.7' - Fracture, 30 deg, rough, undulating, open 136.7' - Fracture, 30 deg, rough, undulating, open 136.7' - Fracture, 30 deg, rough, undulating, open 136.8' - Fracture, 30 deg, rough, undulating, open	-		Limostono	П	126 0 126 El Fractura 7000		126.0	-
R18-NO 5 ft 94% 26 131.0 NRR 131.0 NRR 2 131.5' - Fracture, 10 deg, rough, undulating, open 131.7' - Fracture, 45 deg, rough, undulating, open 131.7' - Fracture, 45 deg, rough, undulating, open 131.7' - Fracture, 45 deg, rough, undulating, open 131.7' - Fracture, 45 deg, rough, undulating, open 131.7' - Fracture, 20 deg, rough, undulating, open 132.4' 132.75' 133.2' - Fracture, 20 deg, rough, undulating, open 133.8' - Fracture zone, rough, undulating, open 133.8' - Fracture zone, rough, undulating, fragments 3/16"-1" 136.0' Sft 16 50%	-		 126.0-126.8' - pale yellowish brown, 	Ш	120.0-120.5 - Flacture zone	2		-
R18.NO Str. Open 127.4-127.9' - Fracture zone 127.4-127.9' - Fracture zone 129.4-130.2' - Fracture zone 129.4-	-		(10YR 6/2), fine grained, mild HCl	H	126.8' - Fracture, horizontal, rough, stepped,			-
R18-NO 127.4-127.9' - Fracture zone 127.7-130.7' - Volksy yellow, (57 Y6/4), fine grained, weak (R2), volds <11/6' over 20% of core, predominately oriented along laminated bedding planes, trace volds to 3/16'' 127.7-130.7' - Volksy yellow, (57 Y6/4), fine grained, mild HCI reaction, weak to medium strong (R2 to R3), volds <11/16' on 25% of core, volds and fossil molds to 3/16'' 308'' on 5%, zone yellow in the production of sold in the production of sol	-		- <1/16" over 10% of surface, trace	Ħ		3		
130	_		voids to 3/16"	Ħ				
weak (R2), voids <1/16" over 20% of core, orpadominately oriented along laminated bedding planes, trace voids to 3/16" 131.0 NR 131.0 NR 131.5' - Fracture, 10 deg, rough, undulating, open 131.7' - Fracture, 45 deg, rough, undulating, ight 131.7' - Fracture, 30 deg, rough, undulating, open 132.2, 132.5, 133.4' - Fracture, 20 deg, rough, undulating, open 132.4, 132.75, 133.2' - Fracture, 10 deg, rough, undulating, open 132.4, 132.75, 133.2' - Fracture, 10 deg, rough, undulating, open 132.4, 132.75, 133.3' - Fracture, 10 deg, rough, undulating, open 132.4, 132.75, 133.2' - Fracture, 10 deg, rough, undulating, open 132.4, 132.75, 133.2' - Fracture, 10 deg, rough, undulating, open 132.4, 132.75, 133.2' - Fracture, 10 deg, rough, undulating, open 132.4, 132.75, 133.2' - Fracture, 10 deg, rough, undulating, open 132.4, 132.75, 133.2' - Fracture, 10 deg, rough, undulating, open 132.4, 132.75, 133.2' - Fracture, 10 deg, rough, undulating, open 132.4, 132.75, 133.2' - Fracture, 10 deg, rough, undulating, open 132.4, 132.75, 133.2' - Fracture, 10 deg, rough, undulating, open 133.6 - Fracture zone 136.5' - Fracture, 10 deg, rough, undulating, open 132.4, 133.7' - Fracture, 10 deg, rough, undulating, open 132.4, 133.7' - Fracture, 10 deg, rough, undulating, open 132.4, 132.75, 133.2' - Fracture, 10 deg, rough, undulating, open 132.4, 132.75, 133.2' - Fracture, 10 deg, rough, undulating, open 133.6 - Fracture zone 136.5' - Fracture, 10 deg, rough, undulating, open 133.0' - Fracture zone 136.5' - Fracture, 10 deg, rough, undulating, open 133.0' - Fracture zone 136.5' - Fracture, 20 deg, rough, undulating, open 133.0' - Fracture zone 136.5' - Fracture, 20 deg, rough, undulating, open 136.0' - Fracture zone 136.0' - Fracture zone 138.0' - Fracture zone 24.0' - Fracture zone 25.0' - Fracture zone 25.0' - Fracture zone 25.0	-	1	- brown, (10YR 5/4), fine grained,	버		32 0		-
laminated bedding planes, trace voids to 3/16" 127.7-130.7" - dusky yellow, (5Y 6/4), fine grained, mild HCI reaction, weak to medium strong (R2 to R3), voids (1/16" on 25% of core, voids and fossil molds to 3/16"x3/8" on 5%, zone of very weak rock (R1) with laminar bedding from 129.1-129.8" No Recovery 130.7-131.0" Limestone 132.4, 132.75, 133.2" - Fracture, 20 deg, rough, undulating, open 132.4, 132.75, 133.2" - Fracture, 10 deg, rough, undulating, open 132.4, 132.75, 133.2" - Fracture, 10 deg, rough, undulating, open 133.8-134.0" - Fracture, 20 deg, rough, undulating, open 133.8-134.0" - Fracture, 30 deg, rough, undulating 133.8-134.0" - Fracture, 30 deg, ro			weak (R2), voids <1/16" over 20% of	\square				
131.0). -	Weaker rock at 129.0'		団	120 / 130 2' Fracture zono	2		
131.0 NR 131.0 NR 3	_		voids to 3/16"		123.4-130.2 - Flacture 2011e —	_		
131.0 NR 3 131.5' - Fracture, 10 deg, rough, undulating, open 131.7' - Fracture, 45 deg, rough, planar, open 131.75' - Fracture, 30 deg, rough, undulating, tight 132.2, 132.5, 133.4' - Fracture, 20 deg, rough, undulating, open 133.8-134.0' - Fracture zone, rough, undulating, open 133.8-134.0' - Fracture zone, rough, undulating, fragments 3/16"-1" 136.0	_			\mathbb{H}		0		-87.6
131.5' - Fracture, 10 deg, rough, undulating, open 131.7' - Fracture, 45 deg, rough, planar, open 131.7' - Fracture, 30 deg, rough, undulating, tight 132.2, 132.5, 133.4' - Fracture, 20 deg, rough, undulating, open 133.4', 132.75, 133.2' - Fracture, 10 deg, rough, undulating, open 133.8-134.0' - Fracture, 20 deg, rough, undulating, open 133.8-134.0' - Fracture zone, rough, undulating, fragments 3/16"-1" 136.0 2	_	recorded	to medium strong (R2 to R3), voids	Ħ	_	NR	131.0	l _
R19-NO 5 ft 62% 26 20 20 20 20 20 20 20 20 20 20 20 20 20	_	1		Щ		3		
131.7" - Fracture, 45 deg, rough, planar, open 131.7" - Fracture, 30 deg, rough, undulating, tight 132.2, 132.5, 133.4" - Fracture, 20 deg, rough, undulating, open 132.4, 132.75, 133.2" - Fracture, 10 deg, rough, undulating, open 133.5" - Fracture, 30 deg, rough, undulating open 132.4, 132.75, 133.2" - Fracture, 10 deg, rough, undulating, open 133.5" - Fracture, 20 deg, rough, undulating open 133.5" - Same as 127.7-130.7" except more fossiliferous with both gray and brown limestone fragments to 3/8"x3/4" on 5%, light olive gray (5Y 3/8"x3/4" on 5%, light olive gray (5Y 6/1) mottling, moderately fossiliferous No Recovery 130.7-131.0" Limestone 131.0-131.5" - Same as 127.7-130.7" except more fossiliferous with both gray and brown limestone fragments to 3/8"x3/4" on 5%, light olive gray (5Y 6/1) mottling, moderately fossiliferous No Recovery 134.7-136.0" R19: Run time not recorded No Recovery 134.7-136.0" R19: Run time not recorded Sity Sand (SM) 136.0-136.5" - pale yellowish brown, (10YR 6/2), fine grained, 20% silt, poorly graded Limestone 136.5-138.0" Driller's Remark: Soft material at 138.0" Driller's	_	1	zone of very weak rock (R1) with	$\vdash \vdash$				
R19-NQ 5 ft 62% 135.2, 132.5, 133.4' - Fracture, 20 deg, rough, undulating, tight 132.4, 132.75, 133.2' - Fracture, 10 deg, rough, undulating, open 133.8-134.0' - Fracture zone, rough, undulating, fragments 3/16"-1" 136.0 R20-NQ 5 ft 50% 138.0-138.3' - Fracture, norizontal, smooth, planar, tight 136.8, 137.05, 137.37' - Mechanical break (3) R20-NQ 5 ft 50% 138.0-138.3' - Fracture zone 131.0-131.5' - Same as 127.7-130.7' except more fossiliferous with both gray and brown limestone fragments to 3/8"x3/4" 131.5-134.1' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, strong (R4), voids <1/16" on 10% of core, voids 3/8"x3/4" on 5%, light olive gray (5Y 6/1) mottling, moderately fossiliferous No Recovery 134.1-136.0' Silty Sand (SM) 136.0-136.5' - pale yellowish brown, (10YR 6/2), fine grained, 20% silt, poorly graded Limestone 136.5-138.0' - yellowish gray to pale yellowish brown with yellowish brown, (5Y 7/2 to 10YR 6/2), fine grained, mild HCl reaction, strong (R4), MR 131.0-131.5' - Same as 127.7-130.7' except more fossiliferous with both gray and brown limestone fragments to 3/8"x3/4" 131.5-134.1' - yellowish gray, (5Y 6/1) mottling, moderately fossiliferous No Recovery 134.1-136.0' Silty Sand (SM) 136.0-136.5' - pale yellowish brown, (10YR 6/2), fine grained, poorly graded Limestone 136.5-138.0' - yellowish gray to pale yellowish brown with yellowish brown, (5Y 7/2 to 10YR 6/2), fine grained, mild HCl reaction, strong (R4),	_	1		Щ	131.7' - Fracture, 45 deg, rough, planar, open	1		
135	_	1	Limestone	Щ				
rough, undulating, open 132.4, 132.75, 133.2' - Fracture, 10 deg, rough, undulating, open 133.8-134.0' - Fracture zone, rough, undulating, fragments 3/16"-1" NR 136.0 NR 136.0 NR 136.5' - Fracture, horizontal, smooth, planar, tight 136.5' - rough, undulating, open 136.8, 137.05, 137.37' - Mechanical break (3) R20-NQ 5 ft 50% R20-NQ 5 ft 50% NR 138.0-138.3' - Fracture zone R20-NQ 6 core, voids 3/8"x3/4" on 5%, light olive gray (5Y 6/1) mottling, moderately fossiliferous No Recovery 134.1-136.0' Sitty Sand (SM) 136.0-136.5' - pale yellowish brown, (10YR 6/2), fine grained, 20% silt, poorly graded Limestone 136.5-138.0' - yellowish gray to pale yellowish brown with yellowish brown, (5Y 7/2 to 10YR 6/2), fine grained, mild HCI reaction, strong (R4), did HCI reaction, strong (R4),		1	131.0-131.5' - Same as 127.7-130.7' except more fossiliferous with both	Ш	132.2, 132.5, 133.4' - Fracture, 20 deg,	26 . 42		
rough, undulating, open 133.7' - Fracture, 30 deg, rough, undulating 133.8-134.0' - Fracture zone, rough, undulating 133.8-134.0' - Fracture zone, rough, undulating 136.0 136.0 136.0 136.5' - Fracture, horizontal, smooth, planar, tight 136.8, 137.05, 137.37' - Mechanical break (3) 138.0-138.3' - Fracture zone 131.5-134.1' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, strong (R4), voids <1/16" on 10% of core, voids 3/8"x3/4" on 5%, light olive gray (5Y 6/1) mottling, moderately fossiliferous No Recovery 134.1-136.0' Silty Sand (SM) 138.0-138.0' - pale yellowish brown, (10YR 6/2), fine grained, 20% silt, poorly graded Limestone 136.5-138.0' - yellowish gray to pale yellowish brown with yellowish brown, (5Y 7/2 to 10YR 6/2), fine grained, mild HCI reaction, strong (R4),		1	gray and brown limestone fragments	Н		<u>-</u> ∪ >10		Ι ΄
135 -92.6 NR 133.7 - Fracture, 30 deg, rough, undulating 133.8-134.0' - Fracture zone, rough, undulating, fragments 3/16"-1" 136.0 136.0 136.5' - Fracture, horizontal, smooth, planar, tight 136.8, 137.05, 137.37' - Mechanical break (3) 138.0-138.3' - Fracture zone 136.5' - Fracture, horizontal, smooth, planar, tight 136.8, 137.05, 137.37' - Mechanical break (3) 138.0-138.3' - Fracture zone 136.5' - Fracture, horizontal, smooth, planar, tight 136.7' - rough, undulating, open 136.8, 137.05, 137.37' - Mechanical break (3) 138.0-138.0' - yellowish gray to pale yellowish brown, (5Y 7/2 to 10YR 6/2), fine grained, mild HCI reaction, strong (R4), mild HCI reaction, strong (R4),	_	1	เบ 5/8"X3/4" _ 131.5-134.1' - yellowish gray, (5Y	H	rough, undulating, open			
undulating, fragments 3/16"-1" 136.0 2 136.5' - Fracture, horizontal, smooth, planar, tight 136.7' - rough, undulating, open 136.8, 137.05, 137.37' - Mechanical break (3) R20-NQ 5 ft 50% 138.0-138.3' - Fracture zone 138.0-138.3' - Fracture zone 138.0-138.3' - Fracture zone 138.0-138.3' - Fracture zone 138.0-138.0' - yellowish gray to pale yellowish brown, (5Y 7/2 to 10YR 6/2), fine grained, mild HCI reaction, strong (R4), 138.0-138.0' - mild HCI reaction, strong (R4),	-	1	7/2), fine grained, moderate HCl	罝	133.7' - Fracture, 30 deg, rough, undulating	NIE.		135
136.0 2 136.5' - Fracture, horizontal, smooth, planar, tight 136.7' - rough, undulating, open 136.8, 137.05, 137.37' - Mechanical break (3) R20-NQ 5 ft 50% 10 138.0-138.3' - Fracture zone 138.0-138.3' - Fracture zone 138.0-138.0' Silty Sand (SM) 136.0-136.5' - pale yellowish brown, (10YR 6/2), fine grained, 20% silt, poorly graded Limestone 136.5-138.0' - yellowish gray to pale yellowish brown, (5Y 7/2 to 10YR 6/2), fine grained, mild HCI reaction, strong (R4),				Н		NR		-92.6
2 136.5' - Fracture, horizontal, smooth, planar, tight 136.7' - rough, undulating, open 136.8, 137.05, 137.37' - Mechanical break (3) 138.0-138.3' - Fracture zone 136.5-138.0' - yellowish gray to pale yellowish brown, (5Y 7/2 to 10YR 6/2), fine grained, mild HCI reaction, strong (R4),	-	recorded	light olive gray (5Y 6/1) mottling,	Щ			136.0	
136.5' - Fracture, horizontal, smooth, planar, tight 136.7' - rough, undulating, open 136.8, 137.05, 137.37' - Mechanical break (3) 138.0-138.3' - Fracture zone 138.0-138.3' - Fracture zone Silty Sand (SM) 136.0-136.5' - pale yellowish brown, (10YR 6/2), fine grained, 20% silt, poorly graded Limestone 136.5-138.0' - yellowish gray to pale yellowish brown with yellowish brown, (5Y 7/2 to 10YR 6/2), fine grained, mild HCI reaction, strong (R4),	=					2		
R20-NQ 5 ft 50% 16 50% 17 Fracture zone 136.7' - rough, undulating, open 136.8' - Fracture zone 136.5-138.0' - yellowish gray to pale yellowish brown, (5Y 7/2 to 10YR 6/2), fine grained, 20% silt, poorly graded Limestone 136.5-138.0' - yellowish brown, (5Y 7/2 to 10YR 6/2), fine grained, mild HCI reaction, strong (R4),	=	1	Silty Sand (SM)	Щ		4		
R20-NQ 5 ft 50% 16 50% 138.0-138.3' - Fracture zone 138.0' Driller's Remark: Soft material at 138.0' Limestone 136.5-138.0' - yellowish gray to pale yellowish brown with yellowish brown, (5Y 7/2 to 10YR 6/2), fine grained, mild HCI reaction, strong (R4),	'.15-	SC-3 collected at 137.15	136.0-136.5' - pale yellowish brown,	Ш		_		Ι ΄
136.5-138.0' - yellowish gray to pale yellowish brown with yellowish brown, (5Y 7/2 to 10YR 6/2), fine grained, mild HCI reaction, strong (R4),	-		poorly graded	Ш	136.8, 137.05, 137.37' - Mechanical break (3)	0		
yellowish brown with yellowish brown, (5Y 7/2 to 10YR 6/2), fine grained, mild HCI reaction, strong (R4),	i -			H	138.0-138.3' - Fracture zone			
(5Y 7/2 to 10YR 6/2), fine grained, mild HCI reaction, strong (R4),	-	material at 138.0'	yellowish brown with yellowish brown,	口	•	16		-
	_	1		罝	·			-
1 140 INIX INIX INIX INIX INIX INIX INIX	-	1	laminated bedding, at 136.8' and	dash	•	NR		140
-97.6 137.2', 136.8-137.2' moderate R20: 46 minutes R20: 46 minutes		R20: 46 minutes	137.2', 136.8-137.2' moderate	Ш	_			-97.6
141 0 Land 141 0 Land	-	1	<1/16" over 20% of surface	Ш			141 0	-
138.0-138.5' - moderate olive brown,	-	1	138.0-138.5' - moderate olive brown,					-
open to 3/16" moderate HCI reaction, weak (R2),	-	1	moderate HCl reaction, weak (R2),	\square	open to 3/16"	3		-
141.5' - Fracture, 10 deg, rough, undulating, open to 1/4" trace voids <1/16" over <25% of surface	-	1		H		_		-
No Recovery 138.5-141.0'	-	1		丗	141.9' - Fracture, 15 deg, rough, undulating,	2		-
R21-NQ open - I 42 0' - Fracture 10 deg rough undulating	_	1	<u>-</u>	dash				-
- 5 ft 60 1 open to 1/8"	-	1	_	囯		50 1		-
				H			3070	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-27	SHEET	9	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722971.1 N, 458154.7 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

WATER	LEVELS: 4.4	1 ft bo	gs on 3	3/06/07 START : 2/8/2007 END : 2/	10/20	07 LOGGER : A. Teal	
≥ ∩ ⊙	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
SELOV SE ANI SON (ft	UN, I, AND ERY (%	(9)	JRES OT	DESCRIPTION	IC LO	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
145_ -102.6			5	142.55' - Fracture, 30 deg, smooth, planar, open to 3/16" - 143.3' - Fracture, 65 deg, rough, planar, 30% coverage brown staining, open to 3/16" - 143.7. 144.0' - Mechanical break		Limestone 141.0-142.2' - Same as 138.0-138.5' except voids <1/16" increase to 40%, laminated bedding on last 4" of run 142.2-145.3' - pale yellowish brown	R21: 20 minutes
-	146.0		NR 2	144.4' - Fracture, 5 deg, rough, planar, tight 144.6, 144.7' - Fracture, horizontal, rough, undulating, open 144.9, 144.95, 145.0' - Bedding plane,		transitions to yellowish brown, (10YR 6/2 to 10YR 5/4), fine grained, moderate to mild HCl reaction, medium strong (R3), laminated	-
-	R22-NQ 4 ft 88%	56	1 5	horizontal, smooth, planar, tight to open up to 1/8" 146.3' - Fracture, 75 deg, rough, undulating, tight to open up to 3/16", gray staining on 20% at surface		bedding below 143.5' increasing crenulations with depth, bedding angles up to 10 deg, voids <1/16" over 5% coverage except zone at 20% from 143.5-145.0' trace voids to	- - -
150_	150.0		0 NR	146.5' - Fracture, 5 deg, rough, undulating, tight 147.1' - Fracture, 15 deg, rough, undulating, open		3/16", color changes to moderate yellowish brown (10YR 5/4) at 144.8' No Recovery 145.3-146.0' Limestone	R22: 18 minutes
-107.6 -107.6				147.2' - Fracture, 25 deg, rough, undulating, tight to open 1/8" 147.7' - Fracture, 10 deg, rough, undulating, tight 148.0' - Fracture, 10 deg, rough, undulating, open 148.2' - Bedding plane, 10 deg, smooth, undulating, tight 148.3' - Fracture, 10 deg, rough, undulating, open 148.9, 148.95' - Fractures, horizontal, smooth, planar, open up to 1/16"		146.0-148.0' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine grained, mild to moderate HCI reaction, medium strong to strong (R3 to R4), trace faint laminated bedding from 146.0-147.0', voids <1/16" over 1-10% increasing with depth 148.0-148.4' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCI reaction, very weak (R1), thin laminated bedding, voids <1/16" over 25% of surface 148.4-149.5' - yellowish gray, (5Y 7/2), fine grained, moderate HCI reaction, medium strong to strong (R3 to R4), thin laminated bedding, 5 deg angle bedding, trace voids <1/16", trace fossil casts, molds No Recovery 149.5-150.0' Bottom of Boring at 150.0 ft bgs on 2/10/2007	



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	B-28	SHEET	1	OF	۵	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723060.1 N, 458242.6 E (NAD83)

ELEVATION: 41.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

DRILLING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

WATER	LEVELS	: 2 ft bgs	on 4/25/0)7 S	START : 4/25/2007 END : 5/1/2007 LOGGER : D. Roraback
				STANDARD	SOIL DESCRIPTION COMMENTS
LOW AND N (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	
ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
41.5	0.0			(14)	Top Soil $\frac{\Delta L_2}{\Delta L_2}$
-		1.5	SS-1	2-2-3	0-0.5' - roots
-	1.5			(5)	Poorly Graded Sand (SP) 0.5-0.9' - yellowish gray, (5Y 7/2), moist to wet, loose,
-	1.0				\fine grained, no HCl reaction, trace nonplastic fines, \frace organics decreasing with depth
-					Poorly Graded Sand With Silt (SP-SM)
					\ 0.9-1.5' - moderate yellowish brown, (10YR 5/4), moist to wet, loose, fine grained, no HCl reaction,
					10-15% nonplastic fines, trace roots
_					<u> </u>
5 36.5	5.0				O''L O L (OL)
36.5				0-0-1	Silty Sand (SM) 5.0-6.2' - yellowish gray, (5Y 7/2), wet, very loose, fine
-		1.2	SS-2	(1)	grained, no HCl reaction, 25-30% nonplastic fines,
-	6.5				Trace 10013
-					-
-					-
-					- I
-					†
-					†
10	10.0				†
31.5					Silty Sand (SM) 10.0-10.7' - pale yellowish brown to dark yellowish
		0.7	SS-3	1-2-3 (5)	brown, (10YR 6/2 to 10YR 4/2), wet, loose, fine
	11.5			(-)	\daggarder \
_					10 % diganes
_					_
_					4 1
-					- 1
-					
15 <u> </u>	15.0				Silty Sand (SM)
-		1.1	SS-4	2-4-10	15.0-15.35' - light olive gray, (5Y 5/2), wet, very loose, fine grained, mild HCl reaction, 25-30% low to
-	16.5			(14)	medium plasticity fines
-	10.5				Silt (ML) 15.35-15.55' - grayish orange, (10YR 7/4), wet, soft to
-					medium stiff, fine grained, nonplastic, very rapid
					dilatancy, mild HCI reaction, 5-10% very fine sand Silty Sand (SM)
					\15.55-16.1' - yellowish gray, (5Y 8/1), moist, medium
					dense, fine to medium grained, strong HCI reaction, 25% low to medium plasticity fines, two gravel-sized
_					pieces up to 1"
20					
L	l				I I



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-28	SHEET	2	OF	9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723060.1 N, 458242.6 E (NAD83)

ELEVATION: 41.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 299205, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 2 ft bgs	on 4/25/0)7	START : 4/25/2007 END : 5/1/2007 LOGGER : D. Roraback
				STANDARD	SOIL DESCRIPTION O COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SOILMENTO DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
H BE ATIO		RECOVERY (ft)			MOISTURE CONTENT, RELATIVE DENSITY OR MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
SURF			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
21.5	20.0				Silt (ML)
		1.0	SS-5	7-9-8 (17)	20.0-21.0' - yellowish gray, (5Y 8/1), wet, very stiff, nonplastic, very rapid dilatancy, mild HCl reaction
	21.5			(,	
_					
-					- .
-	-				
-	_				
-	_				
25	25.0				†
16.5	20.0				Silt With Sand (ML)
		1.4	SS-6	10-15-15 (30)	25.0-26.4' - dark yellowish orange, (10YR 6/6), wet, very stiff, fine to medium grained, nonplastic, very rapid dilatancy, mild to moderate HCl reaction,
-	26.5			(00)	rapid dilatancy, mild to moderate HCl reaction, 15-25% fine to medium sand-sized
-	-				-
-	-				│
-	_				-
-					
-					† †
30	30.0				1
11.5				17.00.17	Silt With Sand (ML) 30.0-31.0' - Same as 25.0-26.4' except moist to wet,
_		1.0	SS-7	17-20-17 (37)	hard, trace fine to coarse gravel-sized
-	31.5				
-	_				
-	_				
-	-				
-					1
]
35	35.0				
6.5			00.5	4-0-0	Sandy Silt (ML) 35.0-35.25' - moderate yellowish brown, (10YR 5/4), wet, very loose, mild HCl reaction, 40% fine to
-	<u> </u>	0.3	SS-8	(0)	\wet, very loose, mild HCl reaction, 40% fine to \medium sand-sized, trace organics
-	36.5				-
-	-				
-	1				
]] [
-]]
-					
40					



PROJECT NUMBER:	BORING NUMBER:		
338884 FI	R-28	SHEET	3 OF 9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723060.1 N, 458242.6 E (NAD83)

ELEVATION: 41.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

DRILLING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

WATER	LEVELS	: 2 ft bgs	on 4/25/0)7 5	START : 4/25/2007 END : 5/1/2007	LOGGE	R : I	D. Rora	aback
300				STANDARD	SOIL DESCRIPTION		_ ,		COMMENTS
ANC (#)	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLC	NB		3	DEPTH OF CASING, DRILLING RATE,
H BE		RECOVE			MOISTURE CONTENT, RELATIVE DENSITY	OR			DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERAL	.OGY	5	2	INSTRUMENTATION
1.5	40.4	0.4	SS-9	50/5	Silty Sand With Limestone Fragments (SM)		工		
				(50/5")	40.0-40.4' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), wet, v	very			_
l _					dense, mild to moderate HCl reaction, 28% fine 20% limestone fragments in lenticular shapes	es,			_
_					20 / minostorio magnionio in fonticala: chapeo		1		-
-							1		-
-	-						+		-
-	-						+		-
-	-						1		-
45	45.0						1		-
-3.5	10.0				Silt With Sand (ML)		1	П	_
		1.0	SS-10	23-30-17 (47)	45.0-46.0' - moderate yellowish brown, (10YR 5 wet, hard, nonplastic, rapid dilatancy, mild to		$\mathbb{1}$	Ш	
l _	46.5			,	moderate HCl reaction, 10-15% fine sand-sized 5-10% organics in <1/16" thick lenses	d, /			_
-					(Control of games and an arrange and arrange and arrange arran	/	1		-
-	-						4		-
-							+		-
-	-						1		-
-	-						1		-
50	50.0						1		-
-8.5				10.04.50/5	Silt With Sand (ML) 50.0-51.3' - Same as 45.0-46.0' except 25% fin	no to	T	П	
		1.3	SS-11	13-24-50/5 (74/11")	medium sand-sized, trace organics	ie to]		
_	51.4						╫	Щ	_
-							1		-
-	-						+		-
-							┨		-
-							1		-
-	1						1		-
55	55.0						1		-
-13.5		0.8	SS-12	32-50/3	Silt (ML)	fine]		
_	55.8			(82/9")	55.0-55.8' - Same as 50.0-51.3' except 10-15% sand-sized, trace organics in thin threads and contact the same as 50.0-51.3' except 10-15%.	chunks	#	Щ	_
_							1		<u>-</u>
-							1		-
-	-						+		-
-	-						+		-
-	-						+		-
-	1						1		-
60	1						1		-
						_	T	1	



PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	B-28	SHEET	4	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723060.1 N, 458242.6 E (NAD83)

ELEVATION: 41.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

DRILLING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

						, auto naminer, Avvo rous, c			ONIENTATION : Vertical
WATER	LEVELS	: 2 ft bgs	on 4/25/	07 5	START : 4/25/2007	END: 5/1/2007	LOGGEF	₹ : D.	Roraback
				STANDARD		SOIL DESCRIPTION		G	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	AL (ft)	PENETRATION TEST RESULTS		<u> </u>		SYMBOLIC LOG	
밀끈인		RECOVE	FRY (ft)	LOT HESSEIS	SOIL NAME,	, USCS GROUP SYMBOL,	COLOR,	음	DEPTH OF CASING, DRILLING RATE,
FAC				011 611 511		CONTENT, RELATIVE DEN Y, SOIL STRUCTURE, MIN		l B	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
959			#TYPE	6"-6"-6" (N)	CONSISTENC	T, SOIL STRUCTURE, WIIN	IENALOGT	S.Y.	INSTRUMENTATION
-18.5	60.0	0.3	SS-13	50/4	Silt With Sand /	And Limestone Fragmen	te (MI)		
10.0	00.0	0.0	100 10	(50/4")	│	ne as 55.0-56.0' except 20	0% fine to /-	1	_
I -					\ medium sand-siz	zed, 20% coarse sand to	fine /		_
					\gravel-sized lime	estone fragments			
1 -							•		_
-							-	1	-
-							-	1	-
-							-	-	_
I _							-		_
							•		
65	65.0						-	1	Complete soil sampling at 11:45 on 4/25/07
65 <u> </u>	65.1	0.0	SS-14	50/1	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	ments	T	Ħ	, , , , , , , , , , , , , , , , , , , ,
				(50/1")	\ 65.0-65.1' - light	gray, (N7), moderate to s	strong HCl / .	1	-
_					reaction, fragme	ents about 3/8"x3/4" in siz ing at 65.0 ft bgs	e/ _	1	_
					See the next she	eet for the rock core log			
I -					OCC THE HEAT SHE	set for the rook core log			
-							-	1	-
-							-		-
-							-		-
-							-		_
I -							_		_
70									
-28.5									_
-							-	1	-
-							-	1	-
-							-		_
I _									_
							-	1	7
-							-	1	-
-							-	1	-
-							-	1	-
-							-	1	_
75							_	1	
-33.5									
							-]
-							-	1	-
-							-	1	-
-							-	-	-
_							-	1	_
1 -							- -]
-							-	1	7
-							=	1	-
-							-	1	-
80									



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-28

SHEET 5 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723060.1 N, 458242.6 E (NAD83)

ELEVATION: 41.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

CORING	NILTHODAI	ND L	אורוטג	MENT: CME 55 S/N 299205, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
WATER	LEVELS: 2 ff	bgs o	on 4/2	5/07 START : 4/25/2007 END : 5/	1/2007	LOGGER : D. Roraback	
				DISCONTINUITIES	П	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)			 	SYMBOLIC LOG		
III X	z'A'≿	_	FRACTURES PER FOOT	DESCRIPTION	ᄓ	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
표일은	8 1	Q D (%)	158	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	۱à۱	MINERALOGY, TEXTURE,	FLUID LOSS, CORING RATE AND
₽₩¥	유탈성		25.	PLANARITY, INFILLING MATERIAL AND	J ₩	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
		S. O	5. 1	THICKNESS, SURFACE STAINING, AND TIGHTNESS	 ‰	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-23.5					97		01 1 1 1 105 01
-23.5	05.0		1	65.15' - Fracture, horizontal, rough,	Н	Limestone Fragments - 65.0-66.2' - pale yellowish brown,	Start rock coring at 65.0'
			'	undulating, faces do not join together	Ш	(10YR 6/2), fine grained, moderate	Water level approximately
-			2			HCl reaction, medium strong (R3),	2.0' (very muddy, may not
I -			\ <u>-</u>	66.1' - Fracture, 10 deg, rough, undulating,	Ш	- large infilled cavities 1"-2", trace	be accurate, 4/25/07,
				open, weathered faces, shell like fossil	Н	organic inclusions	15:00)
-	R1-HQ		NR	imprint on both sides of fracture 66.15' - Fracture, horizontal, rough,	1	No Recovery 66.2-68.2'	Driller's Remark: Rods
-	5 ft	32	' ' ' '	undulating	Ш	-	dropped at 66.0-68.0',
	54%			undulating	Ш		interpret lost recovery to be
-				68.15' - Fracture, horizontal, smooth,	Н	- Limentone	from 66.2-68.2'
-			3	rounded face	Н	_ Limestone	1
I _			Ľ	68.35, 68.75' - Fractures (2), horizontal,		68.2-69.7' - Same as 65.0-66.2' - except small voids (<1/16") over 30%	
1			3	smooth, undulating, tight	Щ	of core, fossiliferous with few	R1: 5 minutes
			1	69.15, 69.3, 69.55' - Fractures (3), 0-20 deg,	╁┼┼	1/4"-1/2" cavities (molds) with couple	1 +
70	70.0		NR	rough, undulating, slightly weathered, open —	╀┤	of casts, increased large dissolution	
-28.5				70.0-70.4' - Fracture zone, five 1-2" angular	Ш	type cavities from 69.1-69.7'	
1 -			8	fragments	Ш	No Recovery 69.7-70.0'	1 1
-			\vdash	70.4' - Fracture, horizontal, rough, stepped,	₩	- Limestone	1 -
I _			1	terminates fracture zone above	Н	_ 70.0-72.5' - moderate olive brown to	
			'	70.9' - Fracture, horizontal, rough, planar,	ГΠ	moderate yellowish brown, (5Y 4/4 to	SC-1 collected at 71.5-
-	R2-HQ			open -	Ш	- 10YR 5/4), moderate HCl reaction,	72.5'
l -	5 ft	65	2	71.5' - Fracture, 5 deg, rough, undulating	\vdash	medium strong (R3), highly	-
	100%			72.8, 73.1' - Fractures (2), 10 deg, rough,	Н	fossiliferous with 30% fine (<1/16") voids and 5% 1/16"-1/8"	
-				stepped, some fragmentation	Ш	voids/casts/molds, several larger	
-			2	73.0' - Fracture, 70 deg, rough, planar, tight,	Ш	cavities up to 1", trace organic	-
l -				some fragmentation -	₽	- laminations/inclusions	
				73.85, 74.2, 74.45' - Fractures (3), 10 deg,	Н	72.5-73.6' - Same as 70.0-72.5'	R2: 7 minutes
75	75.0		3	rough, planar, open		except 5-10% fine (1/16") voids, very	
-33.5	75.0			74.8' - Fracture, 60 deg, rough, undulating, —	₩	— few large voids or cavities, grayer	_
			>10	terminates with some rock fragments at end	Н	3/8" thick laminations throughout	
			10	of core (75.0')		- core - 73.6-78.1' - Same as 72.5-73.6'	
-				75.0-75.4' - Fracture zone, 1-2" fragments - 75.4' - Fracture, 10 deg, rough, planar, tight	ш	except very weak (R1)	1
-			>10	75.65, 75.7, 75.9, 76.1, 76.25, 76.27' -	\vdash	- except very weak (IVI)	-
l _				Fractures (6), horizontal, smooth to rough,	Н	_	_
	R3-HQ			planar, open			
-	5 ft	0	>10	76.25-76.4' - Fracture zone, fragments up to	\Box	_	
-	76%		<u> </u>	3/4"	╀┼┤	_	1 4
1			3	76.6' - Fracture, 45 deg, smooth, planar,	Н	78.1-78.65' - Same as 72.5-73.6'	
1 -			ــــّـــا	slightly weathered, open	口	except 0-10% fine voids	1
-				76.8, 77.15' - Fractures (2), 10 deg, rough,	╙	78.65-78.8' - Same as 73.6-78.1'	R3: 4 minutes
-			NR	undulating, open, with rock fragments between	H	No Recovery 78.8-80.0'	
80	80.0			77.5-78.1' - Fracture zone			Drilling ended at 80.0' on
-38.5				78.1' - Bedding plane, horizontal, rough,	Ш	Limestone	4/25/07 — Drilling resumed on
-			2	stepped, open	╂┼┼	- 80.0-83.8' - moderate yellowish	4/26/07
I -				78.3' - Fracture, 20 deg, rough, stepped,	╀┤	brown, (10YR 5/4), moderate to	Rock varies from
1				open	Ш	strong HCl reaction, very weak to	competent to friable
1 -			2	78.65' - Fracture, horizontal, rough, stepped,		- weak (R1 to R2), 25-40% fine	intermittently with no clear
-	D4.112		<u> </u>	open	╀┼┤	(<1/16") voids throughout core, fossiliferous with many 3/16" to 3/8"	contacts, but on the whole -
I _	R4-HQ 5 ft	28	>10	80.1' - Fracture, 20 deg, rough, undulating,	Ш	- fossil casts and molds, minor black	described as friable
1 -	76%	20	10	open - 80.4' - Fracture, 10 deg, rough, undulating,	口	infilling	SC-2 collected at 80.5-
1 -	'0/0			onen	╙		81.6'
-			>10	81.6' - Mechanical break	╀┤	_	-
1			<u> </u>	82.3' - Fracture, 60 deg, rough, undulating,	Ш	No Pocovory 92 9 95 0	
1 -			NIE.	open with lots of associated rock fragments	Ш	- No Recovery 83.8-85.0'	R4: 5 minutes
I -			NR	82.3-83.5' - Fracture zone, angular 3/4"-2"	╁┼┼	_	1 +
85	85.0			fragments	H		
1							
					Ш		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-28

SHEET 6 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723060.1 N, 458242.6 E (NAD83)

ELEVATION: 41.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

CORING	I WE I HOD AI	ND EC	JUIPIV	MENT: CME 55 S/N 299205, mud rotary, NQ tools, HW c	asiriy		ORIENTATION : Vertical
WATER	LEVELS: 2 f	t bgs o	on 4/2	5/07 START : 4/25/2007 END : 5/	1/2007	LOGGER : D. Roraback	
305	· -			DISCONTINUITIES	ניו	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		တ္သ	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표원인	Y A A	(%	FRACTURES PER FOOT		일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H A A	RE F GTF SOV	Q D (%)	LD S	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	l BO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
SUR	S S S S S S S S S S S S S S S S S S S	a Q	-RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-43.5	714			83.5, 83.7' - Fractures (2), 20 deg, rough,	3,	Limestone	
			2	undulating, slightly weathered	世	- 85.0-89.05' - Same as 68.2-69.7']
				85.45' - Fracture, 15 deg, rough, undulating,	ш	except moderate yellowish brown,	
				slightly weathered, open	Н	(10YR 5/4), very weak to medium	1
-			1	85.6' - Fracture, 10 deg, rough, planar, weathered but tight	П	strong (R1 to R3), 10-25% fine (<1/16") voids (fewer voids at	1 1
-	R5-HQ			86.7' - Fracture, 40 deg, rough, undulating,	Н	85.0-85.5', 88.1-88.2'), many 1/4"	1 -
-	5 ft	65	1	tight	ш	 fossil molds/casts, some gray or 	1 -
_	100%			87.05' - Fracture, vertical, rough, undulating,	Н	beige infill in cavities, trace organics	1 -
			٦	tight 87.25' - Fracture, 30 deg, rough, undulating,			1
]			2	tight, half of core is missing from 87.2-87.35'	Щ	_	1
-				88.1, 88.45' - Fractures (2), 10 deg, rough,	\Box	- 89.05-89.6' - Same as 85.0-89.05'	R5: 5 minutes
-			2	undulating, tight	口	except interbedded zones of very	-
90 <u> </u>	90.0			89.25' - 10 deg, rough, undulating, tight to healed	₽	weak (R1) rock with few voids and	-
-48.5			1	89.8' - Fracture, horizontal, rough, undulating	Ш	medium strong (R3) rock with 20% voids]
				to stepped, open	H	89.6-93.4' - Same as 85.0-89.05'	
1 7				90.8, 91.3' - Fractures (2), 30 deg, rough,		_	1
-			2	planar, opposing, tight	14	-] 1
-	R6-HQ		<u> </u>	91.9, 92.1' - Mechanical break (2), 60 deg,	団	_]
-	5 ft	72	2	rough, planar to undulating	뮈	_	-
	92%			02.01 Freeture 40 des sous states of	Н	_	l J
				92.9' - Fracture, 10 deg, rough, planar, fine organic lamination	Щ]
			6	93.25' - Fracture, 60 deg, rough, stepped,	H	93.4-94.6' - moderate olive brown to] 1
-			1	beginning of fracture zone	口	moderate yellowish brown, (5Y 4/4 to 10YR 5/4), very fine grained, mild to	R6: 15 minutes
-			1	93.3-93.5' - Fracture zone 93.5, 93.8, 94.2' - Fractures (3), horizontal,	₽₩	moderate HCl reaction, strong (R4),	
95 <u> </u>	95.0		NR	smooth, planar	口	no small (1/16") voids at top,	-
-53.5			5		\mathbb{H}	increase with depth to 5% at bottom, a few 1/4" round cavities]
				95.5, 95.9' - Fractures (2), rough, stepped,	口	No Recovery 94.6-95.0'	
1 7				silty sand infilling, open	Ш	Limestone	1
-			1		Ш	95.0-98.3' - moderate yellowish] 1
-	R7-HQ			96.75' - Fracture, 40 deg, rough, stepped,	뮈	brown, (10YR 5/4), fine grained, moderate HCl reaction, weak to	-
-	5 ft	52	0	tight	ᡛᡰ	- medium strong (R2 to R3), 10-20%	-
1 _	90%			97.5' - Mechanical break	Щ	fine voids, small cavities up to 1/4"]
				98.2' - Fracture, 10 deg, smooth, planar,	H	and larger and sometime elongated	
1 7			3	open to tight	П	 cavities contain light colored infill, trace organics 	1
-			4	98.6, 99.5' - Fracture, vertical, rough,	Ш	98.3-99.5' - Same as 95.0-98.3'	R7: 15 minutes
-			NR	stepped, some fragmentation, some crystallization on surfaces	団	except 3% fine voids, cavities up to	1
100_	100.0		INK	´ _	H	1" in size No Possyony 99 5-100 0"	-
-58.5			>10	100.0-100.9' - Fracture zone, several horizontal and vertical fractures	口	No Recovery 99.5-100.0' Limestone]
			10		Ш	100.0-104.6' - Same as 95.0-98.3'	
1			_	100.9, 101.15, 101.4, 101.9, 102.25' -	Ш	except sequence of rock with voids	1
-			3	Fractures (5), 20-40 deg, rough, undulating, open	口	 and rocks without, with cavities present at at transitions, maximum of]
-	R8-HQ			- P	Ш	- 35% fine voids	1
-	5 ft	43	3	102.25' - Fracture, vertical, rough, undulating,	Ш	=	1 -
_	92%			some fragmentation	Н	_]
				102.9' - Fractures (2), horizontal and 60 deg, rough, undulating, open			
1 1			1	103.6' - Fracture, 20 deg, rough, undulating	14	-] 1
-			2		団	_	R8: 10 minutes
-					╂┼┦	- N- D	1
105	105.0		NR		H	No Recovery 104.6-105.0'	

APPENDIX 2BB-649 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-28

SHEET 7 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723060.1 N, 458242.6 E (NAD83)

ELEVATION: 41.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2 ff	bgs c	n 4/2	5/07 START: 4/25/2007 END: 5/	1/200	7 LOGGER : D. Roraback	
≥ D হ				DISCONTINUITIES] g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ZES ⊢	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BI	STH, OVEF	(%) Q	F.05	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
SURF SURF SLEV	SECO	ROL	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-63.5	0716	<u>IL</u>	ш.п.	104.45' - Fracture, horizontal, rough,	0)	Limestone	
-			6	stepped, beige-colored infill	Ħ	 105.0-108.4' - moderate yellowish 	-
-				105.0-105.2' - Fracture zone, 1/2"-1" angular fragments	H	brown, (10YR 5/4), fine grained, moderate HCl reaction, weak to	-
-			1	105.3' - Fracture, 50 deg, rough, stepped,	₽	 medium strong (R2 to R3), small 	-
-	R9-HQ			open 105.9' - Fracture, 20 deg, rough, stepped,	Ш	(1/4") fossil cavities often with cast, 10-25% fine (1/16") voids	-
-	5 ft	37	>10	open	坦	- 10 20 % linie (1710) voids	-
-	78%		-	106.3' - Fracture, 45 deg, rough, planar, tight but weathered	Ш	_	-
-			>10	107.1' - Fracture, 25 deg, rough, stepped,	+	108.4-108.9' - moderate yellowish	-
-			-	very open and weathered with dissolution and fragmentation	\Box	brown, (10YR 5/4), strong HCl	R9: 8 minutes
-			NR	107.7-108.0' - Fracture zone, with angular	H	reaction, 20% gravel, 30% sand, 50% silt-sized particles, very friable	R9. 6 Illillutes
110 <u> </u>	110.0			rock fragments up to 2" 108.15' - Fracture, 60 deg, rough, undulating,	\boxminus	No Recovery 108.9-110.0'	-
-00.5			0	open	П	Limestone - 110.0-114.4' - Same as 105.0-108.4'	-
-			-	108.4' - Fracture, 10 deg, rough, stepped, open	ш	_	-
-			0		丗	_	-
-	R10-HQ		-		╆╫	_	Driller's Remark: Hit silt
-	5 ft	93	1	112.3' - Fracture, 45 deg, rough, undulating,	\blacksquare	_	layer at 112.0' about 4" -
-	100%		_	tight to open	H	_	thick; not evident in core
-			0		H	_	-
-			-		Н	_	R10: 13 minutes
-			1		Ш	114.4-115.0' - Same as 110.0-114.4'	Nio. 13 minutes
115 <u> </u>	115.0		-	114.9' - Fracture, horizontal, rough,	田	except very weak (R1)	
			1	undulating	丗	115.0-117.5' - moderate yellowish brown, (10YR 5/4), fine grained,	SC-3 collected at 115.1- 116.1'
-			-	115.1' - Fracture, horizontal, rough, undulating	+	_ moderate HCl reaction, very weak (R1), 5-10% fine voids, few	-
-			2	116.5' - Fracture, 40 deg, rough, undulating,	+	elongated 1/4"-1/2" fossil molds	-
-	R11-HQ			open	\Box	-	-
-	5 ft	47	1	116.6' - Fracture, 5 deg, rough, undulating, slightly weathered, open	H	117.5-117.95' - Same as	-
-	70%			117.1' - Fracture, horizontal, rough,	世	 115.0-117.5' except medium strong 	-
-			2	undulating, open 118.05' - Fracture, 30 deg, rough, undulating,	H	to strong (R3 to R4), 0-10% fine voids, few elongated 1/4"-1/2"	-
-			NR	tight	囯	cavities/molds	R11: 6 minutes
			INL	118.3' - Fracture, rough, undulating, tight to open, 3" side fracture	団	117.95-118.2' - Same as 115.0-117.5' except very weak (R1),	-
120 -78.5	120.0		_	120.0-120.2' - Fracture zone, subangular	丗	— with increased voids to 15%	-
-			>10	rock fragments 1/2"-1" in size	\mathbb{H}	118.2-118.5' - Same as 115.0-117.5' except weak (R2), 10-15% fine voids	-
-			2	120.2' - Fracture, 5 deg, rough, undulating 120.4, 121.0' - Fractures (2), 25 deg, rough,	Ħ	 No Recovery 118.5-120.0' Limestone 	-
-			\neg	stepped to undulating, open with subangular	╁	120.0-121.2' - moderate yellowish	-
-	R12-HQ			fragments	Ш	 brown to dusky yellow, (10YR 5/4 to 5Y 6/4), fine grained, moderate HCl 	
-	5 ft	8			╫	reaction, medium strong (R3), fine	
-	24%		NR		円	 voids (<1/16"), fossiliferous with voids and cavities primarily 	
-					団	elongated up to 1/4"-1/2"	-
-					\blacksquare	No Recovery 121.2-125.0'	R12: Run time not
405	405.0				${\mathbb H}$	-	recorded -
125	125.0		-		Ħ		

Rev. 7



PROJECT NUMBER:

33884.FL

B-28

SHEET 8 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723060.1 N, 458242.6 E (NAD83)

ELEVATION: 41.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

CORING	I WE I HOD AI	ND LC	ZUIFIV	MENT: CME 55 S/N 299205, mud rotary, NQ tools, HW c	asiriy		ORIENTATION : Vertical
WATER	LEVELS: 2 f	t bgs c	n 4/2	5/07 START : 4/25/2007 END : 5/	1/200	7 LOGGER : D. Roraback	
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
BH	N A K	(%	A P		임	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
HAY.	GTF S	Q D (%)	FO	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BB	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
E SEP	SEN SEN	a	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-83.5	014				0,	Limestone	-
-00.5			3	125.35' - Fracture, 80 deg, smooth,		- 125.0-126.25' - moderate yellowish	_
				undulating, tight	Ш	brown to light olive brown. (10YR 5/4	
				125.45' - Fracture, 20 deg, rough, planar,	Н	to 5Y 5/6), fine grained, moderate	1
			8	tight but weathered 125.85' - Fracture, 0-70 deg, rough, stepped,	П	 HCl reaction, medium strong (R3), 10-20% small (1/16") voids, some 	1 1
-	R13-HQ			tight, some minor fragmentation	╂┼┤	1/4" cavities	Driller's Remark: Rods
-	5 ft	22	NR	126.1' - Fracture, 10 deg, rough, undulating,	ш	 126.25-127.0' - light olive grav. (5Y 	dropped at 127.0-127.5',
_	84%		. 1	minor fragmentation	Н	5/2), fine grained, moderate HCl	interpret lost recovery to be
			1	126.35, 126.4, 126.45, 126.6, 126.75, 126.85' - Bedding plane (6), horizontal, smooth,		reaction, strong (R4), 0-10% fine (1/16") voids, very fine horizontal	from 127.0-127.8'
			'	planar, tight to open	Ш	laminations	1
-				126.95' - Fracture, vertical, rough, planar	ш	No Recovery 127.0-127.8'	R13: 9 minutes
-			>10	127.8' - Fracture, 10 deg, open, weathered	\vdash	Limestone	1
130 <u> </u>	130.0			128.9' - Fracture, 10 deg, rough, undulating, tight, weathered		127.8-130.3' - Same as 125.0-126.25' except alternating very	-
			>10	129.4' - Fractures (2), 20 deg and 70 deg,	Ш	 weak (R1) and medium strong (R3)]
				rough, undulating to planar, tight, friable	Н	zones below 128.8'	
			1	129.4-130.0' - Fracture zone, 1/2"-1" angular fragments	口	130.3-131.3' - moderate yellowish brown to moderate olive brown,	1
-				130.0-130.3' - Fracture zone, 1/2"-1"	\vdash	(10YR 5/4 to 5Y 4/4), fine grained,	1 1
-	R14-HQ			subangular rock fragments	口	moderate HCl reaction, medium	1 -
-	5 ft	7		130.3' - Fracture, horizontal, rough, planar	╂┼┤	_ strong (R3), 20% voids <1/16",	
_	26%			130.6' - Fracture, 70 deg, rough, undulating, trace iron oxide infill of 1/4" cavity on fracture		several 1/4" cavities and few larger elongated cavities	_
			NR	face	Ш	No Recovery 131.3-135.0'	
				131.0' - Fracture, horizontal, rough,	ш		1
-				undulating, tight	Н	=	R14: 6 minutes
-				-	Н	-	1 -
135 <u> </u>	135.0				ш	Limestone	Driller's Remark: 134.0-
			>10		\vdash	- 135.0-135.3' - Same as 130.3-131.3'	135.0' soft drilling
l _				135.3' - Fracture, 10 deg, rough, undulating,		except moderate olive brown to light	
			•	open	Н	olive gray, (5Y 4/4 to 5Y 5/2)	Driller's Remark: Drilling
			8	135.45' - Fracture, 5 deg, smooth, planar, open	ш	 135.3-136.45' - moderate olive brown, (5Y 4/4), moderate HCl 	rod sank approximately 2" - during lunch break
-	R15-HQ		>10	135.5, 135.65, 135.75, 135.77' - Fractures	╁┼	reaction, strong (R4), 0-3% fine	- Lanning landin break
-	5 ft	13	-10	(4), 10 deg, smooth, planar, tight but		- (1/16") voids, horizontal bedding	1 -
-	52%			weathered	₽₩	planes 1/8"-1/2" thick, trace organics 136.45-137.1' - alternating intervals	-
				136.45' - Fracture, 0-40 deg, rough, stepped, open	Ш	of material same as 135.0-135.3' and]
			NR	136.5' - Fracture, horizontal, rough, planar	H	same as 135.3-136.45'	
1 7				136.6, 136.75, 136.85, 135.88, 136.95' -	Ш	137.1-137.6' - Same as 135.0-135.3'	R15: 7 minutes
140	140.0			Fractures (5), horizontal, rough, planar, tight to open	Ш	No Recovery 137.6-140.0'] - 1
140 -98.5	140.0			136.7' - Fracture, horizontal, rough, planar,		Limestone	-
-			4	healed	\Box	- 140.0-140.15' - light olive brown, (5Y]
				137.1' - Fracture, 20 deg, rough, stepped,	Ш	5/6), fine grained, moderate HCl]
			2	open, weathered 137.1-137.6' - Fracture zone, rock fragments	Щ	reaction, medium strong (R3), 20% - small (1/16") voids	
			2	1/2"-2"	Н	140.15-143.2' - light olive gray to	1
-	R16-HQ			140.15' - Bedding plane, horizontal, rough,	П	yellowish gray, (5Y 5/2 to 5Y 7/2),	1
-	5 ft	22	>10	stepped, open 140.6, 140.8, 141.0, 141.25' - Fractures (4),	Н	- very fine to fine grained, moderate	-
-	64%		0	0-20 deg, rough, stepped, 1/8" infilling, open,	Ш	HCl reaction, strong (R4), 3-10% small (<1/16") voids, several 1/4" to] -
-				breaks typically occur at large cavities	Н	- 1/2" cavities, some molds/cast,]
				140.8-141.0' - Fracture, vertical, 1" fragments	H	several up to 1" cavities, some with	l J
1 7			NR	141.95' - Fracture, 10 deg, rough, undulating, highly weathered, tight, black organics on	Ш	infill	R16: 12 minutes
145	145.0			fracture face	Ш	No Recovery 143.2-145.0'	1 1
140	1+0.0				\Box		
$\overline{}$							



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-28	SHEET	9	OF	9	

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723060.1 N, 458242.6 E (NAD83)

ELEVATION: 41.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

00111110	METHODA	110 20	ZOII IV	TENT . CIVIL 33 3/14 299203, Hidd Totally, 14Q tools, 11VV Co	Joning		ORILINTATION . Vertical
WATER	LEVELS: 2 f	t bgs o	on 4/2	5/07 START : 4/25/2007 END : 5/1	1/200	7 LOGGER : D. Roraback	
300	_			DISCONTINUITIES	ניו	LITHOLOGY	COMMENTS
ON E			S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표원인	ER'A	(%	로 로		일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
F A A	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	(%) Q	S F	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	/BO	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	S O	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-103.5				142.3' - Fracture, 40 deg, rough, undulating		Limestone	
-			>10	142.4-142.65' - Fracture zone, very angular -	H	 145.0-145.55' - light olive gray, (5Y 	-
-				1"-2" rock fragments	世	5/2), mottled appearance, fine	-
l -			3	142.65' - Fracture, 0-30 deg, rough, stepped 142.8' - Fracture, horizontal, rough, stepped,	\Box	grained, moderate HCl reaction, - medium strong to strong (R3 to R4),	_
				underlain by angular 1"-2" rock fragments	Н	5% fine (<1/16") voids, many 3/16"	
1 7	R17-HC			143.05' - Fracture, 20 deg, rough, undulating	H	voids, irregular laminations, trace	Driller's Remark: 147.0-
-	5 ft 58%	0	8	145.0-145.4' - Fracture zone, red staining on - fracture faces, angular to subangular rock		- organics 145.55-146.8' - grayish orange,	150.0' soft drilling –
-	3070			fragments, 1/2"-2"	ш	(10YR 7/4), very fine to fine grained,	-
-				145.4' - Fracture, 30 deg, rough, stepped,	╁	 strong HCl reaction, strong (R4), no 	-
-			NR	trace infill, weathered 145.55' - Fracture, 10 deg, smooth,		voids, no cavities 146.8-147.9' - yellowish gray to	D47: 42 minutes =
-				undulating, open -	屵	- dusky yellow, (5Y 7/2 to 5Y 6/4), fine	R17: 12 minutes
150_	150.0			145.7' - Fracture, 10 deg, rough, stepped,	oxdot	grained, mild to strong HCl reaction,	
-108.5				tight 145.9' - Fracture, 70 deg, smooth, undulating, -		weak to strong (R2 to R4), strength decreasing with depth, 5% fine	
-				tight, fracture extends from 145.55-146.2'	1	(<1/16") voids at top, increasing to	
-				146.5, 146.8' - Fracture (2), 85 deg, rough,	1	20% fine voids with depth	
-				undulating, tight, 1/16" relief 146.8, 146.9' - Fractures (2), horizontal,	l	No Recovery 147.9-150.0' Bottom of Boring at 150.0 ft bgs on	-
-				weathered zone	ł	5/1/2007	-
-				147.5-147.9' - Fracture zone, angular to		-	_
-				subangular 1/2"-1-1/2" fragments		_	_
l .				_			_
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-29

SHEET 1 OF 9

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723157.5 N, 458338.8 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit

						, auto hammer, AWJ rods,		ORIENTATION : Vertical R : T. Stewart, P. De Sa'rego				
WATER	LEVELS	: 4.2 ft bo	gs on 5/30)/07 S	START : 5/23/2007	END : 5/31/2007	LOGGE	R : T. T	Stewart, P. De Sa'rego COMMENTS			
≩Q €	044451	INTERM	I (A)	STANDARD PENETRATION		SOIL DESCRIPTION		8	GOIVIIVIEN 13			
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	` ,	TEST RESULTS	SOIL NAME.	, USCS GROUP SYMBOL	COLOR.	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,			
H B		RECOVE	ERY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			BOL	DRILLING FLUID LOSS, TESTS, AND			
			#TYPE	6"-6"-6" (N)	CONSISTENC	Y, SOIL STRUCTURE, MI	NERALOGY	S≺M	INSTRUMENTATION			
41.7	0.0			(11)	Poorly Graded S	Sand With Silt (SP-SM)		171	Installed 6" SW casing to approximately 5'			
-		1.5	SS-1	1-2-4	0.0-1.5' - very lig	ht gray to yellowish gray	y, (N8 to 5Y	111	below ground surface -			
-		1.0	00 1	(6)		e, fine grained, 5% nong ace very fine sand-sized		-li¦i	Using 24" split spoon (SS)			
-	1.5				the bottom			1,11	-			
-								┨	-			
-								┨	-			
-								┨	-			
-								1	-			
-								┨	-			
								-	-			
5 36.7	5.0				Clayey Sand (SC	C)		///	Water level assumed at 3.0' below ground			
-		0.8	SS-2	0-1-2	√ 5.0-5.4' - pale gr	een, (10G 6/2), wet, ver	y loose, very		surface due to wet sample at 5.0' (SS-2) and -			
-		0.0	33-2	(3)	Silt (ML)	ed, medium to high plas	sticity	┨	increasing moisture content in SS-1 SS-2 taken at 14:36			
-	6.5				∫ 5.4-5.7' - grayish	yellow, (5Y 8/4), wet, s		┨	-			
-					reaction, carbona	rapid dilatancy, moderat ate derived	te HCI	┨	-			
-								1	-			
-								1	-			
-								┨	-			
-								┨	-			
- 40	40.0							┨	-			
10 <u></u> 31.7	10.0				Silt (ML)			Ηп	-			
-		1.4	SS-3	8-25-50/5	10.0-11.4' - gray	ish yellow mottled with r	moderate	$\parallel \parallel$	-			
-	11.4			(75/11")	very rapid dilatar	vith 5Y 7/6), moist, hard, ncy, moderate HCl reac	, nonplastic, tion, trace	$\parallel \parallel$	-			
-					very fine sand, tr	race black fragments, ca	arbonate /	╀	1			
-					\uenveu			1	-			
-								1				
-								1	-			
-								1	-			
-								1	-			
15	15.0							1				
26.7	13.0				Silt (ML)			+	SS-4 taken at 14:50			
-		1.0	SS-4	21-11-17	15.0-16.0' - grav	ish yellow, (5Y 8/4), mo dilatancy, moderate H0	ist, very stiff,	1	-			
-	16.5			(28)	\ trace very fine to	medium grained sand,	carbonate /	╫	1			
-	10.5				derived			1				
-								1				
-								1				
-								1				
-								1	-			
-								1				
20								1				
								T				



PROJECT NUMBER:

338884.FL

B-29

SHEET 2 OF 9

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723157.5 N, 458338.8 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

						, auto hammer, AWJ rod			ORIENTATION : Vertical		
WATER	LEVELS	. 4.2 11 0	gs on 5/30		START : 5/23/2007	END: 5/31/2007 SOIL DESCRIPTION	LUGGE	Т	. Stewart, P. De Sa'rego COMMENTS		
<u>\$</u> 9€	SAMPI F	INTERVA	AL (ft)	STANDARD PENETRATION				9			
BELC CE AI	, ., ., .,	RECOVI		TEST RESULTS	SOIL NAME,	, USCS GROUP SYMBO	DL, COLOR,	Z C L	DEPTH OF CASING, DRILLING RATE,		
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)		CONTENT, RELATIVE D Y, SOIL STRUCTURE, N		SYMBOLIC LOG	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION		
21.7 - -	20.0	1.5	SS-5	16-12-14 (26)	dense, fine to co	ish yellow, (5Y 8/4), wo parse grained, moderat -sized, 30-40% nonpla	te HCl reaction,	-	SS-5 taken at 14:56		
- - - - 25 16.7 - -	25.0 25.5	0.5	SS-6	50/5.5 (50/5.5")	fine to coarse gra	ish yellow, (5Y 8/4), w ained, moderate HCl r -30% nonplastic fines,	eaction, 15%	- - - - - - - - - - - -	SS-6 taken at 15:02		
30 11.7 -	30.0	1.2	SS-7	10-6-2 (8)	fine to medium g	nt olive brown, (5Y 5/6) grained, mild to modera onplastic fines, carbona	ate HCl	- - - - - -	SS-7 taken at 15:10		
- - - -								- - - - - -	Driller's Remark: Hard at 32.8'		
35 6.7 - -	35.9	0.1	∖ SS-8 <i>)</i>	50/1.5 (50/1.5")	Limestone Frag 35.0-35.1' - light HCl reaction	ments And Silt olive grey, (5Y 5/2), m	nild to moderate		SS-8 taken at 15:22		
- - - - 40								- - - - - - -	Driller's Remark: Drilled into softer zone after 37.0'		
								\perp	1		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-29	SHEET	3	OF	9

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723157.5 N, 458338.8 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit WATER LEVELS: 4.2 ft bgs on 5/30/07 START: 5/23/2007 END: 5/31/2007 LOGGER: T. Stewart, P. De Sa'rego									
WATER	LEVELS	START : 5/23/2007 END : 5/31/2007 LOGGER : T. Stewart, P. De Sa'rego							
				STANDARD	SOIL DESCRIPTION COMMENTS				
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	AL (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION				
H H H		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND				
THE A			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
				(N)					
1.7	40.0	1.0	SS-9	35-50/5.5	Silt With Sand (ML) 40.0-41.0' - moderate olive brown to light olive brown, - Drill time from 37.0-40.0' approximately 1-1/2 minutes				
l -	41.0			(85/11.5")	(5Y 4/4 to 5Y 5/6), moist to wet, hard, low plasticity,				
l -					rapid dilatancy, moderate to strong HCl reaction, 25% /- fine to medium sand-sized, carbonate derived, trace /-				
l -					very fine sand-sized black particles				
l -									
-					_				
-									
-									
-									
45	45.0				074 (111)				
-3.3		1.3	SS-10	35-48-50/4	Silt (ML)				
l -	46.0	1.3	35-10	(98/10")	sand-sized gray particles				
l -	46.3								
-									
-									
_					_				
_									
l -									
l -									
50	50.0								
-8.3				34-27-30	Silty Sand With Limestone Fragments (SM) 50.0-51.4' - light olive gray, (5Y 5/2), wet, very dense,				
-		1.4	SS-11	(57)	fine to coarse grained, moderate HCl reaction, 40% of				
_	51.5				sample is fine to coarse gravel-sized limestone, 30-35% low plastic fines, all carbonate derived				
_					_				
-									
-									
-									
-]]				
-]				
55	55.0								
-13.3	·	0.7	SS-12	39-50/3.5 (89/9.5")	Silty Sand (SM) 55.0-55.7' - moderate olive brown, (5Y 4/4), wet,				
-	55.8			(09/8.0)	│ dense, fine to coarse grained, moderate HCl reaction, / │ │				
l _					\ 10% fine gravel-sized limestone, 40% low plastic				
_									
I -]				
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-29	SHEET	4	OF	9	

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723157.5 N, 458338.8 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 4.2 ft b	gs on 5/30	0/07 S	START : 5/23/2007 END : 5/31/2007 LOGGEF	R : T.	Stewart, P. De Sa'rego
				STANDARD	SOIL DESCRIPTION	П	COMMENTS
AND (#)	SAMPLE	INTERVA	AL (ft)	PENETRATION TEST RESULTS		Ĭ	
1 BEI		RECOVI	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	OLC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	INSTRUMENTATION
-18.3	60.2	0.0	SS-13	(N) 50/2	No Recovery 60.0-60.2'	0)	Driller's Remark: Will add 60.0' of 4" HW
-				(50/2")	_	ł	casing before continuing SPTs -
-					Begin Rock Coring at 61.0 ft bgs	ł	Last ŠPT taken on 5/23/07 at 60.0' (SS-13) Deviated hole during 4" HW casing
-					See the next sheet for the rock core log	ł	installation
-					-	ł	-
-					-	1	-
-					-	1	-
-					-	1	1
-					-	1	1
65_					-]	
-23.3							
] -							
-					-		_
-					-		-
-					-	-	-
-					-	ł	-
-					-	ł	-
-					-	ł	-
70					-	1	-
-28.3					_	1	_
-					-	1	
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80						\vdash	



PROJECT NUMBER:

33884.FL

B-29

SHEET 5 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723157.5 N, 458338.8 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

CORING	I WE I HOD AI	ND EC	ZUIFIV	IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
WATER	LEVELS: 4.2	ft bgs	s on 5	/30/07 START : 5/23/2007 END : 5/	31/20	DOT LOGGER: T. Stewart, P. De Sa'r	rego
				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S.	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
HH H	L'A H, A ER)	(%	FRACTURES PER FOOT		음	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H H A	GTF	Q D (%)	CT.	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
P S S	SEC	S S	'RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	61.0	ц.		, ., ., ., ., ., ., ., ., ., ., ., ., .,	- "	Limestone	Porobolo construction is
_	01.0		1		Ш	- 61.0-63.6' - moderate yellowish	Borehole construction is 5.0' of 6" SW casing -
			·	61.5' - Fracture, horizontal, rough, undulating, possible contact between limestone and sand	ш	brown, (10YR 5/4), medium grained,	installed to 5.0' below
				lens	Н	mild HCl reaction, weak (R2), 30%	ground surface with 62.0'
-			7	62.0, 62.4' - Mechanical break (2)	口	- surface coverage of voids up to 1/8"	of 4" HW casing installed -
-	R1-NQ			62.6-63.0' - Fracture zone	₩	at 61.0-61.5', increasing to 40-50% coverage from 61.5-63.6', 10% dark	to approximately 60.0' P. De Sa'rego begins
-	5 ft	42	0		ш	- (possibly organics) clasts up to 1/8"	logging -
_	52%				Н	size, increasing to 3/8" size at	Water level: 4.2' below
					Н	62.6-63.0'	ground surface on 5/30/07 Driller's Remark: Possible
65			NR	-	Ш	No Recovery 63.6-66.0'	sand lense at 61.5-63.0';
-23.3				_	Н		driller will advance casing
-					ဓ	-	R1: 5 minutes -
-	66.0				₽₩		11:55 Advancing HW casing to 65.0'
_			1		Ш	Limestone - 66.0-67.95' - Same as 61.0-63.6'	casing to ob.o
]				66.6, 67.05, 67.25, 67.95' - Fractures (4),	H	except trace cavities/fossil casts up	1
				horizontal, smooth to rough, planar to		to 1-9/16"x3/8" at 66.7- 67.3'	1
-			3	undulating, 1/8" relief	ш	-	-
-	R2-NQ			68.65' - Fracture, horizontal, rough,	Н	67.95-69.2' - Same as 61.0-63.6'	-
_	5 ft	42	>10	undulating, 1/4" relief		except very weak to weak (R1 to R2),]
	64%			and all all all all all all all all all al	Н	10-15 fossil casts/cavities up to	
]			_1_	69.05' - Fracture, <10 deg, rough, undulating	Ш	1-3/16"x3/8"	1
70					Н	No Recovery 69.2-71.0'	1
70 <u> </u>			NR	_	Ш		R2: 6 minutes —
					Н	_	TV2. 0 minutes
I _	71.0				ш	-	_
					\vdash	Limestone	
1 7			0		\mathbb{H}	 71.0-71.95' - Same as 61.0-63.6' except 20-40% surface coverage of 	1
-				72.0-72.4' - Fracture zone	Ш	voids up to 3/16" (percentage	SC-1 collected at 71.0-
-			>10	-	H	 increasing with depth),10-20%, 	71.95'
-				72.6' - Mechanical break 72.9-73.4' - Fracture zone	口	cavities up to 1-3/16"x3/8", large	-
	R3-NQ 5 ft	28	>10	12.0-13.4 - Hacture 20116	Ш	(3-7/8"x3-1/8") cavity infilled with fine grained, weak (R2) carbonate]
	48%	20				material at 71.2-71.6', 20% of core	
					H	contains black organic thread-like	1
			NR			 inclusions up to 1-9/16"x1/8" long 71.95-72.4' - Same as 61.0-63.6' 	-
75 <u> </u>					Ш	except fine grained, very weak (R1),	R3: 7 minutes
					\vdash	- trace voids	
_	76.0				Ħ	72.4-73.4' - Same as 71.0-71.95']
			.40	76.0-76.1' - Fracture zone	Н	except very weak (R1) No Recovery 73.4-76.0'	
]			>10	76.1-76.4' - Mechanical break 76.4-76.7' - Fracture zone	Ш	Limestone	1
-					H	76.0-76.7' - moderate yellowish	1
-			2	77.25, 77.7' - Fracture or mechanical break,		brown, (10YR 5/4), fine grained, mild	-
-				rough, undulating, tight	ш	HCl reaction, very weak to weak (R1 to R2), 10-15% surface coverage of	-
	R4-NQ 5 ft	20			Н	voids up to 1/8", trace infilled cavities]
]	40%	20			F	up to 1-3/16"x3/8", infilled with	1
-					H	fossiliferous limestone	1
-			NR		囯	-	-
-38.3				_	H		R4: 9 minutes
-56.5						_	N4. 9 IIIIIIules
	81.0				Ш		
					_		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-29

SHEET 6 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723157.5 N, 458338.8 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

CORING	NETHOD A	ND EC	JUIPIV	MENT: CIME 55 S/N 316625, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
WATER	LEVELS: 4.2	ft bgs	s on 5	/30/07 START : 5/23/2007 END : 5/	31/20	D7 LOGGER : T. Stewart, P. De Sa'r	ego
>	<u></u>			DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
E S E	SHI	S.	뜐믮	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DNOI 3, 1231 N230213, 210.
_			2	81.7, 82.3, 82.5' - Mechanical break (3) 82.0' - Fracture, <5 deg, smooth, planar to undulating, tight		Limestone 76.7-78.0' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, very weak to weak (R1 to R2), 30-40% surface coverage of	-
- - -	R5-NQ 5 ft 88%	75	1	82.95, 83.4' - Fractures (2), <5 deg, smooth, planar to undulating 83.5' - Mechanical break		voids up to 1/8", 10-15% casts/cavities up to 1"x2" infilled with very soft black (possible organic) material	- - -
85_ -43.3 -	86.0		1 3 NR	84.25' - Fracture, 10-15 deg, smooth, undulating — 85.0, 85.2' - Fractures (2), 10-15 deg, rough, undulating		No Recovery 78.0-81.0' Limestone 81.0-83.4' - moderate yellowish brown, (10YR 5/4), fine to medium grained, mild HCl reaction, very weak (R1), 20-30% surface coverage of	R5: 6 minutes
-			1 >10	86.3' - Mechanical break 86.6' - Mechanical break 87.1- 88.1' - Fracture zone		voids up to 1/16", 10% casts and cavities up to 1-9/16"x1-3/16", partially infilled with soft black (possible organic) material 83.4-85.1' - Same as 81.0-83.4'	-
- -	R6-NQ 5 ft 56%	22	>10	88.3-88.6' - Fracture zone		except weak to medium strong (R2 to R3) 85.1-85.4' - Same as 81.0-83.4' No Recovery 85.4-86.0' Limestone	- - -
90 -48.3			NR			 86.0-87.6' - moderate yellowish brown, (10YR 5/4), medium grained, mild HCl reaction, very weak to weak (R1 to R2), 10-15% voids up to 3/16", 	R6: 9 minutes
-	91.0		6	91.0-91.4' - Fracture zone	F	trace casts/cavities up to 3/8"x3/8" 87.6-88.8' - Same as 86.0-87.6' except medium strong (R3), trace	-
-			4	91.7-91.75' - Fracture zone 92.0' - Fracture, <10 deg, rough, undulating, 1/16" relief 92.75' - Fracture or mechanical break, 35-40		dark (organic) clasts, 15% casts/cavities up to 3/8"x3/8" No Recovery 88.8-91.0' Limestone 91.0-91.7' - moderate yellowish	-
-	R7-NQ 5 ft 70%	42	1	deg, rough, undulating, 1/16" relief 93.9' - Fracture, horizontal, rough, undulating, 1/8-3/16" relief		brown, (10YR 5/4), fine to medium grained, mild HCl reaction, medium strong (R3), 10-15% surface coverage of voids up to 1-3/16"	
95_ -53.3 -	96.0		NR	94.2-94.5' - Mechanical break		91.7-92.3' - Same as 91.0-91.7' — except 30-40% casts/cavities up to 2"x1" 92.3-94.5' - Same as 91.0-91.7'	R7: 6 minutes
- - -			2	96.4' - sand/limestone contact, horizontal, rough, undulating 96.6' - Fracture, horizontal, rough, undulating		except trace casts/cavities up to 9/16"x3/8", trace dark organic matter, large (2"x1") cavity at 93.8' No Recovery 94.5-96.0' Silty Sand (SM)	- - -
- - -	R8-NQ 5 ft 98%	38	>10 4	97.55-97.75' - Fracture zone 98.1, 98.5' - Fractures (2), horizontal, rough, undulating, 3/16" relief		96.0-96.4' - carbonate derived, 30% nonplastic fines	
- 100_ -58.3	3078		3	98.6' - Fracture, 30 deg, rough, undulating 98.9-99.2' - Fracture zone (3 or more), 0-60 deg, rough, undulating 99.55, 99.85, 100.25' - Fractures (3), <30 deg, rough, undulating		- - 	- R8: 5 minutes
	101.0		6	100.55-100.9' - Fracture zone			-
					1		



PROJECT NUMBER:

33884.FL

BORING NUMBER:

B-29

SHEET 7 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723157.5 N, 458338.8 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

CORING	INETHODA	ND E	JUIPIV	IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW o	asing		ORIENTATION : Vertical
WATER	LEVELS: 4.2	2 ft bg	s on 5	/30/07 START: 5/23/2007 END: 5.	31/20	D7 LOGGER: T. Stewart, P. De Sa'ı	rego
				DISCONTINUITIES	(1)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	1
BH 등인	Y A A	(%	FRACTURES PER FOOT		일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING FLUID LOSS, CORING RATE AN
ΉΤΥ YA7	ZE F GTF SOV	(%) Q	CT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	/BO	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SUF	COF	a a	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC
			NR/		H	Limestone	
-			>10	101.5-102.1' - Fracture zone	╓	- 96.4-100.9' - moderate yellowish	
_				101.5-102.1 - Flacture zone	₽	brown, (10YR 5/4), medium grained,	
_			4		╨	mild HCl reaction, very weak to weak (R1 to R2), extremely weak (R0) at	
				102.5' - Fracture, 0-30 deg, rough,	Н	97.6', 15-20% surface coverage of	
_	R9-NQ		>10	undulating, 1/8" relief 103.0-103.2' - Fracture zone, <3/16" relief		voids up to 1/8", 10% casts/cavities	
_	5 ft 44%	31		100.0 100.2 1100.010 20110, 10/10 10/101	╫	 up to 2"x3/8", partial recrystallization of carbonate material in voids 	
_	44 /0				╥	No Recovery 100.9-101.0'	
-			NR		+	- Limestone	
105 <u> </u>				_		101.0-102.1' - moderate yellowish brown, (10YR 5/4), medium grained,	
-03.3					Н	mild HCl reaction, weak (R2), 5-10%	R9: 3 minutes Driller's Remark: Fluid loss
	106.0				Ш	surface coverage of voids up to	at 105.0' below ground
				106.0-106.3' - Fracture zone	\mathbb{H}	1/16", trace cavities up to 3/4"x3/8" _ 102.1-103.2' - Same as 101.0-102.1'	surface
_			>10	106.5, 106.95' - Fractures (2), <10 deg,	口	except very weak (R1)	
-				rough, undulating	₩	No Recovery 103.2-106.0'	
-			1		╨	Limestone	
_	D40 NG			107.7' - Fracture, <10 deg, rough, undulating	╁┤	106.0-109.4' - Same as 101.0-102.1' except very weak (R1) from	
_	R10-NC 5 ft	! I 46	2	108.0' - Fracture, 30 deg, rough, undulating	\blacksquare	_ 106.0-107.9' and 108.2-109.4'	
	68%			108.5' - Fracture or mechanical break, <15 deg, rough, stepped, tight, <1/16" relief	Ж		
			1	109.3' - Fracture, horizontal, rough,	П		
110				undulating, 3/16" relief	Н	No Recovery 109.4-111.0'	
-68.3			NR		Ħ	-	R10: 3 minutes
-	444.0				世	_	
-	111.0			111.0-111.3' - Fracture zone	╫	Limestone	
-			3	111.4, 111.7' - Fractures (2), horizontal,	╼	- 111.0-111.7' - Same as 101.0-102.1'	
_				rough, undulating	+	No Recovery 111.7-116.0'	
_					二	_	Driller's Remark: No circulation
					Н		Circulation
	R11-NC				Ш		
_	5 ft 14%	0	NR		Ή	=	
-	,		1411			-	
					₩	-	
115 <u> </u>				_	╨		R11: 3 minutes
, 0.0					+	-	IXTI. STIMILULES
_	116.0				Ħ		
			>10	116.0-116.2' - Fracture zone	\mathbb{H}	Limestone	
				116.5-116.85' - Fracture zone	Ш	- 116.0-116.5' - Same as 101.0-102.1' 116.5-118.8' - pale yellowish orange	
_					\Box	to light gray, (10YR 8/6 to N7),	Water level: 4.4' below
_			2	117.5' - Fracture, horizontal, rough, planar to	口	 coarse grained, strong HCl reaction, extremely weak to very weak (R0 to 	ground surface on 5/31/07
-	R12-NC	l		stepped, 1/8" relief	┲	R1), trace voids (<3/16"), trace	Driller's Remark: Still no
-	5 ft	27	4	117.6-117.85' - Fracture, 50 deg, rough, undulating, 1/8" relief	$+\Box$	 cavities to 1"x1/8", highly friable, 	circulation
-	56%			118.05' - Fracture, horizontal, rough,	世	fossiliferous, "coquina" appearance, increase in gray color (fossils)	
				undulating, tight, 1/16" relief	\Box	corresponds to increase in HCl	
120			NR	118.4-118.8' - Fracture zone		reaction and decrease in hardness	
-78.3			' ''	_	Щ	No Recovery 118.8-121.0'	R12: 4 minutes
-	121.0				Ш	-	
	121.0				\Box		
							<u> </u>



PROJECT NUMBER:

33884.FL

BORING NUMBER:

B-29

SHEET 8 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723157.5 N, 458338.8 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

COKING	NILTHOD A	ND L	ZUIFIV	IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW ca	asing		ORIENTATION : Vertical
WATER	LEVELS: 4.2	ft bg	s on 5	/30/07 START : 5/23/2007 END : 5/3	31/20	D7 LOGGER : T. Stewart, P. De Sa'r	ego
200	(9)			DISCONTINUITIES	ڻ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	822	ď	F H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	ŝ	CHARACTERISTICS	BROFG, FEOT REGGETO, ETG.
-			2	121.85, 121.9' - Mechanical break (2)	TH H	Limestone 121.0-121.55' - moderate yellowish brown, (10YR 5/4), medium grained, mild HCl reaction, weak (R2),	SC-2 collected at 121.0-
-	R13-NQ	36	>10	121.5-123.0' - Fracture zone - 123.3' - Fracture, horizontal, rough, -		 10-15% surface coverage of voids up to 1/8", trace casts/cavities up to 1-3/16"x3/8" 121.55-124.7' - Same as 	Driller's Remark: No fluid circulation -
_	5 ft 92%	30	3	undulating, 3/16" relief 123.95' - Fracture, 20 deg, rough, undulating, 1/8" relief 124.35' - Fracture, <10 deg, rough,		121.0-121.55' except 10-20% surface coverage of casts/cavities up to 1-3/16"x3/8", with trace carbonate	-
12 <u>5</u> -83.3 -	126.0		2 NR	undulating 124.45-124.7' - Fracture, 60 deg, rough, undulating		infill/recrystallization 124.7-125.6' - Same as 121.0-121.55' No Recovery 125.6-126.0'	R13: 5 minutes
_ _ _ _			_0_	124.85' - Fracture, 60 deg, rough, undulating, 3/16" relief - 124.85-125.2' - Mechanical break, 60 deg 125.25' - Mechanical break		Limestone 126.0-126.1' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, medium strong (R3), no visible voids, 10% fossil casts up	Driller's Remark: No fluid circulation
- - -	R14-NQ 5 ft 2%	0	NR	- - -		to 9/16"x9/16" No Recovery 126.1-131.0' -	- - -
130 <u> </u>				- -		- -	R14: 3 minutes
_	131.0			-	ш	Limantona	-
-			8	131.1, 131.2, 131.25, 131.45, 131.6' - Fractures (5), horizontal, smooth to rough, planar		Limestone 131.0-133.9' - Same as 121.0-121.55' except coarse grained, 50-60% surface coverage of voids up	- Driller's Remark: No fluid
-	R15-NQ	7	5	131.7, 131.75, 131.95' - Fractures (3), <5 deg, rough, undulating 132.1, 132.2, 132.25, 132.55, 132.95' - Fractures (5), <10 deg, rough, undulating		to 3/16" at 132.1-132.3', and medium gray (N5) mottling at 133.2-133.9'	circulation -
- -	5 ft 58%	,		133.2, 133.4, 133.6, 133.65' - Fractures (4), <10 deg, rough, undulating -		No Recovery 133.9-136.0'	
135 <u> </u>	136.0		NR	-			R15: 4 minutes
- - -			4	136.1, 136.9' - Fractures (2), <5 deg, rough, undulating, 1/8" relief 136.75, 137.5' - Fractures (2), 15-20 deg,		Limestone - 136.0-136.9' - Same as - 121.0-121.55' - 136.9-140.1' - medium light gray and	- Driller's Remark: No fluid
- -	R16-NQ		>10	rough, undulating, 3/8" relief 137.25- 137.5' - Fracture zone, <10 deg, rough, undulating, 4 fractures 137.6-138.15' - Fracture zone		 very pale orange, (N6 and 10YR 8/2), fine grained, mild to moderate HCl reaction, medium strong to strong 	circulation - SC-3 collected at 138.15-
- - -	5 ft 82%	28	5	- - - - - - - - - - - - - - - - - - -		 (R3 to R4), trace voids up to 3/16", 20-30% casts/cavities up to 2-3/8"x1-3/16" at 138.3-140.1', black organic infill at 139.4-140.1' 	139.05'
140_ -98.3 -	141.0		0 NR	<1/16" relief, black stains on 80% of surface		No Recovery 140.1-141.0'	R16: 14 minutes
_							
	l				\Box		



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	B-29	SHEET	9	OF	9	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723157.5 N, 458338.8 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

CORING	INIL ITIOD A	ND L	ZUIFIV	MENT: CIME 55 S/N 316625, mud rotary, NQ tools, HW o	asiriy		ORIENTATION: Vertical
WATER	LEVELS: 4.2	2 ft bg	s on 5	/30/07 START : 5/23/2007 END : 5/	31/20	07 LOGGER : T. Stewart, P. De Sa'r	
≥∩≎	, ©			DISCONTINUITIES	٥	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	507	ROCK TYPE, COLOR,	OUZE AND DEDTIL OF GARING
ᆱ병은	RUN H, 4 ÆR	Q D (%)		DEDTIL TYPE OPIENTATION POLICINESS	SYMBOLIC	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YFA YFA	RE I) Q i	75 F	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	₩ W	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SUF	COL	S S	F.F.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
				141.1' - Fracture, horizontal, rough,	+	Limestone	
-			2	undulating, 3/8" relief	F	 141.0-141.9' - grayish orange to pale 	-
_				141.85' - Fracture, 15 deg, rough, undulating,	₽	yellowish brown, (10YR 7/4 to 10YR	_
			1	1/8" relief	厂	6/2), fine grained, mild HCl reaction, medium strong (R3), trace (<5%)	_
			' '	142.05' - Fracture, horizontal, rough,	\vdash	surface coverage of voids up to	
-	R17-NQ			undulating		1/16", trace cavities up to 9/16"x3/8"	Driller's Remark: Very soft
-	5 ft	33			╨	- 141.9-142.05' - Same as 121.0-121.55'	at 143.3-145.0' -
-	40%				匸	142.05-142.8' - Same as	-
-			NR		╀	- 141.0-141.9'	-
145_				_		142.8-143.0' - moderate yellowish	
-103.3					\vdash	brown, (10YR 5/4), medium grained, mild HCl reaction, weak (R2),	R17: 7 minutes
	146.0					60-70% surface coverage of voids up	1
-	. 10.0				一	to 3/16", 10-15% casts/cavities up to	1
-			2	146.35, 146.55' - Fractures (2), horizontal,		_ 3/4"x3/8" No Recovery 143.0-146.0'	-
-				rough, planar 147.05, 147.25' - Fractures (2), <15 deg,	$oldsymbol{oldsymbol{arPsi}}$	Limestone	-
_			3	rough, undulating, tight	╁┰	_ 146.0-146.55' - Same as	_
				147.75' - Fracture, <15 deg, rough,	厂	142.8-143.0'	SC-4 collected at 147.75-
	R18-NQ			undulating, tight		T 146.55-148.5' - Same as L 141.0-141.9'	148.60'
	5 ft 64%	42	3	148.65-149.05' - Fracture zone	\vdash	148.5-149.2' - Same as 142.8-143.0'	1
-			1	148.65' - Fracture, <15 deg, rough,	╁	t ,, ,, ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	-
				undulating, tight		No Recovery 149.2-151.0'	-
150 -108.3			NR	_	╀┷		R18: 7 minutes
-100.5					\Box	_	
	151.0						Total depth of boring at 151.0' below ground
					ı	Bottom of Boring at 151.0 ft bgs on	\surface 10:19, 5/31/07
					1	- 5/31/2007	
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-30

SHEET 1 OF 9

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.1 N, 458444.8 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

DRILLING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

WATER LEVELS: 2.4 ft bgs on 5/03/07									ONIENTATION : Vertical
WATER	LEVELS	: 2.4 ft b	gs on 5/0:	3/07 S ∎	START : 5/2/2007	END : 5/6/2007	LOGGE	₹ : D.	Roraback
>				STANDARD		SOIL DESCRIPTION		ي	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				SYMBOLIC LOG	
표공한		RECOVE	RY (ft)			ME, USCS GROUP SYMBOL, E CONTENT. RELATIVE DEN	1	DEPTH OF CASING, DRILLING RATE,	
YFA YFA			#TYPE	6"-6"-6"		NCY, SOIL STRUCTURE, MIN		ΔBC	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			#ITPE	(N)	00.10.0.2.	101, 0012 011 100 101 12, 11111		SY	
42.2	0.0			. ,	Poorly Gradeo	d Sand With Silt (SP-SM)		177	
-		١.,	00.4	2-4-4	→ 0.0-0.45" - dar	rk gray, (N3), moist, loosé, t	fine grained, 🏻 /̄ ⁻	1 11	-
-		1.4	SS-1	(8)		on, silica sand to 1/32", 15%	fines,		_
	1.5					organics, roots			_
					Poorly Graded	g Sand (SP) ry light gray to light gray, (N	8 to N7)		
-					\moist, loose, v	ery fine grained, no HCl re	action, silica	1	-
-					sand to <1/32"	", trace nonplastic fines		1	-
-							-	1	-
-							-	1	_
							_		
5	5.0						-	1	7
37.2	3.0				Silty Sand (SN	VI)		111	Water level 2.4' below ground surface on
-			000	2-5-3	5.0-5.9' - light	brownish gray with medium	n gray -	111	5/03/07 -
-		0.4	SS-2	(8)	mottling, (5YR	R 6/1 with N4), wet, loose, ve	ery fine		_
I _	6.5				\grained, medic	um to high plasticity, no HC <1/32", 30-40% fines, trace	roots	1	_
					Silica saria to s	< 1702 , 00 +070 lines, trace	10013		
							-		_
-							-	1	=
-							-	┨	-
-							-	4	_
_							_		_
10	10.0						-	1	-
32.2	10.0				Silt (ML)			ΙП	_
-		, ,	000	1-6-6	10.0-11.2' - ye	ellowish gray, (5Y 7/2), wet,	medium stiff,	┨║║	-
_		1.2	SS-3	(12)		ry rapid dilatancy, moderate		4	_
	11.5				HCI reaction, t	trace very fine sand-sized,	carbonate	ľ	_
							-	1	_
-							-	1	-
-							-	┨	-
-							-	1	_
_							-	1	
15	15.0						-	1	1
27.2	13.0				Sandy Silt (MI	L)		Ш	-
-		, _	00.4	0-21-35	15.0-16.5' - ye	ellowish gray, (5Y 5/2), wet,	hard,	$\ \ $	-
-		1.5	SS-4	(56)	medium dense	e, nonplastic, very rapid dila	atancy,		_
_	16.5					reaction, 25-30% fine to co 3 limestone lenses to 1" thi		Ш	_
					carbonate deri		- ,		
]									7
-							-	1	-
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	B-30	SHEET	2	OF	9

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.1 N, 458444.8 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 299205, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 2.4 ft bo	gs on 5/03	3/07 5	START : 5/2/2007 END : 5/6/2007	LOGGEF	? : D	. Roraback
300				STANDARD	SOIL DESCRIPTION		g	COMMENTS
AND AND	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME LISCS CROLID SYMBOL COL	OB	CLO	DEPTH OF CASING DRILLING PATE
H BE ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COL MOISTURE CONTENT, RELATIVE DENSIT	Y OR	30Li	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERA	ALOGY	SYMBOLIC LOG	INSTRUMENTATION
22.2	20.0			(1.1)	Silty Sand With Limestone Fragments (SM)		П	
-	1	0.4	SS-5	6-6-6 (12)	20.0-20.9' - light olive gray, (5Y 5/2), wet, med dense, fine to coarse grained, moderate HCI	dium - reaction	Ш	<u> </u>
-	21.5			(12)	\35% fine to coarse gravel-sized limestone fra \30% plastic fines, all carbonate	gments,	1	-
-					\30% plastic lines, all carbonate		1	<u> </u>
_						_		_
-						_		_
_						_		_
-						_	l	-
25 <u> </u>	25.0				Sandy Silt (ML)		Ш	
		0.6	SS-6	4-2-8	25.0-25.6' - dusky vellow, (5Y 6/4), wet, stiff, r	medium _	Ш	-
-	00.5	0.0	33-0	(10)	dense, fine to medium grained, low plasticity, dilatancy, moderate to strong HCl reaction, 35	rapid _ 5-40% -	ł	-
-	26.5				fine to medium sand, 10-15% fine gravel-size limestone fragments, all carbonate	ed / -	l	-
-	-				limestone magments, an carbonate		l	-
-						-		-
-	1					-		-
-						_	1	_
						_		
30	30.0							
12.2				12-8-15	Sandy Silt With Limestone Fragments (SM) 30.0-30.85' - Same as 25.0-25.6' except very	stiff		_
-		0.9	SS-7	(23)	15% fine to coarse gravel-sized limestone fra	gments	Ш	-
-	31.5					_	l	-
-	-					-	l	-
-						-	l	-
-						-	l	-
-						-	l	-
-						-		-
35	35.0					-	1	-
7.2	35.0 35.2	0.2	SS-8	50/2 (50/2")	Limestone Fragments		Н	-
				(30/2)	\displaysize 35.0-35.2' - light olive gray, (5Y 5/2), mild to n HCl reaction, very poor recovery, two limestor	ne _		
					\fragments, to 1/2"			_
_						_]
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PROJECT NUMBER:	BORING NUMBER:	
338884 FI	B-30	SHEET 3 OF 0

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.1 N, 458444.8 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

DRILLING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

WATER	LEVELS	: 2.4 ft bo	gs on 5/00	3/07	START : 5/2/2007 END : 5/6/2007 LOGGE	R:	D. Roraback
> ~ ~				STANDARD	SOIL DESCRIPTION	آ	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
TH BE		RECOVE			MOISTURE CONTENT, RELATIVE DENSITY OR		DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
DEP' SURI ELE			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		S INSTRUMENTATION
2.2	40.0	0.2	SS-9	50/2 (50/2")	Limestone Fragments	Ŧ	
_				(30/2)	40.0-40.2' - light olive gray, (5Y 5/2), mild to moderate HCI reaction, wafer-shaped limestone fragments to	1	
-					1/4" thick, fine to coarse sand-sized fragments	1	-
-						1	-
-						+	-
-						1	-
-						1	1
]	
45 -2.8	45.0 45.2	0.2	SS-10	50/2.5	Limestone Fragments And Silty Sand (SM)	1	TI:
-2.0				(50/2.5")	\ \delta 5.0-45.2' - light olive gray, (5Y 5/2), wet, very dense, low plasticity, moderate HCl reaction, fine to medium	+	-
-					sand-sized with 15-25% fines, 70% limestone fragments, 30% sand, all carbonate	┨	-
-					Begin Rock Coring at 45.0 ft bgs	1	1
					See the next sheet for the rock core log	1	
_						1	
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50						1	-
-7.8					-	1	1
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-30

SHEET 4 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.1 N, 458444.8 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

CORING METHOD A	AND F	QUIPI	MENT : CME 55 S/N 299205, mud rotary, NQ tools, HW c	asıng		ORIENTATION : Vertical
WATER LEVELS: 2	4 ft bg	s on 5	/03/07 START : 5/2/2007 END : 5/6	6/200	7 LOGGER : D. Roraback	
			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft) CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-2.8 45.0		1	45.0-45.5' - Fracture, 85 deg, rough, undulating	Ħ	Limestone - 45.0-48.5' - moderate olive brown,	Begin rock coring at 45'
-		>10	- - 46.6' - Fracture, horizontal, rough, undulating,	Ė	(5Y 4/4), mild to moderate HCI reaction, extremely weak to very weak (R0 to R1), very fine to medium	-
- R1-N0 - 5 ft 70%	33	3	open 46.7-46.9' - Fracture zone, <5-90 deg, rough, undulating, open	Ħ	grained voids to 1/16", 25-30% casts/molds up to 3/8" over 5-10% of surface, trace black (N1) carbonaceous inclusions	_
- 10%		2	47.1' - Fracture, horizontal, rough, undulating, open 47.5' - Fracture, 15-25 deg, rough,		No Recovery 48.5-50.0'	-
50 50.0		NR	undulating, tight 47.8-48.4' - Fracture, 85-90 deg, rough, undulating, tight		-	R1: 4 minutes
-7.8 - -		>10	48.1' - Fracture, horizontal, rough, stepped, tight - 48.4' - Fracture, 10 deg, rough, undulating, tight		Limestone 50.0-51.4' - moderate olive brown, (5Y 4/4), moderate HCl reaction,	-
		3	50.0-50.2' - Fracture zone, angular gravel-sized limestone fragments 50.55-50.8' - Fracture, 45 deg, rough,	Ħ	weak to medium strong (R2 to R3), very fine to fine grained, carbonate, voids to 1/16" over 20-25%, cavities to 3/8" over <5%, sparsely	
R2-N0 - 5 ft - 90%	23	3	undulating, tight 51.0-51.35' - Fracture, 80-85 deg, rough, undulating, open		fossiliferous 51.4-54.5' - moderate olive brown, (5Y 4/4), fine to medium grained,	- -
-		>10	51.7' - Fracture, horizontal, rough, undulating, open 51.9-52.1' - Fracture, 70-75 deg, rough, undulating, open	Ė	moderate HCl reaction, extremely weak to very weak (R0 to R1), friable, becoming very weak (R1) at	R2: 6 minutes
55 <u>55.0</u> -12.8	-	NR	52.3' - Fracture, 20 deg, rough, undulating, semi-tight — 52.6, 52.8, 53.1, 53.3,' - Fractures (4),		 54.0' and below, black carbonaceous/organic lenses/laminae (1/16") very abundant at 53.5', voids (<1/16") over 20-25%, 	_
		3	horizontal, rough, undulating, semi-tight 53.4-53.8' - Fracture zone, horizontal 54.0' - Fracture, 50 deg, rough, undulating,		cavities (<3/8") over 5% of surface, poorly fossiliferous No Recovery 54.5-55.0'	
R3-N0 - 5 ft	17	4	open 55.25' - Fracture, <5-70 deg, rough, stepped, open 55.42' - Fracture, <5 deg, rough, stepped,	H	Limestone 55.0-56.8' - moderate yellowish brown, (10YR 5/4), mild HCl reaction,	-
_ 54%			open, black carbonaceous stain over 30% of surface 55.54' - Fracture, 10 deg, smooth, planar to	Ħ	weak (R2), low density, thin black carbonaceous laminae at 55.0-55.2' with discontinuous carbonaceous laminae below, voids (generally	-
-		NR	stepped, open, black carbonaceous film over 20% 55.68' - Fracture, <5 deg, rough, stepped,		- <1/16") over 15-20% of surface, some cavities (<1/16"), fossil mold/casts sparse	R3: 9 minutes Hit pocket at 60'
60 <u>60.0</u> -17.8 -		1	open, black carbonaceous film over 5% 56.0' - Fracture, <5 deg, rough, undulating, tight		56.8-57.7' - yellowish gray, (5Y 7/2), dense, mild HCl reaction, medium strong (R3), voids (1/16" or less)	Losing sample core kicked — over sideways, no way of knowing orientation of core
- - - R4-N0 - 5 ft 9%	0	NR	56.52' - Fracture, horizontal, rough, planar, tight 56.82' - Fracture, 0-60 deg, rough, stepped, open 57.25' - Fracture, <5 deg, smooth, undulating, open		 unevenly distributed across 10-15% of rock surface, cavities rare, fossil molds/casts sparse No Recovery 57.7-60.0' Limestone 60.0-60.45' - yellowish gray, (5Y 7/2), 	Rock re-ordered rock into more logical sequence during field review
970			57.35' - Fracture, <5 deg, smooth, planar, open, carbonaceous staining/film over 10% 57.5-57.6' - Fracture zone, gravel-sized rock fragments, rounded to angular 60.25' - Fracture, horizontal, smooth, undulating, tight, black carbonaceous film		- dense, mild to moderate HCl reaction, medium strong to strong (R3 to R4), black, thin, carbonaceous - laminae common, voids/cavities <1% surface, fossil molds/casts sparse to absent	No recovery due to blocked core barrel R4: 16 minutes
65 65.0			covering 20% of rock surface	Ħ	assorit	
	1	1		_		I



PROJECT NUMBER:

33884.FL

B-30

SHEET 5 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.1 N, 458444.8 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

			<u> </u>	VIENT . CIVIE 33 3/N 299203, Midd Totally, NQ tools, HVV C	uog		ORIENTATION : Vertical
WATER	LEVELS : 2.4	ft bg	s on 5	/03/07 START : 5/2/2007 END : 5/	6/200	7 LOGGER : D. Roraback	
>00				DISCONTINUITIES	ڻ ا	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표원인	ER, A	9	굶		음	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H A A	GT SON	(%) Q	FS	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	BO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
P S S	SEN S	a Q	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	014	ш	шп	,	0)		
-22.8			2	65.1' - Fracture, horizontal, rough, undulating,	Н	No Recovery 60.45-65.0' - Limestone	
			_	open		65.0-68.8' - light olive gray, (5Y 5/2),	
-				65.9, 66.1, 66.2' - Mechanical break (3)	Н	very fine to fine grained, mild HCl	1
-			4	66.5' - Fracture, 5-10 deg, smooth,	₽	reaction, extremely weak (R0),	-
_				undulating, tight	ш	friable, nonplastic silt along fractures,	
	R5-NQ	4.0		66.7' - Fracture, 10 deg, rough, undulating,	Н	voids to 1/16" over 10%, casts/molds	
-	5 ft 96%	13	3	tight	т	up to 3/8" over <5% of surface	1
-	9070			67.1' - Fracture, horizontal, rough, undulating,	Ш	=	1
-			3	open 67.3' - Fracture, 45-50 deg, smooth, stepped,	Н	-	-
				open open	Н	- 68.8-69.8' - light olive gray, (5Y 5/2),	_
			1	67.6' - Fracture, 45 deg, rough, undulating to	ш	fine grained, moderate HCl reaction,	R5: 10 minutes
70	70.0			stepped, open	1	very weak to weak (R1 to R2), voids	1 1
70 <u> </u>	70.0		NR	68.3' - Fracture, 0-5 deg, rough, undulating, —	Ħ	— to 1/16", molds/casts to 3/8", on	⊢
			2	open 68.4' - Fracture, 0-5 deg, rough, undulating,	ш	5-10% of surface, occasional carbonaceous laminae on 1-3% of	
			_	open open	Н	- surface	
				68.8' - Fracture, 0-5 deg, rough, undulating,	\Box	No Recovery 69.8-70.0'	1
-			0	tight	ш	Limestone	1
-	DG NO			69.5' - Fracture, horizontal, rough, undulating,	Н	- 70.0-70.7' - moderate olive brown,	-
_	R6-NQ 5 ft	53	3	open		(5Y 4/4), fine to medium grained,	
	94%	00		70.7' - Fracture, 0-5 deg, rough, undulating, open	Н	moderate to strong HCl reaction, medium strong (R3), voids to 1/16"on	
1 7				70.75' - Fracture, horizontal, rough,	ш	35-40% of surface, casts/molds to	1
-			>10	undulating, open	Н	3/8" over 5%, fossiliferous	
-				72.2' - Fracture, 10 deg, rough, stepped,	₽	_ (molds/casts)	DG: 40 minutes
_			2	open	П	70.7-73.6' - light olive gray, (5Y 5/2),	R6: 10 minutes
75	75.0		NR	72.6-72.8' - Fracture, 60-65 deg, rough, undulating, open	Н	moderate to strong HCl reaction, medium strong (R3), voids to 1/16"	
-32.8				72.8-73.6' - Fracture, 85-90 deg, rough,	Ш	over 3-5% of surface, sparsely	
-			3	undulating, tight	ш	distributed throughout interval and	1
-				73.6-73.9' - Fracture zone, 0-90 deg, rough,	Н	concentrated in possible cavity	SC-1 collected at 75.8-
_			0	stepped to undulating, open 74.2, 74.3' - Fractures (2), horizontal,		infillings, fossils rare to absent, casts/molds to 3" on 10% of surface,	76.7'
				smooth, planar, open	Н	silty sand along fractures	
	R7-NQ			75.1' - Fracture, 0-10 deg, rough, stepped,	П	73.6-74.3' - Same as 70.7-73.6'	1
-	5 ft	48	>10		П	except yellowish gray, (5Y 7/2),	1
-	94%			75.2-75.3, 75.4-75.5' - Fractures (4), 30 deg,	₽₩	extremely weak (R0), becoming	1 -
1 _			0	rough, undulating, tight 77.2' - Fracture, 0-5 deg, smooth, stepped,	Ш	coarser grained, with very soft clay along fractures, friable, sandy texture]
1				open	H	74.3-74.7' - Same as 70.7-73.6	
1 7			3	77.4' - Fracture, 0-15 deg, smooth, stepped,		except yellowish gray, (5Y 7/2)	R7: 9 minutes
				open	Ш	- No Recovery 74.7-75.0'	1 1
-37.8	80.0		NR	77.5-78.0' - Fracture zone, 0-70 deg, rough, stepped to undulating, open, gravel sized	H	Limestone 75.0-77.2' - yellowish gray, (5Y 7/2),	I ⊢
-57.0			>10		\Box	very fine to fine grained, strong HCl]
				78.6-78.7' - Mechanical break	ш	reaction, very weak to weak (R1 to	
_				79.0-79.3' - Fracture, 50-60 deg, rough,	\mathbb{H}	R2), voids to 1/4" over 3-5%, cavities	1 1
-			1	undulating, tight	口	to 3/8" over <1% of surface, poorly	1
-	DO NO			79.45' - Fracture, horizontal, rough, undulating, tight	₽₩	fossiliferous 77.2-77.7' - yellowish gray, (5Y 7/2),	1 -
_	R8-NQ 5 ft	30	3	79.6' - Fracture, 50 deg, rough, stepped,	Ш	mild to moderate HCl reaction,]
	58%	50		open		extremely weak (R0),	
				80.0-80.2' - Fracture zone, gravel-sized	111	nonfossiliferous, very thin	1 1
-				limestone rock fragments 80.35-80.5' - Fracture, 70-80 deg, rough,	口	discontinuous black carbonaceous laminae, rounded to subrounded	1
-			NR	undulating, open	$\vdash\vdash$	clast-like inclusions (3/8"-3/4") of	R8: 7 minutes
_				80.5-80.7' - Fracture zone, rough, planar to	Ш	moderate olive brown (5Y 4/4),	Ro. / minutes
85	85.0			stepped, horizontal to high angle, open	Щ	extremely weak (R0) limestone	
					П		
					•		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	B-30	SHEET	6	OF	9	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.1 N, 458444.8 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

COMING	INICTITIOD A	ND LC	ZOIFIV	IENT: CME 55 S/N 299205, mud rotary, NQ tools, HW c	asiriy		ORIENTATION : Vertical
WATER	LEVELS: 2.4	ft bgs	s on 5	/03/07 START : 5/2/2007 END : 5/	6/2007	LOGGER : D. Roraback	
≥∩≎	, ©			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	OLZE AND DEDTH OF GAGING
불병은	RUY H. A.	(%) Q	URI	DEDTIL TYPE OPIENTATION POLICINESS	1 🗒 🛭	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
F A S	RE I) [ACT R FC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	MBC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	N N N N N N N N N N N N N N N N N N N	S. O.	FR/ PEF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-42.8				81.3-81.6' - Fracture, 30-80 deg, rough,	ш	Limestone	
-			2	undulating, orientation angle increasing with	╂┼┤	- 77.7-79.7' - yellowish gray, (5Y 7/2),	-
-				depth 82.0' - Fracture, horizontal, rough, undulating,		very fine grained, moderate to strong HCl reaction, medium strong (R3),	Driller's Remark: (87.0-
-			>10	tight	Ш	 voids to 1/16" on 20-25%, cavities to 	90.0') open hole in rock,
1 _				82.35-82.5' - Fracture, 20-30 deg, rough,	Ш	3/4" on 1-2%, occasional hair-line	rods dropped one more
	R9-NQ			undulating, tight	\vdash	incipient fracture traces	foot when released 87-88' void
-	5 ft 88%	37	1	82.8' - Fracture, 0-5 deg, rough, undulating, open	Н	 No Recovery 79.7-80.0' Limestone 	88-89.5' solid
-	0070		0 /	85.1' - Fracture, 0-10 deg, rough, undulating,	ш	80.0-82.9' - light olive gray, (5Y 5/2),	89.5-91' void
-				open	丗	- fine grained, mild HCl reaction,	Driller's Remark: Lost -
-			NR	85.35-85.4' - Fracture, 5-10 deg, rough, undulating, open	Н	medium strong (R3), voids to 1/16" on 20-25%, cavities	circulation at 87.0' R9: 9 minutes
-				86.1' - Fracture, horizontal, rough, undulating,		- 1-3/16"-3/4"except at 80.9-81.0',	R9. 9 millutes
90	90.0			tight	Ш	larger cavities 1-3/16x1-3/16x3/8" on	
-47.8				86.5-87.2' - Fracture zone 87.5' - Fracture, 5 deg, rough, undulating,		>5% , trace fossil molds/casts No Recovery 82.9-85.0'	
1 -				open	\square	Limestone	
1 -					Ш	85.0-86.6' - moderate yellowish	Driller's Remark: 91.0-95.0'
-					ш	 brown, (10YR 5/4), fine grained, moderate HCl reaction, weak to 	open, minimal resistance -
-	l R10-NQ			-		medium strong (R2 to R3), voids to	as sporadic stringers of rock, or small breccia
-	5 ft	0	NR		\vdash	_ 1/16" on 15-18%, cavities to 3/4" on	clasts, yield rig chatter –
1 -	0%			_	Ш	<5%, fossiliferous (molds and casts) 86.6-88.1' - pale olive brown, (5Y	_
					Ш	_ 5/6), fine grained, weak to medium	
					Ш	strong (R2 to R3), void spaces over	
-					Н	25% of surface, solution cavities over 15-20%, trace organics, iron oxide	R10: 2 minutes
	05.0				ш	patina on some cavities, fossiliferous	_
95 <u> </u>	95.0			_	Н	(molds/casts)	_
-					団	No Recovery 88.1-103.0'	_
-					\vdash	_	Drillada Danaadii 05 0
1 -				_			Driller's Remark: 95.0- 103.0', rods were
					Н		apparently sitting on a
	R11-NQ				Ш		small piece of rock; when
-	5 ft 0%	0	NR		Н	_	connection was made the rods free fell to 103.0' with
-	0,0					_	no recovery
-					╂╫	_	-
1 -					口	_	R11: Run time not
1 -					\Box	_	recorded -
~	100.0			_	口		_
-57.8				_	H	_	
1					Щ		
-			, ,_		Ш		1
1 -			NR	·		_	-
1 -	l R12-NQ				Ш	_	
1 -	5 ft	0			\sqcup	_	-
1 -	14%				団	_	Actual recovery was from
1 -			0		H	_	Actual recovery was from 103.0-103.7'
1 _					岸		_
1			NR		$\vdash \vdash \vdash$		R12: 3 minutes
105	105.0				Ш		1
1	. 50.0				\sqcap		
	_						-



PROJECT NUMBER:

338884.FL

B-30

SHEET 7 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.1 N, 458444.8 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

COMING	INLITIODA	ND LC	ZUIFIV	IENT: CME 55 S/N 299205, mud rotary, NQ tools, HW ca	asing		ORIENTATION : Vertical
WATER	LEVELS: 2.4	ft bgs	s on 5	/03/07 START : 5/2/2007 END : 5/6	5/2007	7 LOGGER : D. Roraback	
				DISCONTINUITIES	ניז	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
HH H	L'A H, A ER)	(%	FRACTURES PER FOOT		음	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
L HAC	S E R GTP OVI	(%) Q	CTL	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
FIE SHE	SEC	S S	'RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	λ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-62.8	014	ш	шш		0)		
-02.0			0	105.1' - Fracture, horizontal, rough,	Ш	Limestone - 103.0-103.7' - yellowish gray, (5Y	_
				undulating, open 105.25' - Fracture, 0-5 deg, rough,	ш	7/2)), strong HCl reaction, extremely	
				undulating, open	Н	weak to very weak (R0 to R1),	SC-2 collected at 105.9- 107.2'
-			0	105.5' - Fracture, horizontal, rough,		 medium grained, sandy texture, voids (<1/16") over 1-2% of surface, fossils 	107.2
-	R13-NQ			undulating, open 105.6-105.8' - Fracture zone	Н	absent	1 -
-	5 ft	27	5	105.6-105.6 - Fracture 2016 107.05' - Fracture, 5 deg, rough, undulating,	Ш	- No Recovery 103.7-105.0'	1 -
I _	64%			tight	Н	Limestone	l <u> </u>
			1	107.4' - Fracture, 40 deg, rough, undulating,		105.0-105.6' - Same as 103.0-103.7' - 105.6-108.2' - light olive gray to pale	
				open 107.5' - Fracture, 0-5 deg, rough, undulating, _	Ш	yellowish brown, (5Y 5/2 to 10YR	1
-			NR	open		6/2), mild to moderate HCl reaction,	R13: 12 minutes
-				107.7' - Fracture, 0-2 deg, rough, undulating,	\square	 weak (R2), voids (<1/16") over 5% of 	-
110 <u> </u>	110.0			open	Ш	surface, cavities (3/8" to 3/16") <1%, trace fossil molds/casts	Water level 1.0' below
-07.6				108.0' - Fracture, 0-2 deg, rough, undulating, open -	Ш	No Recovery 108.2-120.0'	Water level 1.9' below ground surface 5/5/07
				-	Н	_	greana canace erere:
-				-	Н	=	1 1
-	R14-NQ			-	口	-	1 -
-	5 ft	0	NR	-	Н	_	1 -
-	0%			_		_	1 -
				_	Ш	_]
-				-	Н	=	R14: 4 minutes
- 445	445.0			-	ш	_	1 1
115 <u></u> -72.8	115.0				ш	_	No recovery, pulled cutter —
				-	Ш	_	casing and found core
I _				_	Н	_	fragment which may have
					Н		been blocking inner core
				_	Ш		barrel; problem may be - due to inner barrel not
-	R15-NQ			-	Н	-	locking properly
-	5 ft	0	NR	-	口	-	Solution: Lift outer barrel -
-	0%			-	Н	_	off bottom of hole before locking in inner barrel
				_	Ш	_	LOOKING III IIIIICI DAITCI
					Н		
				_	Щ		R15: 5 minutes
120	120.0			-	Ш	-	1
-77.8	120.0			_	団	Limestone	⊢
-			>10	120.2' - Fracture, 0-80 deg, smooth, stepped,	\vdash	 120.0-120.5' - light olive gray, (5Y 	-
1 -				open 120.3' - Fracture, horizontal, rough, stepped, -	Ш	5/2), very fine to fine grained,	
				open _	Щ	moderate HCl reaction, medium strong to strong (R3 to R4), voids to	l J
				120.3-120.5' - Fracture zone, angular to	Ш	1/16" over <5% of surface, casts to]
1 1	R16-NQ			subrounded gravel-sized rock fragments 120.5-120.75' - Fracture zone, 80 deg, rough,	\Box	3/16" over <5%, fossils absent] 1
-	5 ft	0		undulating, tight, fracture plane bounded on	Н	- 120.5-121.0' - yellowish gray, (5Y	-
-	20%		NR	either end by horizontal, stepped to	Ш	7/2), medium grained, strong HCl reaction, extremely weak to very	-
_				undulating, rough, open bedding planes	H	 weak (R0 to R1), sandy texture, very 	-
				120.75-121.0' - Fracture zone, subrounded gravel-sized rock fragments -	口	similar to 103.0-103.7']
				gravor-sizea rook iraginents	Ш	No Recovery 121.0-125.0'	R16: 4 minutes
125	125.0			-	Ш] 1
120	120.0				\Box		
$\overline{}$							



PROJECT NUMBER:

338884.FL

BORING NUMBER:

B-30

SHEET 8 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.1 N, 458444.8 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT: CME 55 S/N 299205, mud rotary, NQ tools, HW casing

CORING ME	THOD AN	ID EG	QUIPN	IENT : CME 55 S/N 299205, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
WATER LEV	/ELS : 2.4	ft bgs	on 5		6/200	LOGGER : D. Roraback	
≥∩≘	. @			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-82.8			2	125.25' - Fracture, 0-5 deg, rough, stepped, ight	H	Limestone - 125.0-126.7' - dusky yellow to yellowish gray, (5Y 6/4 to 5Y 7/2),	Water level 2' below ground surface on 5/6/07 -
			3	125.6' - Fracture, 0-5 deg, rough, undulating, open	H	fine to very fine grained, strong HCI reaction, extremely weak to weak (R0 to R2), fossiliferous	-
-	R17-NQ 5 ft 58%	42	3	undulating, open 126.4, 126.5' - Fractures (2), horizontal, smooth, planar, open	Ė	126.7-127.9' - yellowish gray, (5Y - 7/2), very fine to fine grained, strong HCl reaction, very weak to weak (R1	-
130 130.			NR	127.2' - Fracture, 5-10 deg, rough, undulating, tight 127.7' - Fracture, 0-5 deg, rough, stepped, semi tight 127.75-127.9' - Fracture, 45-50 deg, rough, undulating, semi tight		to R2), voids (1/16") over 1-2% of surface, cavities sparse from 126.7-127.5', becoming more common with depth No Recovery 127.9-130.0'	R17: 6 minutes
-87.8			4	130.1' - Fracture, 10-15 deg, rough, undulating, open 130.2' - Fracture, 5-10 deg, rough,	-	Limestone 130.0-131.2' - yellowish gray, (5Y 7/2), very fine to fine grained, strong	_
			3	undulating, open 130.4-130.5' - Fracture, 30-35 deg, rough, undulating, open	Ē	HCl reaction, extremely weak to very weak (R0 to R1), voids (1/16") over 5-10% of surface, cavities to 3/8"	
	R18-NQ 5 ft 84%	45	4	130.8' - Fracture, 0-5 deg, rough, undulating, open 131.2' - Fracture, 5-10 deg, rough,	Ė	<5%, fossiliferous (predominantly micro-fossils), very irregular, undulatory surface	SC-3 collected at 132.7-
_			3	undulating, open 131.5' - Fracture, 0-5 deg, smooth, undulating, semi tight	H	131.2-131.85' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCl reaction, extremely weak to very	133.5'
135 <u>135</u> .	5.0		NR	131.9' - Fracture, horizontal, smooth, stepped 132.1' - Fracture, horizontal, rough, planar, open	F	weak (R0 to R1), voids <1%, cavities (<1/8") over 1% surface, rock surface generally uniform (slightly	R18: 5 minutes
-92.8 - -			3	132.2-132.3' - Fracture zone, 0-50 deg, smooth to rough, planar to stepped, open 132.3' - Fracture, 0-5 deg, rough, undulating,	F	undulatory), fossils absent, "silty textured" 131.85-132.2' - light olive gray, (5Y 5/2), dense, fine grained, moderate	-
-	R19-NQ		3	open 132.7' - Mechanical break 133.5' - Fracture, 10 deg, rough, undulating, tight		to strong HCl reaction, medium strong (R3), voids (<1/16") over 1-2% surface, cavities (3/8"x1/32")	-
-	5 ft 76%	22	3	133.6-133.75' - Fracture zone, 0-50 deg, smooth to rough, planar to stepped 133.75' - Fracture, 0-5 deg, rough,	Ė	rare, fossils trace to absent 132.2-134.2' - moderate yellowish brown, (10YR 5/4), dense, moderate	-
-			5 NR	undulating, open 135.1' - Fracture, 0-60 deg, rough, stepped, open	Ė	to strong HCl reaction, weak (R2), voids (1/16-1/8") over 5-10% of surface, cavities up to 3/8" over 2-3% of surface, fossils rare to absent,	R19: 16 minutes
140 140. -97.8	0.0			135.4' - Fracture, 10 deg, smooth, stepped, open	1	trace very dark or black — carbonaceous laminae seen at 133.0-134.2'	_
			4	tight 136.3-136.7' - Fracture, 70-75 deg, rough, undulating, tight 136.4' - Fracture, 5-10 deg, rough,		No Recovery 134.2-135.0'	-
	R20-NQ 5 ft	20	>10	undulating, tight 136.8' - Fracture, horizontal, rough, undulating, open	Ħ	-	
	58%	20	NR	137.0' - Fracture, horizontal, rough, stepped to undulating to planar, open 137.2' - Fracture, 20 deg, rough, stepped, tight		- -	-
145 145.	5.0			137.4-137.55' - Fracture, 60 deg, rough, undulating, open	Ė		R20: 11 minutes
					_		•



PROJECT NUMBER:

338884.FL

B-30

SHEET 9 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.1 N, 458444.8 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, HW casing

CORING	IVIL ITIOD AI	ND LC	ZUIFIV	IENT: CME 55 S/N 299205, mud rotary, NQ tools, HW c	asing	_		ORIENTATION : Vertical
WATER	LEVELS : 2.4	ft bas	s on 5	/03/07 START: 5/2/2007 END: 5/	6/200)7	LOGGER : D. Roraback	
				DISCONTINUITIES	П	Τ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)				SYMBOLIC LOG	Н	252501	55
I N × ×	ŽAŽ		TES I	DESCRIPTION	5	ı	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
표일본	S F, Ř	Q D (%)	158	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	금	ı	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
F F 등	#\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	۵	AC_ R F	PLANARITY, INFILLING MATERIAL AND	₩	ı	AND ROCK MASS	SMOOTHNESS, CAVING ROD
DE SU ELE	898	R	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SY	ı	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-102.8				137.7' - Fracture, horizontal, rough,	T	t	Limestone	SC-4 collected at 146.7-
-			2	undulating, open -		1	135.0-138.2' - variegated dusky	147.3'
1 4				138.0' - Fracture, horizontal, smooth,	₽	Ł	yellow to grayish yellow to light gray	_
				undulating, open	Н	1	to medium gray, (5Y 6/4 to 5Y 8/4 to	
1 7			0	138.2' - Fracture, horizontal, smooth,		1	N7 to N5), very fine grained, strong HCl reaction, medium strong to	1
-	R21-NQ	ļ		undulating, tight 138.3' - Fracture, 5 deg, smooth, undulating,	₩	ł	strong (R3 to R4), voids (<1/16")	-
-	5 ft	57	4	tight -	仜	1	over 5% of rock surface, cavities up	_
	92%	0.	.	138.75' - Fracture, horizontal, smooth, planar,		1	to 3-1/8" in length near bottom of	
1 7				tight	╨	ſ	section, some lined with black	1
-			3	138.8' - Fracture, horizontal, smooth, planar,	世	t	amorphous coating (possibly	1
-				tight 140.1' - Fracture, 5-10 deg, smooth, planar,	┰	₽	hematite), large (5") cavity at 135.5-135.8', poorly fossiliferous	D24: 44 minutes
			2	tight	╨	L	(mold and casts)	R21: 11 minutes
150	150.0		NR	140.3-140.5' - Fracture, 45-50 deg, smooth,	ш	1	Limestone	
-107.8				planar, tight	1	T	138.2-138.8' - yellowish gray to	Bottom of boring at 150.0'
-				140.55, 140.65' - Fractures (2), horizontal,	1	H	dusky yellow to olive gray, (5Y 7/2 to	below ground surface -
1 -				rough, planar, open 141.2' - Fracture, 5-10 deg, rough,	1	F	5Y 6/4 to 5Y 3/2), fine grained, strong HCl reaction, weak to medium strong	1
				undulating, tight		L	(R2 to R3), laminated, voids rare to	
1 7				141.3' - Fracture, 0-5 deg, rough, stepped,	1	Γ	absent, rare cavities (<1/16-1/8"	1
-				open	1	r	diameter)	-
-				141.8' - Fracture, horizontal, rough,	1	ŀ	No Recovery 138.8-140.0'	-
_				undulating, open 141.9-142.2' - Fracture zone, angular to	1	L	Limestone 140.0-141.9' - yellowish gray to	_
				subangular rock fragments	1	ı	dusky yellow, (5Y 7/2 to 5Y 6/4), very	
1 7				142.4, 142.6' - Fractures (2), horizontal,	1	r	fine to fine grained, strong HCI	1
1 -				rough, undulating, open	1	H	reaction, very weak to medium	1
-				142.7' - Fracture, horizontal, rough,	-	F	strong (R1 to R3), voids to 1/16' over	-
				undulating, tight		L	<1% of rock surface, cavities	
				145.1' - Fracture, horizontal, rough, undulating, open	1	ı	(3/8"x1/8"x3/16") rare 141.9-142.9' - moderate olive brown,	
1 1				145.9-146.1' - Fracture, 60 deg, rough,	1	r	(5Y 4/4), fine grained, moderate HCI	1
-				undulating, tight	ł	ŀ	reaction, weak to very weak (R2 to	-
_				147.3' - Fracture, horizontal, rough,	1	L	R1), voids to 1/16" over 35-40%,	_
				undulating, semi tight	1	ı	cavities to 3/4" over <5%, some	
1 7				147.7' - Fracture, 0-5 deg, rough, undulating, tight	1	Γ	fossils (molds/casts) No Recovery 142.9-145.0'	1
-				147.8' - Fracture, horizontal, rough,	1	H	Limestone	1
-				undulating, open -	1	F	145.0-145.1' - moderate yellowish	-
1 4				147.9-147.8' - Fracture zone, horizontal,	1	L	brown, (10YR 5/4), fine grained,	_
				rough, undulating	1	ı	strong HCl reaction, extremely weak (R0), friable	
1 1				148.1 - Fracture, horizontal, rough, stepped, open	1	t	(R0), friable 145.1-147.9' - Same as 140.0-141.9'	1 1
-				148.2, 148.9, 149.27, 149.3' - Fractures (4),	1	H	147.9-149.2' - variegated very light	-
-				horizontal, rough, undulating, open —	1	F	gray to yellowish gray, (N8 to 5Y 7/2),	-
				149.4' - Fracture, horizontal, smooth, planar,		L	strong HCl reaction, extremely weak	
]				open	1	Γ	to very weak (R0 to R1), very thinly	1
-				-	1	r	laminated with possibly carbonaceous or clayey material	1
-				-	1	F	from 147.9-148.35', voids (<1/16")	-
					1	L	over 2-3% rock, cavities rare to	_
					1	ı	absent, trace fossil echinoderms	
] [-	1	Г	149.2-149.6' - dusky yellow, (5Y 6/4),	1
-				-	1	H	mild HCl reaction, medium strong (R3), voids (<1/16") over 1-2%,	-
-					4	F	cavities (1/16-1/8") rare, fossils rare	-
				_		L	to absent	
]					1		No Recovery 149.6-150.0'	1
1 1				-	1	r	Bottom of Boring at 150.0 ft bgs on	1
-					+	╀	_5/6/2007	
					1	ı		
					\bot	L		



PROJECT NUMBER:

338884.FL

B-30A

SHEET 1 OF 6

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.4 N, 458440.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 75 S/N 252437, mud rotary, auto hammer, NW rods, 5-7/8" tri-cone bit ORIENTATION: Vertical

						ry, auto nammer, NVV rous,			ORIENTATION : Vertical
WATER	LEVELS	: 6.0 ft bo	gs on 6/12	2/07	START : 6/12/2007	END : 6/13/2007	LOGGE	₹ : D. T	
≥∩≎				STANDARD		SOIL DESCRIPTION		چ ا	COMMENTS
Q A S	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				SYMBOLIC LOG	
ᆱᆼ은		RECOVE	ERY (ft)		SOIL NAM	IE, USCS GROUP SYMBOI E CONTENT, RELATIVE DE	L, COLOR,	Ιĕ	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
H A A A			#TYPE	6"-6"-6"	CONSISTEN	ICY, SOIL STRUCTURE, M	INERALOGY	MB	INSTRUMENTATION
DEPTH BELOW SURFACE AND ELEVATION (ft)			"	(N)				SΥ	
42.5					See B-30 for s	hallow soils; no logging/c	oring until	П	0.0-10.0': Drilled with 5-7/8" tricone bit with
-					25.0'			1	no sampling or coring (EZ Mud)
-								┨	-
-								-	-
-								4	_
l _									
								1	
-								1	1
-								1	-
-								-	-
-								4	_
5							_	1	
37.5								ı	
-								1	1
-								1	Driller's Remark: Encountered water at 6.0'
-								1	-
-								-	-
l -								1	_
l _									
								1]
-								1	1
-								1	-
-								-	-
10							_	4	Dellarda Danasado Hala hara da sista da 1400 H
32.5								1	Driller's Remark: Hole has deviated at 10.0'
1								ı	
-								1	10.0-25.0': 5" (PW) surface casing installed with rock devil bit and cleaned out with 3-7/8" -
-								1	with rock devil bit and cleaned out with 3-7/8" - tricone bit
-								┨	10.0-15.0': 30 minutes to drill
-								-	-
- 1								4	-
I -								1	
]
1 -								1]
45								1	-
15 <u> </u>							_	\mathbf{H}	15.0-20.0': 14 minutes to drill
								4	- 10.0 20.0 : 14 minutes to uniii
l _								1	_
1								1]
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20								+	-
								1	
								1	



PROJECT NUMBER:	BORING NUMBER:					Т
338884.FL	B-30A	SHEET	2	OF	6	

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.4 N, 458440.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 75 S/N 252437, mud rotary, auto hammer, NW rods, 5-7/8" tri-cone bit ORIENTATION: Vertical

						ry, auto nammer, NVV 100				ORIENTATION : Vertical
WATER	LEVELS	: 6.0 ft bo	is on 6/12		START : 6/12/2007	END : 6/13/2007	LUG	GEK :	. U.	Thomas COMMENTS
30₽				STANDARD PENETRATION		SOIL DESCRIPTION		\dashv	8	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAM	IE, USCS GROUP SYMB	OL COLOR	- 1	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H BI ACE ATIO		RECOVE	RY (ft)		MOISTURE	CONTENT, RELATIVE	DENSITY OR	- 1	30L	DRILLING FLUID LOSS, TESTS, AND
EPT URF LEV			#TYPE	6"-6"-6"	CONSISTEN	ICY, SOIL STRUCTURE,	MINERALOGY	- 1	Ϋ́	INSTRUMENTATION
22.5				(N)				\dashv	S	20.0-25.0': 4 minutes to drill
								- 4		20.0-20.0 . 4 minutes to uniii
-								- 4		-
-								- 4		_
_										_
_								J		
								- 1		
								1		1
								- 1		1
25	25.0							- 1		1
17.5	_5.0				Sandy Silt (ML	-)		一十	\prod	7
-		1.2	SS-1	9-19-22	25.0-26.2' - gra	ayish orange, (10YR 7/ arse grained, nonplasti	4), moist, hard,	- 1		1
-	26.5			(41)	□ dilatancv. mild	to moderate HCl react	ion. 35% verv	4	Щ	1
-	20.5				fine to coarse s	sand-sized, 10% fine g	ravel-sized, all	/1		-
-					carbonate			-/ -{		-
-								- 1		-
-								\dashv		-
-								- 4		-
-								- 1		-
-								- 4		-
30 12.5	30.0				Cond. Cilé (MI	`			ш	_
12.5				22-16-27	Sandy Silt (ML 30.0-31.0' - Sa	- <i>)</i> ime as 25.0-26.2'		- 4		_
_		1.0	SS-2	(43)				_	Ш	_
_	31.5							4		_
_										
_										Driller's Remark: Firm drilling, no chatter
								J		Driller's Remark: Easier drilling, no chatter
								_1		Driller's Remark: Trip out to begin HQ rock
					Begin Rock Co	oring at 34.0 ft bgs		\Box		\coring
35					See the next s	heet for the rock core lo	Jy	- 1		1
7.5								7		٦
								- 1		1
-								- 1		1
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40									\dashv	



PROJECT NUMBER: BORING NUMBER:

338884.FL B-30A

SHEET 3 OF 6

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.4 N, 458440.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, HQ tools, PW casing ORIENTATION : Vertical

				MENT . CIVIE 75 3/N 252437, Midd Totally, Fig 1001s, FVV C	<u>.</u>		ORIENTATION : Vertical
WATER	LEVELS: 6.0	ft bg	s on 6	/12/07 START : 6/12/2007 END : 6/	13/200	7 LOGGER : D. Thomas	
				DISCONTINUITIES	נח	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	1
H H	N. A. Y.	(%)	FRACTURES PER FOOT		윽	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
FAF	E STER	(%) 🛭	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,		WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
E-S-P	RNA	Ø	RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Z	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ООШ		ď	ш а	THIORNESS, SORI AGE STAINING, AND HOTTNESS	S	CHARACTERISTICS	
	34.0		1	34.05' - Fracture, <5 deg, rough, undulating,	ш	Limestone	Rock coring begins at 34'
25 -				tight -	1 H	- 34.0-37.5' - moderate yellowish	
35 7.5			0	34.1-34.3' - Fracture, sandy silt		_ brown, with lineations of gray to dark yellowish brown, (10YR 5/4, 10YR	_
'.5 _	R1-HQ				ш	- 4/2), fine grained, mild HCl reaction,	_
	3.5 ft	90	_		Н	weak (R2), 1/16-1/8" pebbles in	
-	100%		0	·	ш	matrix where gray, 20% 1/16" voids,	-
-				36.5' - Fracture, 0-20 deg, rough, undulating	Ш	- crumbles to silt to sand-sized	R1: 13 minutes
_			1		H	particles from 34.1-34.3', cavities up to 3/4" from 35.9-37.5'	-
	37.5					10 3/4 110111 33.9-37.5	
]	Ш	37.5-40.8' - Same as 34.0-37.5']
-			0	<u>-</u>	$\vdash \vdash \vdash$	except dark yellowish brown, (10YR	-
-				20 F 20 21 Freeture =	口	4/2), 30% voids up to 1/16" and 2" x	
_			2	38.5-39.3' - Fracture zone, bounded by horizontal to 20 deg rough and undulating -	Щ	1" cavities at 37.7', extremely weak - (R0) at 38.5-39.3', voids up to 3/16"	
			_	surfaces	Н	from 40.3-40.8'	
40	R2-HQ			39.4' - Fracture, rough, undulating, tight	口	_	1
40 2.5	5 ft	57	2		ш		_
2.5	66%		<u> </u>	40.2' - Fracture, 30 deg, rough, undulating	H	_	
			0		ᄇ	No Decement 40 9 42 51	
-				<u> </u>	ш	- No Recovery 40.8-42.5'	1
-			NR	-	Н	_	R2: 2 minutes
-				_		_	-
	42.5				Н		
					Ш	Limestone	
-			0	-		- 42.5-46.5' - dusky yellow, (5YR 6/4),	-
-				-	Н	fine grained, mild HCl reaction, very	_
l _			0	_	Н	weak (R1), 10% gray pebbles up to 1/4", 30% voids 1/16" with voids up	_
						to 3/16", many large voids are linear	
45	R3-HQ			· -	ш	_ , , ,	1
45 -2.5	5 ft	65	0	45.0' - Mechanical break	Ш		_
	80%			40.0 - Weenanical break		_	_
			2	45.8' - Fracture, 50 deg, rough, undulating,	Н		
			-	tight to healed	Ш	_	
-				46.1' - Fracture, 50 deg, rough, undulating,	П	_ No Recovery 46.5-47.5'	R3: 7 minutes
-			NR	tight to healed -	₽₩	-	-
_	47.5				Ш	_	
				47.01 Franking 75 da	\square	Limestone	
-			1	47.8' - Fracture, 75 deg, rough, undulating,	Н	 47.5-51.7' - dusky yellow to moderate yellowish brown, (5YR 6/4 to 10YR 	-
-			<u> </u>	stepped 48.5, 48.8' - Fractures (2), horizontal,	団	5/4), fine grained, moderate HCl	-
_			3	smooth, undulating, open	H	- reaction, strong (R4), very weak (R1)	-
					Н	from 48.5-48.3, 15-25% 1/16 voids	1
50	R4-HQ			49.45' - Fracture, horizontal, smooth,	ш	decreasing to 5-10% below 49.5'	I -
-7.5	5 ft	75	0	undulating, open —	╁┼┤		
-	84%			-	╀┤	_	_
				50.6' - Mechanical break, 10 deg, rough,	Ш		SC-1 collected at 50.6-
			1	undulating, tight	$\vdash\vdash\vdash$		51.7'
-				·	Н		R4: 8 minutes
-			NR	-	口	No Recovery 51.7-52.5'	_
_	52.5		1417]	Н	_	
			آ _م ا		Н	Limestone	
-			3	53.0-54.4' - Fracture or bedding plane,	Ш	 52.5-53.0' - Same as 47.5-51.7' except with 1/16" voids increasing to 	1
-			-	horizontal, rough, undulating, multiple	╂┼┤	25%	
L				fractures	H	2070	
							1

APPENDIX 2BB-673

Rev. 7



PROJECT NUMBER: BORING NUMBER:

338884.FL B-30A

SHEET 4 OF 6

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.4 N, 458440.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, HQ tools, PW casing ORIENTATION : Vertical

WATER	LEVELS : 6.0	ft bg	s on 6	/12/07 START : 6/12/2007 END : 6/	13/20	07 LOGGER : D. Thomas	
≥ ∩ ∷	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	TH.	(%) 🛭	E CO	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	۵	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EPT URF LEV	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	×₩Β	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	02.5	œ	6	THICKNESS, SURFACE STAINING, AND HIGHTNESS	Ś		
_						Limestone - 53.0-54.1' - dusky yellow to moderate	_
55	R5-HQ 5 ft	50	0	_	╨	yellowish brown, (5YR 6/4 to 10YR	
-12.5	80%	00			ፗ	5/4), extremely weak (R0), increasing to very weak (R1) with depth,	Driller's Remark: Softer drilling at 52.5-57.5'
			1	55.65' - Mechanical break, 10 deg, smooth,	Н	horizontal laminations/bedding	compared to previous
			'	planar		planes 1/16" thick, often fractured	
				56.4' - Mechanical break, 60 deg	T	 along organic rich zones, some infilled with silts and clays 	R5: 3 minutes
-	57.5		NR		╨	54.1-56.5' - Same as 52.5-53.0'	1
-	07.0			57.6-57.9' - Fracture or bedding plane,	口	 except with increasing voids to 30-40% with depth 	1
-			2	horizontal, multiple fractures/bedding planes,		No Recovery 56.5-57.5'	1 1
-				infill of clay along one fracture 58.5' - Fracture, 40 deg, rough, undulating,	仠	- Limestone 57.5-60.3' - Same as 52.5-53.0'	-
-			3	low angle, fracture through undulating wavy	片	except strong HCl reaction, few	-
-	R6-HQ			zone (3/4") of dark black organics (lignite)	╀┼	organic laminations (minor)	1
60 <u> </u>	5 ft	47	5	organics clayey and "forky" on fracture surface —	圧	throughout, extremely weak to very weak (R0 to R1) and easily broken at	-
-17.5	92%			59.3-60.1' - Bedding plane, multiple fractures		_ 59.1-60.2,	1 -
_			2	60.1' - sharp discontinuity between silty limestone material with organic and medium	\vdash	60.3-61.0' - light olive gray, (5YR 5/2), very fine grained, strong HCl	l
_				dark gray dense limestone		reaction, strong (R4), 1-2" angular	Driller's Remark: Loss of water at 61.0'
			1	60.4-60.9' - Fracture, limestone fragments	╟	fragments, 5% voids (1/16")	R6: 13 minutes
	62.5		NR	60.9' - Fracture or mechanical break, 75 deg, rough, undulating, semi-planar	\Box	61.0-62.1' - yellowish gray, (5Y 7/2), very fine grained, strong HCl	
				61.0' - Fracture, 60 deg, rough, undulating	Ш	reaction, strong (R4), 5% voids	1
			1	63.0' - Mechanical break, vertical, rough, non	Н	(1/16") increasing with depth to 25% with depth, several 1/4" voids	1
-				planar 63.6' - Fracture, 35 deg, rough, undulating,	Ħ	No Recovery 62.1-62.5'	SC-2 collected at 63.6-
-			2	semi-planar		 Limestone 62.5-67.5' - yellowish gray, (5Y 7/2), 	64.9'
65	R7-HQ			63.7' - Mechanical break, horizontal, rough, undulating	╨	moderate to strong HCl reaction,	1
-22.5	5 ft	43	0	undulating	世	— medium strong (R3), shallow 1/16"	
-	100%				+	voids over 5%, some irregular black laminations, dark yellowish brown	1 -
-			0	65.8' - Fracture, horizontal, carbonate silt,	F	 (10YR 4/2) and extremely weak (R0) 	1 -
-				friable	亡	at 65.8-65.9', extremely weak (R0) to weak (R1) from 65.9-67.5',	R7: 4 minutes
-			1	66.8' - Fracture, 50 deg, rough, undulating,	╀	- increasingly competent with depth	-
-	67.5			semi-planar fracture	\Box	67.5.71.51 dark vallewich brown	-
			2	67.5-67.7' - Fracture zone, horizontal, rough, undulating	口	67.5-71.5' - dark yellowish brown, - (10YR 4/2), fine grained, moderate	-
				68.3' - Fracture, horizontal	_	HCl reaction, extremely weak to very]
			3	68.8, 68.95, 69.3, 70.0' - Bedding plane,	片	weak (R0 to R1), friable, increasing - % of 1/16" voids (up to 40%) at]
			Ŭ	horizontal, organics	片	68.7-71.7', fine organic laminations	l J
70	R8-HQ 5 ft	70	1	00015 1 101	$oldsymbol{\perp}$	at 69.4' and 70.3'	
-27.5	5 π 100%	70		69.9' - Fracture, 10 deg, rough, undulating, — open	口		7
1				· ·	1—		1
			1	70.9' - Fracture, friable, open	F	74 5 79 51	1
				71.5-71.7' - Fracture zone, friable	岸	- 71.5-72.5' - Same as 67.5-71.5' except light olive gray, (5Y 5/2),	R8: 10 minutes
-	72.5		2		╨	except light olive gray, (5Y 5/2), moderate HCl reaction, weak (R2),	1 1
-	72.5				仜	small 1/16" voids decrease to 5%, also several 1/2" voids to cavities	-
-			1	72.9' - Fracture, 30 deg, rough, undulating,	\vdash	- Voids to davities	-
-				includes several 1/2 to 1" elongated cavities	F	-	-
					屵		
\Box							



PROJECT NUMBER: BORING NUMBER:

338884.FL B-30A

SHEET 5 OF 6

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.4 N, 458440.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, HQ tools, PW casing

ORIENTATION : Vertical

WATERI	LEVELS: 6.0	ft bgs	s on 6/	12/07 START : 6/12/2007 END : 6/	13/200	D7 LOGGER : D. Thomas	
≥∩≘	- ©			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H H H	E F F	(%) Q	F.0	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ا کر ا	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FPT FV	NG CO	αD	AC.	PLANARITY, INFILLING MATERIAL AND	ΜB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
SE	SHR	S.	FH	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	BROFG, TEOT REGGETG, ETG.
			0		Ш	Limestone	
75	R9-HQ			74.6, 74.8, 75.1, 75.3' - Fractures (4),	ш	 72.5-78.0' - light olive gray, (5Y 5/2), fine grained, strong HCl reaction, 	1
-32.5	5 ft 100%	70	4	horizontal, rough, undulating, open	Н	weak to medium strong (R2 to R3),	1
-	100 /0		-		口	- shallow 1/16" voids over 5%, 1/2" to	-
-			2	75.7-75.9' - Fractures (2), horizontal and vertical, rough, undulating to stepped,	Н	1" cavities, numerous small (1/8") casts/molds, extremely weak (R0)	-
-			-	silt-sized infilling	口	 silt-sized carbonate material and 	R9: 9 minutes
4			3	76.6' - Fracture, 50 deg, rough, undulating	Н	trace organics at 74.6-75.3', fewer large cavities at 75.3-77.5'	K9. 9 millutes
	77.5			77.3' - Fracture, horizontal and 60 deg,	口	large cavilles at 75.3-77.5	_
			3	rough, stepped	Н		
				77.5' - Fracture, horizontal, smooth,	Ш	78.0-78.5' - moderate yellowish	1
				undulating 77.6' - Fracture, horizontal, smooth,		 brown, (10YR 5/4), moist, mild HCl reaction] 1
			1	undulating, tight	冂	78.5-82.1' - moderate yellowish	1
	R10-HQ		$\vdash \vdash \vdash$	78.0-78.5 - angular fragment 1/2" with fines infilled		brown, (10YR 5/4), fine grained,	-
-37.5	5 ft	53	0	79.2' - Fracture, 30 deg, rough, undulating,	ш	strong HCl reaction, medium strong (R3), 20% 1/16" voids, fossiliferous	
-	92%		-	tight, 1/16" relief	田	with some cavities up to 1/2"	-
			2	80.0-80.2' - Mechanical break 80.9' - Fracture, 20 deg, rough, undulating,	Н	_	_
				3/8" relief	片	_	_
			1	81.4, 81.9' - Fractures (2), horizontal and 40	Н		R10: 6 minutes
1 7.	82.5		NR	deg, rough, angular fragments to 1-1/2", open	Ш	No Recovery 82.1-82.5']
l Ť	02.0				\vdash	Limestone	1 1
-			2	83.1' - Fracture, 75 deg, rough, undulating		- 82.5-86.6' - moderate yellowish	-
-			\vdash	83.2' - Fracture, 10 deg, rough, undulating,	╀┤	brown, (10YR 5/4), fine grained, moderate HCl reaction, medium	-
-			0	organics	Ш	 strong (R3), 25% 1/16" voids, many 	-
-	D11 110		-		団	up to 1/4" cavities and 1" cavities with mold at 83.8'	Driller's Remark: Rods
85	R11-HQ 5 ft	53	3	84.8, 85.1' - Fractures (3), rough, undulating,	H		dropped at 84.5-85.5'
-42.5	82%			1/16" thick, organic laminations		_	
			ا ۾ ا	84.9' - Fracture, 30 deg	Н		
			3	86.0' - Fracture, 75 deg, rough, undulating,	ш		Driller's Remark: Losing
1 7			-1	minor black/gray staining on fracture surface 86.3, 86.4' - Fractures (2), horizontal, rough,	Н	No Recovery 86.6-87.5'	fluid at 86.0-87.5' - R11: 10 minutes
1 1,	07.5		NR	undulating	П	-	Driller's Remark: Rods
†	87.5		$\vdash \vdash \vdash$	07.71.5		_ Limestone	dropped at 87.5-87.9', rods
-			1	87.7' - Fracture, horizontal, rough, undulating	Щ	- 87.5-88.7' - Same as 82.5-86.6'	dropped before drilling _
-			2	88.5' - Fracture, horizontal, rough, undulating,	丗	except yellowish gray, (5Y 7/2), with voids up to 1/4" diameter over 10%	-
-				iron staining	+	- and many up to 3/4" cavities (still	-
	_			88.6' - Fracture, horizontal, rough, undulating		10% small voids), rock becomes	
90	R12-HQ 5 ft	13		_	HH	fractured at 88.5', fragments covered with fine grained material, no	
-47.5	24%	10			Ш	sediment infilling in molds/cavities	
			NR		H	No Recovery 88.7-93.5'	Driller's Remark: Rods
					\Box	_	dropped at 90.5-92.5' -
					╆	_	R12: 2 minutes
-					μЦ	_	Driller's Remark: Difficulty
+	92.5		$\vdash \vdash \vdash$		団	_	setting core barrel due to -
-			NR		╂┼┦	_	sediment in drill pipe
			\square	00.5.04.51.5		- -]
			$\sqcup \sqcup$	93.5-94.5' - Fracture, traces of lignite	\bowtie		
					ш		1



PROJECT NUMBER: BORING NUMBER:

338884.FL **B-30A**

SHEET 6 OF 6

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723272.4 N, 458440.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, HQ tools, PW casing ORIENTATION: Vertical WATER LEVELS: 6.0 ft bas on 6/12/07 START: 6/12/2007 LOGGER : D. Thomas END: 6/13/2007

WATER	LEVELS: 6.0	0 ft bgs on 6/		12/07 START : 6/12/2007 END :	6/13/20	007 LOGGER : D. Thomas	
≥∩ ∵	_ ()			DISCONTINUITIES	ق	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
95_ -52.5	R13-HQ 5 ft 80%	45	>10 0	94.7' - Fracture, 10 deg, rough, undulating, open		Limestone - 93.5-97.5' - yellowish gray, (5Y 5/2), fine grained, strong HCl reaction, very weak (R1), weakly cemented, friable, voids 1/16" over 10%,	Driller's Remark: Logged hole before starting at 93.5' (6 inches past where previous run ended)
-			3	96.0, 96.2, 96.3' - Fractures (3), horizontal and 50 deg, rough, undulating, open		fossiliferous with voids/cavities from 1/4" to 1/2"	R13: 1 minute
-	97.5		1	97.0' - Fracture, 45 deg, rough, undulating, open 97.5-97.8' - Fracture, angular 1"-2" fragment 97.9' - Fracture, 50 deg, rough, undulating		97.5-100.2' - Same as 93.5-97.5' except 1/16" voids increase to 15%, unconsolidated, silt-sized, carbonate	- - -
- 100_	R14-HQ 5 ft	28	2 5	98.9' - Fracture (2), 40 deg and vertical, rough, undulating 99.4-100.0' - Fracture zone, horizontal and		material at 100.0-100.2'	- - -
-57.5 	54%	20	NR	vertical, non planar, friable		No Recovery 100.2-105.1'	- R14: 1 minute
-	102.5					-	- - -
	R15-HQ		NR			 - - - -	- -
105 -62.5 - - -	5 ft 48%	22	>10	105.1-105.8' - Fracture zone 105.7' - Fracture, horizontal, rough, undulating, tight 106.3' - Fracture, horizontal, open, does not fit together		Limestone 105.1-108.7' - pale greenish yellow, yellowish gray, (10Y 8/2, 5Y 7/2), strong HCl reaction, no voids except for one 1/10" fossil mold, extremely	
-	107.5		2	in together		weak (R0) and friable at 105.8-106.3', very weak (R1) and friable with several elongate fossil molds at 106.3-108.7'	-
- 110 -67.5	R16-HQ 5 ft	38	2			108.7-110.8' - light olive gray, (5Y 5/2), fine grained, no to mild HCl reaction, medium strong (R3), 5% voids (1/16" in size), less consolidated (R1) at fractures from	- -
-	100%		>10			- 110.0-110.4' at fractures - 110.8-112.3' - Same as 108.7-110.8' except friable and broken 112.3-112.5' - Same as 108.7-110.8'	- R16: 6 minutes
-	112.5		>10			- except with several elongate fossils Bottom of Boring at 112.5 ft bgs on - 6/13/2007	-
					+		



LNP- 0	Offest Bor	ring Prog	ram			LOG OF BORING NO. B-31		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	HE.	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	:ILE	COORDINATES N 1724391.9 E 457978.0	SYMBOL	
EET	DEPTH (FEET)	MPL	2W/6 R % (R(COVE	PROFILE	SURFACE EL: 43.4		REMARKS
E E		AS Q	BLO	REC		DESCRIPTION	nscs	
	0 -	S-1	1-2 2 (4)	0.9		0-1.5' POORLY GRADED SAND (sp), rounded, spherical, no plasticity, no dry strength, no dilatancy, no toughness, minor amount of organics (black), no odor, no reaction to 1N HCl, fine grained, wet, pale brown (5YR 5/2), very loose.	sp	Drillers using NWJ rods.
	2 	S-2	1-2 4 (6)	0.9		1.5-3.0' POORLY GRADED SAND (sp), grayish orange (10YR 7/4), rounded, spherical, fine grained, no plasticity, no dry strength, no dilatancy, no cementation, homogeneous sand, very loose, no toughness, wet, no reaction to 1N HCI.	sp	
	4 —	S-3	3-5 3 (8)	0.8		3.0-4.5' As above except with a root (organic), loose.	sp	Picture mislabeled: Labeled S-2 in pictures instead of S-3.
	- - -	S-4	3-3 6 (9)	1.0		4.5-6.0' As above except moderate brown (5YR 3/4) with a root (organic), loose.	sp	
	6 	S-5	3-3 4 (7)	0.7		6.0-7.5' As above except grayish brown (5YR 3/2), loose.	sp	
	8	S-6	4-4 6 (10)	0.8		7.5-9.0' As above except grayish orange pink (5YR 7/2), loose.	sp	
	10 —	S-7	4-6 7 (13)	0.9		9.0-13.5' As above except medium dense.	sp	
	- - -	S-8	6-7 8 (15)	0.9			sp	
	12 	S-9	5-8 8 (16)	1.0			sp	
	 14	S-10	5-7 7 (14)	1.0		13.5-16.5' As above except grayish orange pink (5YR 7/2), weak reaction to 1N HCI.	sp	
DATE FIELD	DATE STARTED: 10/15/09 DATE COMPLETED: 10/18/09 FIELD GEOLOGIST: WDS CHECKED BY: JLO				GWL: D GWL: D DRILLII		NOTE	ES: Energy Testing completed with NWJ and AWJ rods on 10/15/09.
_	OVED BY: ING CO.:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- 0	Offest Bo	ring Prog	ram			LOG OF BORING NO. B-31		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	F.C	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	E E	COORDINATES N 1724391.9 E 457978.0	SYMBOL	
EVAT	DEPTH (FEET)	MPLE	1.0%/6" 2.0%/6" 3.0%/6"	OVE	PROFILE	SURFACE EL: 43.4	SSY	REMARKS
EL (FE		SAI	BLC	REC		DESCRIPTION	nscs	
	16 —	S-11	4-6 8 (14)	0.9			sp	
	_ _ _	S-12	4-8 7 (15)	0.9		16.5-21.0' As above except pale yellowish brown (10YR 6/2), weak reaction to 1N HCl.	sp	
	18 —	S-13	7-8 9 (17)	0.9			sp	
	20 —	S-14	8-9 12 (21)	0.9			sp	
	22 —	S-15	6-7 7 (14)	1.1		21.0-25.5' As above except no reaction to 1N HCI.	sp	
	- - -	S-16	6-6 6 (12)	0.9			sp	
	24 —	S-17	8-6 7 (13)	1.0			sp	
	26 — -	S-18	8-8 9 (17)	0.9		25.5-27.0' As above except grayish brown (5YR 3/2) changing to pale yellowish brown (10YR 6/2) at bottom, weak reaction to 1N HCl.	e sp	
	28 —	S-19	7-7 9 (16)	1.3		27.0-30.0' As above except pale yellowish brown (10YR 6/2), no reaction to 1N HCI.	sp	Picture is mislabeled 27 29.5'.
DATE	- -		8-10		014#	SEPTILL AND DATE TIME AND AND AND AND AND AND AND AND AND AND	sp	-0. F
DATE FIELD	DATE STARTED: 10/15/09 DATE COMPLETED: 10/18/09 FIELD GEOLOGIST: WDS CHECKED BY: JLO				GWL: D GWL: D DRILLIN		NOTE	ES: Energy Testing completed with NWJ and AWJ rods on 10/15/09.
	OVED BY ING CO.:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- C	Offest Boi	ring Prog	ram			LOG OF BORING NO. B-31		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	H.E.	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1724391.9 E 457978.0	SYMBOL	
EVAT	DEPTH (FEET)	MPLE	3 % F RG	OVE	PROFILE	SURFACE EL: 43.4		REMARKS
E (FI		SA	BLC	REC		DESCRIPTION	nscs	
	_	S-20	9 (19)	1.1				
	30 —	S-21	7-9 9	1.4		30.0-31.5' As above except pale yellowish brown (10YR 6/2) to light gray (N7).	sp	
	_	021	(18)	1				
	32 	S-22	8-9 10 (19)	1.0		31.5-33.0' As above except very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2), no reaction to 1N HCl.	sp	
	34 —	S-23	8-9 11 (20)	1.3		33.0-34.5' As above except pale yellowish brown (10YR 6/2), no reaction to 1N HCl.	sp	
	- - -	S-24	6-6 3 (9)	1.0		34.5-37.5' As above except very pale orange (10YR 8/2) to grayish orange (10YR 7/4), no reaction to 1N HCI.	sp	Driller switches to AWJ rods.
	36 	S-25	4-2 3 (5)	1.4			sp	
	38 	S-26	3-3 3 (6)	1.3		37.5-39.0' POORLY GRADED SAND (sp), very fine grained with very fine grain black grains, rounded, spherical, non-plastic, no dry strength, slow dilatancy, no toughness, no odor, wet, no reaction to 1N HCl, homogeneous, no cementation, very pale orange (10YR 8/2) with medium gray (N5), very loose to loose.	'	
	40 —	S-27	3-2 2 (4)	1.5		39.0-40.5' Same as 34.5-37.5', very pale orange (10YR 8/2), no reaction to 1N HCl	sp	
	- - -	S-28	4-4 3 (7)	1.2		40.5-42.0' As above except with medium dark gray (N4).	sp	
	42 	S-29	4-3 5 (8)	1.5		42.0-43.5' As above except very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2), loose.	sp	Picture mislabeled: shows S-2 instead of S-29.
	_					43.5-45.0' As above except very pale orange (10YR 8/2) with mediun	n sp	Driller switched back to NWJ rod.
DATE FIELD	L STARTED COMPLE GEOLOG KED BY:	TED: 10	os		GWL: D GWL: D DRILLII	9	<u>I</u> Note	ES: Energy Testing completed with NWJ and AWJ rods on 10/15/09.
APPRO	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- C	Offest Boi	ring Prog	ram			LOG OF BORING NO. B-31		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	Ē.	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	=ILE	COORDINATES N 1724391.9 E 457978.0	SYMBOL	
EV.	DEPTH (FEET)	MPL	2W/6 8 % (R)	SOVE	PROFILE	SURFACE EL: 43.4	SS SS	REMARKS
		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	B.O	REC		DESCRIPTION	USCS	
	44 —	S-30	4-4 5 (9)	1.4		dark gray (N4), weak reaction to 1N HCl.		
	46 —	S-31	5-6 6 (12)	1.2		45.0-46.5' As above except pale yellowish brown (10YR 6/2) with medium gray (N5), weak reaction to 1N HCl, medium dense.	sp	
	_	S-32	5-5 5 (10)	1.2		46.5-48.0' As above except grayish orange (10YR 7/4) with some medium gray (N5), no reaction to 1N HCl, loose.	sp	
	48 —					48.0-54.0' As above except pale yellowish brown (10YR 6/2), medium dense.	n sp	
	- -	S-33	5-5 6 (11)	0.8			sp	
	50 — –	S-34	5-7 7 (14)	0.9				
	52 	S-35	5-6 6 (12)	0.8			sp	
	- -	S-36	5-5 7 (12)	1.0			sp	
	54 — _	S-37	6-6 5 (11)	1.5		54.0-55.5' As above except grayish orange (10YR 7/4) with medium light gray (N6) bands, no reaction to 1N HCl, medium dense.	sp	
	- 56 —		4-5			55.5-58.5' As above except with medium dark gray (N4).	sp	
	-	S-38	5 (10)	1.5			sp	
	- 58 —	S-39	4-5 5 (10)	1.5				
DATE FIELD	STARTED COMPLE GEOLOG KED BY:	TED: 10	os		GWL: D GWL: D DRILLIN	_	NOTE	S: Energy Testing completed with NWJ and AWJ rods on 10/15/09.
APPRO	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- C	Offest Bor	ing Prog	ram			LOG OF BORING NO. B-31		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724391.9 E 457978.0 SURFACE EL: 43.4	USCS SYMBOL	REMARKS
— Э.		<i>⊗</i> 0	B O	R	,	DESCRIPTION 58.5-61.5' As above except very pale orange (10YR 8/2) to grayish	SD Sp	
	60 —	S-40	5-5 6 (11)	1.3		orange (10YR 7/4).		
		S-41	4-5 5 (10)	1.3			sp	
	62 —	S-42	4-5 5 (10)	1.1		61.5-63.0' As above except grayish orange (10YR 7/4) with light gray (N7) bands.	sp	
	64 —	S-43	5-5 6 (11)	1.1		63.0-66.0' POORLY GRADED SAND (sp), fine grained, subrounded to rounded, spherical, non-plastic, no dry strength, no dilatancy, no toughness, no odor, wet, no reaction to 1N HCl, no cementation, homogeneous, very pale orange (10YR 8/2) to grayish orange (10YR 7/4), medium dense.	sp	Water level 10/16/09 @ 0800 6.1'.
	-	S-44	5-5 6 (11)	1.0			sp	
	66 — _ _	S-45	4-4 5 (9)	1.2		66.0-67.5' As above except with medium light gray (N6) bands.	sp	
	68 — 	S-46	3-3 2 (5)	1.4		67.5-69.0' As above except very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2).	sp	
	70 —	S-47	3-3 3 (6)	1.5		69.0-70.5' As above except with medium gray (N5) bands.	sp	
	- -	S-48	3-3 4 (7)	1.2		70.5-72.0' As above except very pale orange (10YR 8/2) with mediun gray (N5) bands.	n sp	
	72 — –	S-49	2-3 2 (5)	1.5		72.0-73.5' As above except with fine black (N1) grains.	sp	
DATE (DATE STARTED: 10/15/09 DATE COMPLETED: 10/18/09 FIELD GEOLOGIST: WDS CHECKED BY: JLO				GWL: D GWL: D DRILLIN		NOTE	ES: Energy Testing completed with NWJ and AWJ rods on 10/15/09.
	OVED BY: NG CO.:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- C	Offest Boi	ring Prog	ram			LOG OF BORING NO. B-31		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	TH ET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724391.9 E 457978.0	SYMBOL	DEMARKS
LEV/	DEPTH (FEET)	AMPL R RU	OW/R & (R	SOVE	PRO	SURFACE EL: 43.4	S S	REMARKS
∃ ()		<i>\s</i> 10	BLO	RE		DESCRIPTION	nscs	
-30.1	 74 -	S-50	2-1 1 (2)	0.1		73.5-75.0' FAT CLAY (ch), very soft, high plasticity, slow dilatancy, medium toughness, high dry strength, wet, no reaction to 1N HCl, homogeneous, with fine sand and coarse gravel, moderate yellowish brown (10YR 5/4), very soft.	CII	
-31.6	- 76 —	S-51	1-1 1 (2)	1.3		75.0-76.5' POORLY GRADED SAND (sp), as at 72.0-73.5', very loose.	'- sp	
	- - -	S-52	2-3 3 (6)	1.5		76.5-79.5' As above except very pale orange (10YR 8/2) to pale yellowish orange (10YR 6/2).	sp	
	78 — –	S-53	1-2 2 (4)	1.5			sp	
	80 	S-54	1-1 1 (2)	1.3		79.5-84.0' As above except moderate yellowish brown (10YR 5/4), trace silt.	sp	
	82 —	S-55	2-2 1 (3)	1.5			sp	
	- -	S-56	2-2 1 (3)	1.5			sp	
	84 — - -	S-57	1-1 2 (3)	1.5		84.0-85.5' As above except moderate yellowish brown (10YR 5/4) with medium gray (N5) bands, trace silt.	sp	
	86 — -	S-58	WOR-1 1 (2)	1.5		85.5-87.0' As above except moderate yellowish brown (10YR 5/4), trace silt.	sp	
	-		WOR- WOR			87.0-88.5' As above except with medium gray (N5) bands.	sp	
DATE (DATE STARTED: 10/15/09 DATE COMPLETED: 10/18/09 FIELD GEOLOGIST: WDS CHECKED BY: JLO				GWL: D GWL: D DRILLIN		NOTES	S: Energy Testing completed with NWJ and AWJ rods on 10/15/09.
	OVED BY: ING CO.:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG: F	ailing 1500



LNP- C	Offest Bo	ring Prog	ram			LOG OF BORING NO. B-31		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	F C	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1724391.9 E 457978.0	SYMBOL	
EVAT	DEPTH (FEET)	MPLE	7 % F RQ	OVE	PROFILE	SURFACE EL: 43.4		REMARKS
<u> </u>		SA	BLC OF	REC		DESCRIPTION	nscs	
	88 —	S-59	1 (1)	1.5		88.5-90.0' As above except moderate yellowish brown (10YR 5/4).	sp	
	90 —	S-60	WOH- WOH WOH (0)	1.5		90.0-91.5' As above except pale yellowish brown (10YR 6/2), trace	sp	
	-	S-61	1-2 2 (4)	1.3		silt.	Sp	
	92 	S-62	1-1 2 (3)	1.2		91.5-93.0' As above except moderate yellowish brown (10YR 5/4) to pale yellowish brown (10YR 6/2) and medium gray (N5) bands, trace silt.	sp	
	94 —	S-63	3-3 4 (7)	1.5		93.0-94.5' As above except moderate yellowish brown (10YR 5/4), trace silt, loose.	sp	
	-	S-64	WOH- WOH WOH (0)	1.5		94.5-96.0' As above except moderate yellowish brown (10YR 5/4), with trace of medium gray (N5), very loose.	sp	Rod advanced additional 8" before helper could stop it.
	96 — -	S-65	WOH- WOH WOH (0)	0.9		96.0-99.0' As above except with medium dark gray (N4) bands, trace silt and coarse gravel (angular, hard), no reaction to 1N HCl, dark gray (N3).	sp	
	98 	S-66	WOH- WOH 1 (1)	1.0			sp	
	100 —	S-67	5-7 8 (15)	1.5		99.0-100.5' As above except moderate yellowish brown (10YR 5/4) and medium light gray (N6), trace silt, medium dense.	sp	
-57.1	-	S-68	1-4 6 (10)	1.1		100.5-103.5' POORLY GRADED SAND with SILT (sp-sm), fine grained sand, subrounded, spherical, low plasticity, low dry strength, no dilatancy, low toughness, no odor, wet, no reaction with 1N HCl, soft, laminated, weak cementation, olive gray (5Y 4/1) and moderate yellowish brown (10YR 5/4), medium dense.	sp- sm	Water level 10/17/09 @ 0750 0.0'
	102 —					your mount (10 117 0/4), modum dense.	sp-	
DATE STARTED: 10/15/09 DATE COMPLETED: 10/18/09 FIELD GEOLOGIST: WDS CHECKED BY: JLO					GWL: D	<u> </u>	NOTE	ES: Energy Testing completed with NWJ and AWJ rods on 10/15/09.
APPRO	OVED BY NG CO.:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- (Offest Bor	ing Prog	ram			LOG OF BORING NO. B-31		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	ОЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724391.9 E 457978.0 SURFACE EL: 43.4 DESCRIPTION	USCS SYMBOL	REMARKS
-65.1 -66.1	104— 106— 108— 1110— 1112— 112—	S-69 S-70 S-71 S-72 S-73 S-74 S-75	NOTB 2-2 5 (7) 3-5 6 (11) 3-7 8 (15) 1-2 3 (5) 1-2 2 (4) WOH-2 (4) WOH-WOH WOH WOH WOOH	1.0 1.0 0.9 1.2 1.5	NNN NN		sp-sm	
	114 — — — — — — — — — — — — — — — — — —	S-77 S-78	WOR- WOR (0) WOR- WOR WOR (0)	1.5		114.0-118.0' As above except medium dark gray (N4).	ch	Advanced another 6" before helper stopped rod. Shortened sampled due to previous test. Driller sets casing to 115.0'.
DATE STARTED: 10/15/09 DATE COMPLETED: 10/18/09 FIELD GEOLOGIST: WDS CHECKED BY: JLO					GWL: D GWL: D DRILLIN		NOTE	ES: Energy Testing completed with NWJ and AWJ rods on 10/15/09.
APPRO	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- C	Offest Bor	ina Proa	ram					PROJECT NO. 07-3935
						LOG OF BORING NO. B-31		
ELEVATION (FEET MSL)	Ħ(SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)		COORDINATES N 1724391.9 E 457978.0	SYMBOL	
EVA'	ОЕРТН (FEET)	MPLE RUN	DW/6' R % F & (RC	COVE	PROFILE	SURFACE EL: 43.4		REMARKS
		S. O.	BL(REC		DESCRIPTION	nscs	
-74.6	118 —	S-79	WOR- WOR WOR (0)	1.3		118.0-118.5' POORLY GRADED SAND with SILT (sp-sm), subrounded to rounded, spherical, fine grained, non-plastic, no dry	sp- sm	
	- -	S-80	WOR- WOR WOR (0)	1.3	1000 0 0 1 1000 0 0 1 1000 0 0 0 1000 0 0 0	strength to low dry strength, no dilatancy, low toughness, no odor, wet, no reaction to 1N HCl, homogeneous, no cementation, pale yellowish brown (10YR 6/2), very loose. 118.5-120.0' As above except moderate yellowish brown (10YR 5/4).		
	120 	S-81	WOR- WOR WOR (0)	1.5		120.0-123.0' As above except with medium dark gray (N5) bands.	sp- sm	
	122 	S-82	WOR- WOR WOR (0)	0.4			sp- sm	
	- 124 	S-83	WOR- WOR WOR (0)	1.0		123.0-124.5' As above except moderate yellowish brown (10YR 5/4).	sp- sm	
	<u> </u>	S-84	WOR- WOR WOR	0.5	1 4 2 2 2 2 2 1 1 4 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	124.5-127.0' As above except very pale orange (10YR 8/2).	sp- sm	
	126 	S-85	(0) WOR- WOR	0.0	1000 0 0 1 1000 0 1 1000 0 1 1000 0 1 1000 0 1		sp- sm	
-83.6 -84.1	- 128 	3-00	WOR (0) WOR-	0.9		127.0-127.5' SILT (ml), low to medium plasticity, medium dry strength, slow dilatancy, medium toughness, organics but no odor, wet, no reaction to 1N HCl, mottled, grayish black (N2), very soft.		
	- - -	S-86	WOR WOR (0)	0.6		127.5-129.0' POORLY GRADED SAND with SILT as at 124.5-127.0'.		
	130 —	S-87	WOR- WOR WOR (0)	0.7		129.0-130.5' As above except with light gray (N7) bands.	sp- sm	
		S-88	WOR- WOR 12 (12)	0.4		130.5-132.0' As above except with trace organics-brownish black (5YR 2/1).	sp- sm	
DATE FIELD	DATE STARTED: 10/15/09 DATE COMPLETED: 10/18/09 FIELD GEOLOGIST: WDS CHECKED BY: JLO					EPTH: 6.1' DATE/TIME: 10/16/09 @ 0800 EPTH: 4.9' DATE/TIME: 10/18/09 @ 1300 NG METHOD: Mud Rotary/Continuous SPT/PQ3Coring	NOTE	S: Energy Testing completed with NWJ and AWJ rods on 10/15/09.
	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG: I	Failing 1500



LNP- Offest Boring Program PROJECT NO. 07-3935										
						LOG OF BORING NO. B-31				
ELEVATION (FEET MSL)	TH ET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	:ILE	COORDINATES N 1724391.9 E 457978.0	SYMBOL			
EVA EET	DEPTH (FEET)	MPL R RUI	DW/6 R % R (R(OVE	PROFILE	SURFACE EL: 43.4		REMARKS		
		SA OF	BLO	REC		DESCRIPTION	nscs			
-89.0	132 —	S-89	40-50/2 (50)	0.5		132.0-132.4' As above except dark yellowish brown (10YR 4/2).	sp- sm			
	- 134 -	R-1	78% (39%)	1.8		TOP OF AVON PARK FORMATION 132.4-132.7' DOLOMITE, degraded, fine grained, medium to high plasticity, slow dilatancy, low toughness, no odor, moist, strong reaction to 1N HCI, firm consistency, homogeneous, weak cementation. 132.7-133.8' DOLOMITE, soft, moderately weathered, unfractured, yellowish gray (5Y 8/1), thick bedded, strong reaction to 1N HCI. 133.8-135.0' DOLOMITE, moderately hard, very slightly weathered, laminated, strong reaction to 1N HCI when powdered, yellowish gray (5Y 8/1), very slightly fractured (bedding planes).		Run-1 Drilling Pressure: 350 psi Kelly Bar RPM: 200 Engine RPM: 1200-1300 Drill Time: 5min 22sec Circulation loss: none 0.3' of fall-in material at top of core. Water level 10/18/09 @ 0800 1.5'.		
	136 — —	R-2	100%	5.0		135.0-135.5' DOLOMITE, soft to moderately soft, severely weathered homogeneous, weak reaction to 1N HCl, yellowish gray (5Y 8/1), intensely fractured. 135.5-137.2' DOLOMITE, moderately hard, slightly weathered, slightly pitted (pits filled with medium gray (N5) dolomite), slightly fractured (135.8', 136.6', 136.8' horizontal), yellowish gray (5Y 8/1). 137.2-140.2' DOLOMITE, moderately hard, moderately weathered, pitted, vuggy (vugs filled with severely weathered dolomite-yellowish		10-18-09, GWL at 1.5 bgs at 0800. Run-2: Drilling Pressure: 400-350 psi Kelly Bar RPM: 198 Engine RPM: 1200-1300 Drill Time: 3min 44sec (135.0-135.5') Driller pulls out due to jammed core barrel 4.5' of lose sand in core, above 135', due to fall in. Drill Time: 27min 46sec (135.5-		
	138 — — — — —					gray (5Y 7/2)), moderately to intensely fractured, light gray (N7), think laminated.	ý	140') Driller Notes: circulation loss at 137.0'.		
	142 —	R-3	98% (50%)	4.9		140.2-141.2' DOLOMITE, hard, fresh, strong reaction to 1N HCl, very light gray (N8), very slightly fractured, thinly laminated. 141.2-143.2' DOLOMITE, soft, moderately weathered, stains in fractures, intensely fractured (possible vertical fracture from, 141.2-142.5'), strong reaction to 1N HCl when powdered, thinly laminated, yellowish gray (5Y 7/2).		Drilling Pressure: 350-300 psi Kelly Bar RPM: 203 Engine RPM: 1200-1300 Drill Time: 8min 29sec (140.0-141.3') Drill Time: 8min 34sec (141.3-144.0') Drill Time: 5min 18sec (144-145') Circulation loss: 100%		
	144 — — —					143.2-145.5' DOLOMITE, hard, very slightly fractured (horizontal fracture at 143.9'), weak reaction to 1N HCI, moderate reaction when powdered, laminated, yellowish gray (5Y 8/1).		Run-4: Drilling Pressure: 350 psi		
	146 —					145.5-147.8' DOLOMITE, soft to moderately soft, slightly fractured (horizontal), weak reaction to 1N HCI, moderate to strong reaction when powdered, very thinly laminated, light olive gray (5Y 6/1) with		Kelly Bar RPM: 197 Engine RPM: 1200-1300 Drill Time: 11min 9sec		
DATE FIELD	DATE STARTED: 10/15/09 DATE COMPLETED: 10/18/09 FIELD GEOLOGIST: WDS CHECKED BY: JLO					DEPTH: 6.1' DATE/TIME: 10/16/09 @ 0800 DEPTH: 4.9' DATE/TIME: 10/18/09 @ 1300 NG METHOD: Mud Rotary/Continuous SPT/PQ3Coring	NOTE	ES: Energy Testing completed with NWJ and AWJ rods on 10/15/09.		
APPR	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500		



LNP- C	Offest Bor	ing Prog	ram			LOG OF BORING NO. B-31		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	тн ЕТ)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724391.9 E 457978.0	SYMBOL	DEMARKO
LEV/ FEET	DEPTH (FEET)	AMPI R RU	OW/ R % R)	COVI	PRO	SURFACE EL: 43.4	uscs s	REMARKS
ш		0/8	<u>я</u> о	RE		DESCRIPTION	Sn	
	148 —	R-4	100% (86%)	5.0		yellowish gray (5Y 8/1) layers. 147.8-150.0' DOLOMITE, moderately hard to hard, slightly fractured (horizontal at 148.1' and 148.3'), thick bedded, yellowish gray (5Y 8/1).		Circulation loss: 100% Final water level 10/18/ 09 @ 1300 4.9'.
-106.6	150 —					BOTTOM OF BORING 150'		
	152 — 154 — 156 — 158 — 160 —							
DATE (STARTED COMPLET GEOLOG KED BY:	TED: 10	os		GWL: C GWL: C DRILLII		<u>I</u> Note	ES: Energy Testing completed with NWJ and AWJ rods on 10/15/09.
APPRO	NED BY: DVED BY: NG CO.:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



I NP. 4	LNP- Offset Boring Program PROJECT NO. 07-3935										
LINF	onset bo	illig Frog	Iaiii			LOG OF BORING NO. B-33		PROJECT NO. 07-5955			
ELEVATION (FEET MSL)	E E	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	I.E	COORDINATES N 1724328.8 E 457955.2	SYMBOL				
EVA ⁻	DEPTH (FEET)	MPLE	NW/6' R % F & (RC	OVE	PROFILE	SURFACE EL: 43.0	S SY	REMARKS			
de		SA OR	BLC	REC		DESCRIPTION	nscs				
	0 -	S-1	2-2 6 (8)	0.7		0.0-1.5' POORLY GRADED SAND (sp), fine grained, no plasticity, no dry strength, rapid dilatancy, low toughness, medium light gray (N6) to medium dark gray (N4), weak reaction to 1N HCl, loose.	sp				
	1.5 —	S-2	5-6 9 (15)	0.9		1.5-4.7' Same as above except dark yellowish orange (10YR 6/6) to very pale orange (10YR 8/2), subangular to rounded grains.	sp				
	3 —	S-3	5-7 6 (13)	0.8			sp				
38.3	4.5 —					4.7-6.0' CLAYEY SAND (sc), 60% sand, 40% silt, sand-fine grained, subrounded to rounded grains, low plasticity, medium dry strength,	sp sc				
37.0	6 —	S-4	3-2 2 (4)	1.2		slow dilatancy, low toughness, light gray (N7), with dark greenish gra (5G 4/1) to greenish black (5GY 2/1)-possible lignite pocket, no odor, no reaction to 1N HCl, soft. 6.0					
	- - -	S-5	3-4 5 (9)	1.0		6.0-7.5' FAT CLAY with SAND (ch), 80% clay, 20% fine grained sand medium to high plasticity, medium to high dry strength, medium toughness, light gray (N7) to light bluish gray (5B 7/1), weak to moderate reaction to 1N HCl, medium stiff.	,				
	7.5 — - - -	S-6	2-3 4 (7)	1.0		7.5-9.0' FAT CLAY (ch), high plasticity, high dry strength, slow to no dilatancy, medium toughness, light bluish gray (5B 7/1) to greenish gray (5G 6/1), weak reaction to 1N HCI (mainly few calcareous pieces, coarse sand size), medium stiff.	ch				
34.0	9 —	S-7	6-7 10 (17)	0.8		9.0' POORLY GRADED SAND (sp), fine grained, subrounded to rounded grains, no plasticity, no dry strength, rapid dilatancy, low toughness, yellowish gray (5Y 8/1) to white (N9), weak to moderate reaction to 1N HCI, medium dense.	sp				
	10.5 — –					Same as above.	sp				
	STARTE		/3/09		GWL: DEPTH: 6.5' DATE/TIME: 11/4/09 @ 0745			ES: Used NWJ rods for SPT			
1	COMPLE				GWL: D			sampling.			
	GEOLOG KED BY:	SIST: JLO WI			DKILLI	NG METHOD: Continuous SPT/Mud Rotary/PQ3 Coring					
APPROVED BY:						R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500			
DRILL	ING CO.:	HUSS				,		•			



LNP- C	Offset Bor	ing Prog	ram			LOG OF BORING NO. B-33		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	Ηſ	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	LE	COORDINATES N 1724328.8 E 457955.2	SYMBOL	
EVAT	DEPTH (FEET)	MPLE	3.W/6" 2. (RQ	OVEF	PROFILE	SURFACE EL: 43.0		REMARKS
EL FE		SAI	BLC	REC		DESCRIPTION	nscs	
	- - 12 	S-8	4-6 6 (12)	0.8		Same as above.	sp	
	- - -	S-9	3-6 7 (13)	0.9				
	13.5 — — —	S-10	4-5 7 (12)	1.1		Same as above.	sp	
	- 15 — - -	S-11	4-5 7	1.0		Same as above.	sp	
	16.5 — —	S-12	3-6	1.1		Same as above except with very fine grained black grains, loose.	sp	
	18 18 	S-13	3-4 6	0.9		POORLY GRADED SAND (sp), fine grained, subangular to rounded grains, well sorted, no plasticity, no dry strength, rapid dilatancy, low toughness, yellowish gray (5Y 8/1), weak reaction to 1N HCl, loose.	sp	
	19.5 — - -	S-14	(10) 2-5 8	1.0		Same as above except medium dense.	sp	
	21 		(13)			Same as above except yellowish gray (5Y 8/1) to pale yellowish brown (10YR 6/2).	sp	
DATE FIELD	STARTED COMPLET GEOLOG KED BY:	ΓED: 11	8 (13) /3/09 /5/09	0.9	GWL: C GWL: C DRILLII		NOTE	S: Used NWJ rods for SPT sampling.
	OVED BY: NG CO.:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- (Offset Bor	ing Prog	ram			LOG OF BORING NO. B-33		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	££	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1724328.8 E 457955.2	SYMBOL	
EVAT	DEPTH (FEET)	MPLE RUN	NW/6" R % F R (RC	OVE	PROFILE	SURFACE EL: 43.0	S SY	REMARKS
EL (F)		SA	BLC	REC		DESCRIPTION	nscs	
	22.5 — —	0.40	4-4	10		Same as above.	sp	
	_ _ 24 —	S-16	7 (11)	1.2		Same as above.	sp	
	_ _ _	S-17	4-5 7 (12)	1.1				
	25.5 — — — —	S-18	7-6 5 (11)	1.5		Same as above except light brownish gray (5YR 6/1).	sp	
	27 — - - -	S-19	3-2 2 (4)	1.5		POORLY GRADED SAND (sp), fine grained, well sorted, no plasticity, no dry strength, rapid dilatancy, low toughness, yellowish gray (5Y 8/1), no reaction to 1N HCl, very loose.	sp	
	28.5 — — —	S-20	2-3 2 (5)	1.4		Same as above except yellowish gray (5Y 8/1) to light brownish gray (5YR 6/1).	sp	
	30 —	S-21	2-2 1	1.4		Same as above.	sp	
	31.5 —	0-21	1 (3)			Color change at 31.3' to yellowish gray (5Y 8/1), moist, not saturated as above. Same as above.	sp	
	_ _ _	S-22	1-1 1 (2)	1.4				
DATE FIELD CHEC	DATE STARTED: 11/3/09 DATE COMPLETED: 11/5/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS					DEPTH: 6.5' DATE/TIME: 11/4/09 @ 0745 DEPTH: 8.7' DATE/TIME: 11/5/09 @ 0745 NG METHOD: Continuous SPT/Mud Rotary/PQ3 Coring	NOTE	ES: Used NWJ rods for SPT sampling.
APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500 DRILLING CO.: HUSS								



to rounded grains, no plasticity, no dry strength, rapid dilatancy, low toughness, yellowish gray (SY 8/1), weak to moderate reaction to 1N HCI, very loose. S-25 1	LNP- (Offset Boi	ring Prog	ram			LOG OF BORING NO. B-33		PROJECT NO. 07-3935
S-23	TION ASL)	F.C	NO.	& (N) REC.	۲۲ (ft.)	E E		MBOL	
S-23	EVAT	DEP1 (FEE	MPLE	3. % F RQ	OVE	ROF	SURFACE EL: 43.0	S SY	REMARKS
S-23	크린		SAI	BLO	REC		DESCRIPTION	- OSN	
S-23 1 1.3		33 —					Same as above.	sp	
S-24 NOR 1.4 NOR 1.4 NOR 1.4 NOR	- - -	S-23	1	1.3					
S-25 1.1 1.5		34.5 —	S-24	WOR	1.4		Same as above.	sp	
S-26		36 — - - -	S-25	1	1.5		to rounded grains, no plasticity, no dry strength, rapid dilatancy, low toughness, yellowish gray (5Y 8/1), weak to moderate reaction to 1N	sp	Water level 11/4/09 @ 0745 6.5'.
Same as above. Same as above.		37.5 — — —	S-26	1	1.5		Same as above except no reaction to 1N HCI.	sp	
Same as above. Same as above. Same as above. Same as above. Same as above. Same as above. Same as above. Same as above. DATE STARTED: 11/3/09 DATE COMPLETED: 11/5/09 GWL: DEPTH: 6.5' DATE/TIME: 11/4/09 @ 0745 GWL: DEPTH: 8.7' DATE/TIME: 11/5/09 @ 0745 Sampling.		39 — - -	S-27	1	1.3		Same as above.	sp	
DATE STARTED: 11/3/09 DATE COMPLETED: 11/5/09 GWL: DEPTH: 8.7' DATE/TIME: 11/4/09 @ 0745 GWL: DEPTH: 8.7' DATE/TIME: 11/5/09 @ 0745 Same as above. Sp NOTES: Used NWJ rods for SPT sampling.		40.5 — - - -	S-28	WOH 1	1.5		Same as above except with very fine grained black grains (10-15%).	sp	NOTE: JLO observes some sampl falling out of spoon when brought up.
DATE STARTED: 11/3/09 GWL: DEPTH: 6.5' DATE/TIME: 11/4/09 @ 0745 NOTES: Used NWJ rods for SPT Sampling.		42 —	S-29	WOH	1.5		Same as above.	sp	
DATE COMPLETED: 11/5/09 GWL: DEPTH: 8.7' DATE/TIME: 11/5/09 @ 0745 sampling.		43.5 — 					Same as above.	sp	
CHECKED BY: WDS	DATE FIELD	COMPLE [®] GEOLOG	TED: 11	/5/09 O		GWL: D	PEPTH: 8.7' DATE/TIME: 11/5/09 @ 0745	NOTE	
APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500 DRILLING CO.: HUSS	APPR	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- Offset Boring Program PROJECT NO. 07-3935										
		J9				LOG OF BORING NO. B-33				
ELEVATION (FEET MSL)	ГН .T.)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1724328.8 E 457955.2	SYMBOL			
EVA ⁻	DEPTH (FEET)	MPLE	OW/6' R % F & (RC	OVE	PROFILE	SURFACE EL: 43.0		REMARKS		
		SA	BL(REC		DESCRIPTION	nscs			
	- - - 45	S-30	WOR- WOR WOR (0)	1.0						
	- - -	S-31	WOR- WOR WOR (0)	1.3		POORLY GRADED SAND (sp), fine grained, well sorted, subrounded to rounded grains, no plasticity, no dry strength, rapid dilatancy, low toughness, yellowish gray (5Y 8/1), very loose, trace (5-10%) very fine black grains, no reaction to 1N HCl.				
-3.5 -3.8	46.5 — — —	S-32	3-5 5 (10)	1.3		46.5-46.8' FAT CLAY (ch), high plasticity, high dry strength, no dilatancy, medium to high toughness, light gray (N7) to medium light gray (N6), no reaction to 1N HCl, medium stiff, trace fine grained calcareous grains.	sp-sc			
-4.5 -4.8	- 48 — -					46.8-47.5' POORLY GRADED SAND with CLAY (sp-sc), 90% fine grained sand, 10% fat clay, subangular to rounded grains, medium plasticity, medium to high dry strength, slow dilatancy, medium toughness, no reaction to 1N HCl, dark yellowish orange (10YR 6/6) to dusky yellowish brown (10YR 2/2), medium stiff.	ch sp-sc			
-5.7	49.5 —	S-33	5-5 5 (10)	1.5	<i>P. X. X. V.</i>	47.5-47.8' FAT CLAY (ch) as at 46.5-46.8'. 47.8-48.0' POORLY GRADED SAND with CLAY (sp-sc) as above except pale yellowish brown (10YR 6/2) to light olive gray (5Y 6/1). 48.0-48.7' POORLY GRADED SAND with CLAY (sp-sc) as above except light gray (N7) to greenish gray (5G 6/1).				
	- - -	S-34	2-6 2 (8)	1.5		48.7' 48.7-51.0' POORLY GRADED SAND (sp), fine grained, subrounded to rounded grains, well sorted, no plasticity, no dry strength, rapid dilatancy, low toughness, very light gray (N8) to light greenish gray (5G 8/1), no reaction to 1N HCI, loose, trace very fine grained black grains.	-			
-8.0 -8.9	51 — — —	S-35	3-6 9 (15)	1.4		51-51.9' CLAYEY SAND (sc), 60% fine grained sand, subrounded to rounded grains, 40% clay, medium to high plasticity, medium to high dry strength, slow to no dilatancy, low toughness, light gray (N7) to light bluish gray (5B 7/1), no reaction to 1N HCl, stiff.	sc			
-0.9	52.5 — –					51.9-53.2' POORLY GRADED SAND (sp), fined grained, subrounded to rounded grains, no plasticity, no dry strength, rapid dilatancy, low toughness, medium light gray (N6) to greenish gray (5G 6/1), no reaction to 1N HCI, medium dense.				
-10.2	_ _ _	S-36	3-4 8 (12)	1.5		53.2-54.9' CLAYEY SAND (sc) as at 51-51.9'.	sc			
	54 — — —	S-37	6-7 7	1.3						
DATE FIELD	DATE STARTED: 11/3/09 DATE COMPLETED: 11/5/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS				GWL: D GWL: D DRILLIN	9	NOTE	S: Used NWJ rods for SPT sampling.		
-	OVED BY: ING CO.:			=	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500		



LNP- C	Offset Bor	ing Prog	ram			LOG OF BORING NO. B-33		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724328.8	USCS SYMBOL	REMARKS
	_	,,,	(14)	22		DESCRIPTION 54.9		
-11.9	55.5 — - -		2-3			54.9-55.5' POORLY GRADED SAND (sp), trace clay, subrounded to rounded grains, fine grained, low plasticity, low dry strength, rapid dilatancy, low toughness, light olive gray (5Y 6/1) to medium bluish gray (5B 5/1), no reaction to 1N HCl, medium dense, well sorted. Same as above except loose.	sp sp	
	57 	S-38	5 (8)	1.5		Same as above.	sp	
	- - -	S-39	1-2 3 (5)	1.2				
	58.5 —		1.5			Same as above except medium bluish gray (5B 5/1) to greenish gray (5G 6/1).	sp	
	-	S-40	1-5 4 (9)	1.4				
	60 —	S-41	1-5 7 (12)	1.0		Same as above.	sp	
	61.5 —	0.40	3-7			Same as above except light olive gray (5Y 6/1).	sp	
	63 —	S-42	9 (16)	1.0		POORLY GRADED SAND (sp), fined grained, subrounded to	sp	
	- - -	S-43	2-6 6 (12)	0.8		rounded grains, well sorted, no plasticity, no dry strength, rapid dilatancy, low toughness, medium gray (N5) and dark yellowish orange (10YR 6/6) to moderate yellowish brown (10RY 5/4), no reaction to 1N HCl, medium dense.		
	64.5 —	S-44	2-3 4 (7)	1.3		Same as above except yellowish gray (5Y 8/1) to light olive gray (5Y 6/1), loose.	sp	
DATE (STARTED COMPLE ^T GEOLOG KED BY:	ΓED: 11	Э		GWL: D GWL: D DRILLIN	9	NOTES	S: Used NWJ rods for SPT sampling.
APPRO	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG: F	Failing 1500



LNP- (Offset Bo	ring Prog	ram			LOG OF BORING NO. B-33		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724328.8 E 457955.2 SURFACE EL: 43.0	SS SYMBOL	REMARKS
日币		S O	BLC	REC	"	DESCRIPTION	nscs	
-23.7	66 — –	S-45	5-10 15	1.3	<i>γ-γ-γ-γ</i>	66.0-66.7' Same as above.	sp 'sc	
-24.1 -24.5	67.5 —	0-43	(25)	1.0	7///	66.7-67.1' CLAYEY SAND (sc), 20% high plasticity clay, 80% fine grained sand, subrounded to rounded grains, low to medium dry strength, slow dilatancy, low toughness, medium gray (N5), no reaction to 1N HCI, medium dense.	sp	
	- - -	S-46	14-23 33 (56)	0.6		67.1-67.5' POORLY GRADED SAND (sp) as above. 67.5-69.7' CLAYEY SAND (sc) as above except yellowish gray (5Y 8 1) to light olive gray (5Y 6/1).	,	
26.7	69 		13-9			69.7		
-26.7	- - 70.5 —	S-47	7 (16)	1.5		69.7-70.5' FAT CLAY (ch), medium to high plasticity, high dry strength, no dilatancy, medium toughness, olive black (5Y 2/1), no reaction to 1N HCl, stiff.	Cn	
	- - - -	S-48	13-50/3 (50)	0.75		Same as above.	ch	No sample 71.25-72.0'.
-29.3	72 — -					72.0-72.3' FAT CLAY (ch) as above.	ch	TOP OF AVON PARK
	- - -	S-49	21-10 2 (12)	0.5		72.3-75.0' Degraded DOLOMITE, dark yellowish orange (10YR 6/6) to moderate yellowish brown (10YR 5/4), severly weathered, soft to very soft, moderate to strong reaction to 1N HCl, silty texture.		FORMATION
	73.5 — - - -	S-50	50/1 (50)	0.0				No recovery. Set casing to 75', no sample 73.58 75'.
	75 — - - -					75-75.5' DOLOMITE, hard, very pale orange (10YR 8/2) to grayish orange (10YR 7/4), moderately fractured, thin to medium bedded, weak reaction to 1N HCl, fresh to slightly weathered, some pits, few vugs, some very thin possibly healed fractures infilled with black material. 75.5-76.1' DOLOMITE, severly weathered to degraded, very soft, 40% dolomite gravel, 60% silt (totally weathered dolomite), moderate yellowish brown (10YR 5/4), no plasticity, low dry strength, low		Run-1: Drilling Pressure: 200-250 psi Kelly Bar RPM: 213 Engine RPM: 1300-1400 Drill Time: 32min 30sec Circ. Loss: None
	76.5 —	•				toughness. 76.1-80.0' DOLOMITE, moderately hard, slightly weathered,		
DATE STARTED: 11/3/09 DATE COMPLETED: 11/5/09 FIELD GEOLOGIST: JLO					GWL: D GWL: D DRILLIN	PEPTH: 6.5' DATE/TIME: 11/4/09 @ 0745	NOTE	ES: Used NWJ rods for SPT sampling.
APPR	CHECKED BY: WDS APPROVED BY: DRILLING CO.: HUSS					R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- Offset Boring Program PROJECT NO. 07-3935										
LINE	onset DOI	y F109	. 4111			LOG OF BORING NO. B-33		1 100E01 NO. 07-3933		
ELEVATION (FEET MSL)	E.F.	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1724328.8 E 457955.2	SYMBOL			
EVA ⁻	ОЕРТН (FEET)	MPLE	DW/6" R % F & (RC	OVE	PROFILE	SURFACE EL: 43.0	SS SY	REMARKS		
🗓 🖰		AS O	BL(REC		DESCRIPTION	nscs			
	78—	R-1	98% (16%)	4.9		moderately fractured (vertical fracture 77-79.5'), pitted, few vugs, thic bedded, no fossils, weak reaction to 1N HCl when powdered, pale yellowish brown (10YR 6/2).	k			
	79.5					80.0-85.0' DOLOMITE, as above except unfractured.		Run-2:		
	81 — - - -					60.0-00.0 BOLOWITE, as above except dimactated.		Drilling Pressure: 200 psi Kelly Bar RPM: 221 Engine RPM: 1400-1500 Drill Time: 20min 9sec Circ. Loss: None		
	82.5 — — — — 84 —	R-2	90% (78%)	4.5		83.5-84.4' Soft zone, intensely fractured.				
	85.5 — —					85.0-87.7' DOLOMITE, moderately hard, strong reaction to 1N HCI when powdered, medium bedded, slightly to moderately weathered in zones/bands, pitted, some vugs, moderately fractured (horizontal-bedding planes only), medium light gray (N6).	ו	Run-3: Drilling Pressure: 150 psi Kelly Bar RPM: 222 Engine RPM: 1400-1500 Drill Time: 50min 6sec Circ. Loss: None Water Level 11/5/09 @ 0745 8.7' NOTE: Added extra core from R-4 to R-3, recalculated recovery and RQD.		
	87 — – –	R-3	100% (70%)	5.0						
DATE STARTED: 11/3/09 DATE COMPLETED: 11/5/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS					GWL: D GWL: D DRILLIN	9	NOTE	ES: Used NWJ rods for SPT sampling.		
	OVED BY: ING CO.:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500		



LNB	Officet Box	ing Dres						DDO IECT NO. 07 2025
LNP-	Offset Bor	ing Prog	ram			LOG OF BORING NO. B-33		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	TH (T:	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ılE	COORDINATES N 1724328.8 E 457955.2	SYMBOL	
EVA EET	DEPTH (FEET)	MPL R RUI	2W/6 R % I & (RC	OVE	PROFILE	SURFACE EL: 43.0	SS S	REMARKS
II I		SA	BLO	REC		DESCRIPTION	USCS	
	88.5 — —					87.7-91.0' DOLOMITE, moderately hard to hard, moderate to strong reaction to 1N HCl when powdered, thick bedded, fresh to slightly weathered, slightly fractured (1 horizontal fracture at 88'), some fossils, fine grained, some pits (decreasing abundance with depth), yellowish gray (5Y 8/1).		
	90 —							Run-4: Drilling Pressure: 250 psi Kelly Bar RPM: 204 Engine RPM: 1200-1300 Drill Time: 17min 8sec
	91.5 — — —		100%			91.0-95.0' DOLOMITE, moderately hard to moderately soft, strong reaction to 1N HCl, when powdered, thick bedded, slightly weathered pitted/porous, slightly fractured, some fossils, yellowish gray (5Y 8/1) to light olive gray (5Y 6/1), few vugs (weathered-out fossils).		Circ. Loss: None
	93 —	R-4	(54%)	5.0				
	94.5 —					94.5-95.0' Friable with very thin black organic lenses. 95.0-100.0' DOLOMITE same as 91.0-95.0'.		Run-5:
	96 — -					95.0-96.2' Vertical fracture, intensely fractured.		Drilling Pressure: 250-300 psi Kelly Bar RPM: 213 Engine RPM: 1300-1400 Drill Time: 10min 55sec Circ. Loss: None
	97.5 — —	R-5	100% (68%)	5.0				
DATE STARTED: 11/3/09 DATE COMPLETED: 11/5/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS					GWL: D GWL: D DRILLIN		<u> </u> Note	ES: Used NWJ rods for SPT sampling.
APPROVED BY:						R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILL	ING CO.:	HUSS						



LNP-	Offset Bor	ing Prog	ram			LOG OF BORING NO. B-33		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724328.8 E 457955.2 SURFACE EL: 43.0 DESCRIPTION	USCS SYMBOL	REMARKS
	99 —					98.7-99.4' Intensely fractured.		
-57.0	100.5 — —				\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ 	BOTTOM OF BORING 100'		
	102 —							
	103.5 — - - -							
	105 — - -							
	106.5 — —							
	108 —							
	109.5 — STARTED		/3/09 /5/09		GWL: [_	NOTES	S: Used NWJ rods for SPT sampling.
CHEC APPR	GEOLOG KED BY: OVED BY: ING CO.:	VV	O DS			NG METHOD: Continuous SPT/Mud Rotary/PQ3 Coring R: Eddie Palmer HELPER: Chad/Cody	RIG: F	Failing 1500



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-01	SHEET	1 ()F	7	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724860.4 N, 455975.6 E (NAD83)

ELEVATION: 43.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

WATER	LEVELS	: 9.5 ft bo	gs on 12/3	3/07	START : 12/2/2007 END : 12/3/2007 LOGGER	: T.	Borton, J. Schaeffer
				STANDARD	SOIL DESCRIPTION	G	COMMENTS
AND (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		CO	
ACE,		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	OLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	INSTRUMENTATION
43.4	0.0			(N)	_ Topsoil	11/	
-		1.1	SS-1	1-1-2	\0.0-0.25' - 80-90% organics /-		-
-	1.5			(3)	Poorly Graded Sand (SP) \[0.25-1.1' - very light gray, white and light brownish \[\]		-
-	1.5				gray, (N8, N9 and 5YR 6/1), dry to moist, very loose, very fine to fine grained, silica sand, 15% organics,		-
-					trace nonplastic fines		-
-							-
_					1		-
5_	5.0					,,,	
38.4				2-3-4	Sandy Lean Clay (CL) 5.0-5.3' - mottled very light gray, grayish yellow, and		_
-		1.0	SS-2	(7)	dark yellowish orange, (N8, 5Y 8/4, and 10YR 6/6),		_
-	6.5				moist, medium stiff, medium plasticity, slow dilatancy, 25-30% very fine silica sand		-
-					Silty Sand (SM) 5.3-6.0' - pale yellowish brown to dark yellowish		-
-					brown, (10YR 6/2 to 10YR 9/2), wet, loose, very fine		-
-					to fine grained, 20% nonplastic fines		-
-					-		-
-					-		-
10 -	10.0				-		-
10 <u> </u>	10.0				Interbedded Poorly Graded Sand And Silt (SP-SM)	H	
-		0.9	SS-3	3-5-6	10.0-10.85' - very pale orange, pale yellowish brown, - dark yellowish brown, (10YR 8/2, 10YR 6/2, 10YR	盐	-
-	11.5			(11)	\setminus 4/2), wet, medium dense, very fine to fine grained, $/$		-
-					\(\subseteq 5-15\% nonplastic fines, varies in beds \(\) -		_
_							_
-]		_
-					_		-
-							-
15 <u> </u>	15.0				Poorly Graded Sand With Silt (SP-SM)	TH	_
-		1 1 1	SS-4	3-4-5	15.0-16.0' - pale yellowish brown, (10YR 6/2), wet,		-
-		1.0	35-4	(9)	loose, very fine to fine grained, silica sand, 10% nonplastic fines	111	-
-	16.5				-		-
-							-
-							-
-							-
1 -							-
-					1		-
20							-
1		1					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-01	SHEET	2	OF	7	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724860.4 N, 455975.6 E (NAD83)

ELEVATION: 43.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

					/N 351574, mud rotary, auto h				ORIENTATION: Vertical
WATER	LEVELS	: 9.5 ft b	gs on 12/3	3/07 S		ND : 12/3/2007	LOGGER	: T.	Borton, J. Schaeffer
>				STANDARD PENETRATION	SOIL D	ESCRIPTION		g	COMMENTS
ANE ANE	SAMPLE	INTERVA	AL (ft)	TEST RESULTS	OOU NAME LIGOO		1 OD	C LC	DEDTIL OF CACINIC DRILLING DATE
HU		RECOVE	ERY (ft)		MOISTURE CONTEN	GROUP SYMBOL, CO	ILOR, FY OR	OLK	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY			SYMBOLIC LOG	INSTRUMENTATION
23.4	20.0			(14)	Silty Sand (SM)			TIT	
-		1.1	SS-5	6-5-5	20.0-21.05' - Same as 1	5.0-16.0' except 15-2	20% -		-
-		'.'	33-3	(10)	nonplastic fines		_	Ш	-
-	21.5						-		-
_							_		_
-							_		_
_							_		_
_									_
_									
25 <u> </u>	25.0								
18.4					Poorly Graded Sand Wi 25.0-25.9' - very pale ora	ith Silt (SP-SM)	brown		
		0.9	SS-6	3-4-6 (10)	(10YR 8/2, 10YR 6/2), w	et, loose, very fine to	o fine	ili.	
	26.5			(10)	grained, silica sand, 7%	nonplastic fines	/-		
-									_
-									_
_							-		-
-							_		-
_							=		=
-							-		-
30	30.0						-		-
13.4	30.0				Silty Sand (SM)			111	-
-		1.1	SS-7	4-4-6	30.0-31.05' - very light a	ray, (N8), moist to w	et, loose, -		-
-	04.5	'''	00 /	(10)	very fine to fine grained, nonplastic fines, trace or	ganics	' <u>/</u> =	111	-
-	31.5				,				-
-							-		-
-							-		-
-							-		-
-							-		-
-							-		_
-							-		_
35	35.0				Cilty Cond (CM)			THE STATE OF	_
8.4				2-2-2	Silty Sand (SM) 35.0-36.2' - Same as 30	.0-31.05' except very	/ loose		_
_		1.2	SS-8	(4)		. ,	_		_
_	36.5						_		_
_							_		_
_									
_									
_									
_									
40									



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-01	SHEET	3	OF	7	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724860.4 N, 455975.6 E (NAD83)

ELEVATION: 43.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

WATER	LEVELS	: 9.5 ft b	gs on 12/3	3/07	START : 12/2/2007 END : 12/3/2007 LOGGER : T. Borton, J. Schaeffer
				STANDARD	SOIL DESCRIPTION COMMENTS
W C (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	ο̈́
B 등 E		RECOVE	ERY (ft)	12011120210	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
3.4	40.0			(N)	Sandy Fat Clay (CH) Driller's Remark: Change in drilling at 44.5'
3.4	40.0			3-5-5	40.0-41.5' - very light gray to medium light gray, (N8 - (stiffer)
-		1.5	SS-9	(10)	to N6), wet, medium stiff, medium to high plasticity, slow dilatancy, 40-45% very fine to fine silica sand
-	41.5				Slow unatarity, 40-43 /6 very fine to fine sinua sand
-					
-					
-					
-					
-					
	45-				-
45 -1.6	45.0				Fat Clay (CH)
-		1.5	SS-10	5-8-9	\ 45.0-45.3' - yellowish gray, (5Y 8/1), moist, medium
-	40.5	1.5	00-10	(17)	\stiff, high plasticity, no to slow dilatancy, no HCl reaction
-	46.5				Fat Clay With Sand (CH)
-					45.3-46.3' - mottled very light gray and light bluish gray, (N8 and 5B 7/1), moist, medium stiff, high
-					plasticity, no to slow dilatancy, mild HCl reaction, fine -
-					to coarse grained particles are both angular carbonate grains and rounded black and brown grains
-					Fat Clay With Poorly Graded Sand (CH)
-					46.3-46.4' - light greenish gray, (5 G 8/1), moist, medium stiff, high plasticity, no dilatancy, no HCl
50	50.0				reaction, 1/2" lens of very fine fine silica sand at 46.5'
-6.6	30.0				Fat Clay (CH) — 46.4-46.5' - brownish gray, (5Y 8/1), moist to wet,
-		1.5	SS-11	4-4-3	∖medium stiff, high plasticity, no dilatancy, no HCl / च]∤∤
-	51.5			(7)	√reaction Silty Sand With Fat Clay (SM)
_					50.0-51.5' - yellowish gray, (5Y 7/2), wet, loose, very fine to fine grained, no HCl reaction, silica sand,
-					\ 20-25% nonplastic to low plastic fines (amount and
-					\plasticity vary with depth), fat clay (CH) lenses occur \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
-					7/1), highly plastic, no HCl reaction
					1
					1
55_	55.0				11
-11.6				4.6.4	Silty Sand With Clay (SM) 55.0-56.5' - yellowish gray, (10YR), wet, loose, very
		1.5	SS-12	1-2-4 (6)	fine to fine grained, 20-30% nonplastic to low plastic ┃ │ │ ┃
	56.5			(=)	fines, 15% of sample consists of 1/2" to 1", sandy fat clay (CH) lenses, same as 50.0-51.5', no HCl reaction
_					in clay materials
_]
_]
_]
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-]
60					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-01	SHEET	4	OF	7	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724860.4 N, 455975.6 E (NAD83)

ELEVATION: 43.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

		9/N 351574, Titud Totally, auto Hammer, AW3 Tods, 5-7/6 tit-corie bit Onie NTATION . Vertical			
WATER	LEVELS	: 9.5 ft bo	gs on 12/3	3/07 S	START : 12/2/2007 END : 12/3/2007 LOGGER : T. Borton, J. Schaeffer
 				STANDARD PENETRATION	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
H H H H H		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR MOISTURE CONTENT, RELATIVE DENSIT
EV.			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
				(N)	
-16.6	60.0			2.4.6	Interbedded Clayey Sand And Fat Clay (SC-CH) 60.0-60.6' - Same as 50.0-51.5 and 55.0-56.5' except
_		1.4	SS-13	3-4-6 (10)	│ 60% clayey sand (SC), mottled yellowish gray and │ │ │ │
	61.5			(- /	light olive gray (5YR 7/2 and 5Y 5/2), moist, loose,
-					very fine to fine grained, 35% medium plastic fines, 40% fat clay (CH), pale green (10G 6/2), moist,
_					medium stiff, highly plastic, no dilatancy, no HCl
-					reaction - -
-					Organic Son (OL) 60.6-61.0' - dusky brown, (5YR 2/2), moist, medium -
-					stiff, medium plasticity, slow dilatancy, shiny, flaky -
-					appearance, 1/4" sand lens at 60.9' Silty Sand With Organics (SM) Driller's Remark: Hard at 64.0'
-					61.0-61.4' - light olive gray, (5Y 5/2), wet, loose, fine
65 <u> </u>	65.0 65.0	0.0	\SS-14 <i>)</i>	50/0	grained, 20% nonplastic fine organics, 1/2" lens of
-21.0	03.0	\U.U/	\33-14/	(50/0")	Sandy organic soil (OL) at 61.3-61.4' 25% fine silica Switch to 2-7/8" tricone bit at 65.0' sand, no HCl reaction
_					No Recovery At 65.0'
_]]
					<u> </u>
					1
_					1
-					1
70	70.0				1
-26.6	70.0				Silty Sand And Limestone Fragments (SM)
-		1.5	SS-15	22-16-19	70.0-71.5' - yellowish gray, (5Y 7/2), wet, dense, fine
-		1.5	00-13	(35)	to coarse grained, 25% low plastic fines, 40-45% fine gravel-sized limestone fragments, strong HCl reaction
-	71.5				graver electric magnetic, energy remarkation [1]
-					-
_					-
_					<u> </u>
_					<u> </u>
_					<u> </u>
75	75.0				1
-31.6	75.0	0.0	SS-16	50/0	No Recovery At 75.0'
-				(50/0")	\few limestone fragments / -
-					†
-					-
-					
-					
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80					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-01	SHEET	5	OF	7	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724860.4 N, 455975.6 E (NAD83)

ELEVATION: 43.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

WATER	/ATER LEVELS: 9.5 ft bgs on 12/3/07								
				STANDARD	SOIL DESCRIPTION COMMENTS				
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	AL (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION				
H H		RECOVE	ERY (ft)	12011120210	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND				
PTH			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY				
E S E				(N)					
-36.6	80.0	1.1	SS-17	4-46-50/1	Sandy Silt And Limestone Fragments (ML) 80.0-81.1' - grayish yellow, (5Y 8/4), wet, fine to				
_	81.1			(96/7")	coarse grained, rapid dilatancy, strong to very strong				
_					HCl reaction, 20-25% fine to coarse carbonate sand, 45-55% limestone fragments to 1" subangular, strong				
l _					\to very strong HCl reaction / _				
_					Begin Rock Coring at 81.0 ft bgs See the next sheet for the rock core log				
					See the flext sheet for the rock core log				
85									
-41. 6									
l _]]				
]]				
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90									
-46.6									
]									
]									
95]]				
-51.6]				
					1 1				
					11				
					1				
]					11				
]					11				
]					11				
]					11				
					1				
100					1				
100									



PROJECT NUMBER:

338884.FL BORING NUMBER:

CT-01 SHEET 6 OF 7

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724860.4 N, 455975.6 E (NAD83)

ELEVATION: 43.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 45B S/N 351574, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

WATER	LEVELS: 9.5	ft bgs	s on 1	2/3/07 START : 12/2/2007 END : 12	2/3/20	D7 LOGGER : T. Borton, J. Schaeffe	er
≥∩≘	(%)			DISCONTINUITIES	Ğ	LITHOLOGY	COMMENTS
N (#	Ä, AND 3Y (%	_	ES T	DESCRIPTION	CLC	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H B H	E RU 3TH, OVEF	(%) Q	TUF FOO	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQI	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	81.0			81.1' - Mechanical break or bedding plane,		Limestone	Begin rock coring at 81.0'
-			3	<5 deg, rough, undulating, tight 81.4' - Fracture, 15 deg, rough, undulating, -	丗	 81.0-84.3' - yellowish gray, (5Y 7/2), fine to coarse grained, strong HCI 	1
-			. 40	tight	Н	reaction, very weak (R1), voids to 1"	1
-			>10	81.6' - Mechanical break or bedding plane, <5 deg, smooth, planar, open <1/16"	Н	 (predominately <1/16") approximately 20% of core, fossiliferous (casts and 	1
	R1-NQ 5 ft	17	>10	82.5' - Mechanical break, <5 deg, rough,	H	molds)]
	66%	17		undulating, tight 82.5-82.7' - Fracture zone, <5 deg, fragments	H]
l _			_1_	to 2", angular 83.4' - Bedding plane, <5 deg, rough,	", angular	No Recovery 84.3-86.0'	<u> </u>
85			ND	undulating, open <1/16"	H	_	
-41. 6			NR	83.6-84.0 - Fracture zone, horizontal, fragments from <1/8" to 2" angular to	Н	_	R1: 11 minutes
-	86.0			subangular	₽	Limestone	Core run times not recorded below run R1
-			>10	84.15' - Fracture, 70-80 deg, rough, undulating, tight	尸	Limestone - 86.0-91.0' - yellowish gray, (5Y 7/2),	- I ecorded below full K1
-				86.0-86.1 - Fracture zone, no visible orientation fragments to 1/2"	₽	very fine to medium grained, strong HCl reaction, weak (R2), zone from	-
-			2	86.6' - Mechanical break, <5 deg, rough,	囯	- 88.3-89.6' medium stong to strong	-
-	R2-NQ			undulating, tight 87.4' - Bedding plane, <5 deg, smooth,	団	_ rock (R3/R4)	-
-	5 ft	78	1	planar, open 1/2", fine infilling - 87.8' - Bedding plane, <5 deg, rough, planar,	丗	-	-
-	100%			tight	Ы	_	
90			0	88.0' - Bedding plane, <5 deg, rough, planar, open, <1/16"	\vdash	-	1
-46.6			_	90.0' - Fracture, <5 deg, rough, undulating,	Ħ	-	
-	91.0		3	open, <1/16", fine infill - 90.6, 90.8' - Fractures (2), 5-10 deg, rough,	Ħ	-	1
-			5	undulating, open, <1/16" 91.15, 91.25' - Fractures (2), <5 deg, rough, -	Ħ	91.0-92.35' - grayish yellow, (5Y 8/4),	1
			5	undulating, open to 1/4"	H	 fine to coarse grained, strong HCl reaction, very weak to weak (R1 to]
_			3	91.5' - Mechanical break or bedding plane, <5 deg, rough, undulating, tight	77	R2), voids to <1/6", 5-15% of core Sandy Fat Clay (CH)	_
_				91.8, 91.95, 92.1, 92.15' - Mechanical break	H	_ \ 92.35-92.5' - light olive gray, (5Y	
_	R3-NQ 5 ft	35	1	or bedding plane (4), <5 deg, rough, undulating, open to 1/4"	₽	\5/2), moist, high plasticity, no ├ \dilatancy	
-	92%			92.35-92.5' - Fracture or bedding plane, <5 deg, smooth, planar, fine infilling	P	Limestone	-
-			>10	93.75, 94.1' - Mechanical break (2), <5 deg,	H	92.5-93.5' - Same as 91.0-92.35' - 93.5-95.6' - Same as 91.0-92.35'	-
95 <u> </u>				rough, undulating, tight 94.5-95.6' - Fracture zone, no visible	H	 except medium to coarse grained, voids to <1/16" approximately 	-
-			>10 NR	orientation, fragments to 2" angular, dark gray to black staining on some fragments	団	15-25% of core	-
-	96.0		INK	-	団	No Recovery 95.6-96.0' Limestone	-
-			1	96.15' - Bedding plane, <5 deg, rough, undulating, open <1/16"	Ш	96.0-101.0' - yellowish gray to	
-				96.6-97.7 - Mechanical break, vertical, - rough, undulating, tight	oxdot	grayish yellow, (5Y 7/2 to 5Y 8/4), fine to coarse grained, strong HCl	
-			2		H	reaction, very weak to medium strong (R1 to R3), fining with depth,	1
-	R4-NQ	20		97.77' - Bedding plane, <5 deg, rough, undulating, tight	Ħ	voids to <1/16" 5-10% of core	1
-	5 ft 100%	33	2	98.5' - Fracture, 45-55 deg, rough,			1
			2	undulating, tight 98.8' - Fracture, 45-55 deg, rough,		_]
100				undulating, open 1/8" 99.6' - Mechanical break or bedding plane, —	H		
-56. 6			2	<5 deg, rough, undulating, open 1/8"	Ш	_]
	101.0		_		H		
					1		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-01	SHEET	7	OF	7	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724860.4 N, 455975.6 E (NAD83)

ELEVATION: 43.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 45B S/N 351574, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

WATER	LEVELS : 9.5	ft bgs		2/3/07 START: 12/2/2007 END: 12		D7 LOGGER : T. Borton, J. Schaeffe	r
				DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
ELOV N (#	N, AND 3Y (%		RES T	DESCRIPTION	CLO	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-			0			Limestone 101.0-106.0' - yellowish gray, (5Y 7/2), very fine to medium grained,	-
-			1	102.0' - Mechanical break, <5 deg, rough, undulating, tight		strong HCl reaction, weak to medium strong (R2 to R3), voids to 1/8" (predominately <1/16") over	-
-	R5-NQ 5 ft 100%	100	0			approximately 15% of core, trace organics	- -
105 -61.6			0			- 	-
-01.0	106.0		0			- - 106.0-111.0' - Same as 101.0-106.0'	- Water level = 9.5' below
-			1	106.3, 107.35, 107.6' - Mechanical break (3), <5 deg, rough, undulating, open 1/8"	H	 except weak (R2), irregular wavy bedding from 106.5-107.45', fossiliferous zone from 107.7-108.7' 	ground surface -
-	R6-NQ		2	-		- with voids to 1/8" over 10-12% of the core	- -
-	5 ft 100%	57	1	108.45' - Fracture, 5-10 deg, rough, undulating, tight 109.15, 110.35' - Fractures (2), 20-30 deg,	H	-	- -
110_ -66.6			1	rough, undulating, tight —		-	_
-	111.0		1	-	Ħ	Bottom of Boring at 111.0 ft bgs on	Total depth of boring is
-				-		- 12/3/2007 -	- -
-				-		-	-
-						- - -	-
-				_			
-						 - -	-
-						-	_ _
-						- -	-
-						-	- -
-						<u>-</u> -	 -



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-02	SHEET	1	OF	4	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724719.3 N, 456342.2 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND FOLIPMENT: CMF 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8" drag bit

DRILLIN	DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8" drag bit ORIENTATION: Vertical										
WATER	LEVELS	: 6.1 ft bo	s on 11/3	30/07	TART : 11/29/2007 END : 12/1/2007 LOGGEF	R : D). Whitaker				
				STANDARD	SOIL DESCRIPTION	ď	COMMENTS				
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		SYMBOLIC LOG					
BEL 일반		RECOVE	RY (ft)	TEGT TIEGGETG	SOIL NAME, USCS GROUP SYMBOL, COLOR,	일	DEPTH OF CASING, DRILLING RATE,				
FAY:			#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	B	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION				
SUF			#1111	(N)	, , , , , , , , , , , , , , , , , , , ,	S					
42.3	0.0				Topsoil	17	Ť				
-		1.2	SS-1	2-3-3	\(\(\)0.0-0.15' - Poorly graded sand with organics \(\) Poorly Graded Sand With Silt (SP-SM)	甘	T				
-	1.5			(6)	\neg 0.15-1.15' - pale yellowish brown grading to dark	111	4				
-	1.5				\ yellowish brown, (10YR 6/2 to 10YR 4/2), moist,	1	1				
-					loose, fine grained, no HCl reaction, silica sand, trace to 10% nonplastic fines	1	1				
-					-	┨					
-					-	1	-				
_					-	1	-				
_					<u>-</u>	4	-				
_					<u>-</u>	1	_				
5	5.0						_				
37.3				4000	Clayey Sand (SC) 5.0-5.75' - moderate yellowish brown to light greenish]				
_		1.3	SS-2	4-3-32 (35)	\neg gray, (10YR 5/4 to 5G 8/1), moist, dense, fine grained, Γ	K	1				
	6.5			(,	\ slow dilatancy, no HCl reaction, 30% medium to high \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	ш	☐ Driller's Remark: Hard drilling at 6.0'				
					Silt (ML)]				
					5.75-6.3' - grayish orange to moderate yellowish brown, (10YR 7/4 to 10YR 5/4), moist, hard,	1	1				
-					brown, (10YR 7/4 to 10YR 5/4), moist, hard, nonplastic, very rapid dilatancy, mild to moderate HCl	1	1				
-					reaction, 5-10% very fine sand, carbonate materials,	1	1				
-					trace organics	1	1				
-					-	1					
					-	1					
10 32.3	10.0				Silt With Limestone Fragments (ML)	╁	Driller's Remark: Lost 50% circulation at				
- 02.0		0.9	SS-3	3-4-50/3.5	10.0-10.85' - grayish orange to dark yellowish orange.	$\ \ $	10.0'				
-	11.3	0.5	00 0	(54/9.5")	(10YR 7/4 to 10YR 6/6), wet, hard, nonplastic, high dilatancy, mild to moderate HCl reaction, 10% very	╂	┧ -				
_	11.5				fine sand, 50% limestone lenses (angular limestone	4	-				
_					fragments up to 1" diameter), trace black organic	1					
_					staining		Driller's Remark: Hard drilling at 12.0'				
_					_						
						1					
]					-	1	1				
1 7					-	1	Driller's Remark: Losing circulation, soft,				
15	15.0				-	1	possible void space at 14-14.5'				
27.3	15.4	0.3	SS-4	50/4.5	Silty Sand With Limestone Fragments (SM)	П					
-				(50/4.5")	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	1	circulation loss at 15.0'				
-					organics	1	1				
-						1					
-					-	1	Driller's Remark: Regaining some circulation				
-					-	1	at 17.5'				
-					-	-	Driller's Remark: Soft at 17.9-18.5', lost all circulation				
-					-	1	Driller's Remark: Light drill chatter at 18.0'				
-	20.0		00 -	F0// =	- N D	┰	Driller's Remark: Hard drilling at 19.0'				
	20.1	0.0_/	SS-5	50/1.5 (50/1.5")	No Recovery 20.0-20.1'	Γ]				
20				(55, 1.5)							
					Begin Rock Coring at 20.0 ft bgs						
					See the next sheet for the rock core log						



PROJECT NUMBER:

338884.FL

BORING NUMBER:

CT-02

SHEET 2 OF 4

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724719.3 N, 456342.2 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION: Vertical

CORING	IVIL IT IOD AI	ND EC	ZUIFIV	MENT: CME 550 S/N 186073, mud rotary, NQ tools, NW	casing	3	ORIENTATION : Vertical
WATER	LEVELS: 6.1	I ft bg:	s on 1	1/30/07 START: 11/29/2007 END: 12	2/1/200	D7 LOGGER : D. Whitaker	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		m	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE OOLOD	1
D A D	Z Z Z	<u></u>	FRACTURES PER FOOT	DESCRIPTION	힐	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
ASE	IN FEW	Q D (%)		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	፬	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
뚜뚜쯧	NG NG NG NG NG NG NG NG NG NG NG NG NG N	a D	N P	PLANARITY, INFILLING MATERIAL AND	₩.	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
E S E	SHR	Ř	F H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	δ	CHARACTERISTICS	BROI G, ILOT REGGETO, ETG.
	20.0		1	20.1' - Fracture, horizontal, rough, undulating,	ш	Limestone	Water level is 6.1' below
-	RT-NQ			bedding plane fracture, half of fracture	Н	 20.0-21.1' - grayish orange to dark 	ground surface on -
I -	1.5 ft 73%	50	2	surface open. <1/16" silt infill	Н	yellowish orange, (10YR 7/4 to 10YR	11/30/07 at 07:50
	21.5		NR	20.85' - Fracture, 10 deg, smooth to rough,		6/6), fine grained, mild HCl reaction,	Begin rock coring at 20'
-				undulating, open, <1/16" fine sand and silt	Ш	 weak (R2), voids to 1/16" diameter over 30% of rock, 5-10% cavities up 	R1: 8 minutes – 08:50-10:15 Changing out
-			>10	infill .	╫	to 1/4" diameter, poorly fossiliferous,	damaged drill bit
l -				20.91' - Fracture, 65 deg, rough, undulating,	Н	- trace recrystallization in pore space	- damaged ann bit
1			١.	trace of fine sand infill, open 21.65' - Fracture, 75 deg, rough, undulating,		No Recovery 21.1-21.5'	
I -			4	open	ш	Limestone	Driller's Remark: Soft
I -	DO NO			22.1-23.0' - Fracture zone, horizontal,	Н	 21.5-24.75' - dark yellowish orange, 	drilling at 23.0', hard at
I -	R2-NQ 5 ft	45	1	angular limestone fragments with trace of silt		(10YR 6/6), fine grained, moderate	24.0'
	65%		Ι΄.	infill	ш	HCI reaction, weak (R2), voids to	
25			0	22.6' - Fracture, 5 deg, rough, undulating,	1-1	 1/16" diameter over 40% of core surface, 5-10% spherical and 	1
25 17.3			I	tight		elongated cavities up to 1/4"	1 -
''.5 -				open to tight (other surface in fragments but	Ш	diameter, highly fossiliferous	1
1			NR	fits tight on surface)	$\vdash\vdash$	(molds/casts)	R2: 23 minutes
-	00.5			22.85' - Fracture, 20 deg, rough, undulating	т	No Recovery 24.75-26.5'	1
-	26.5			to stepped, open	ш	_ Limestone	-
-			>10	23.5' - Fracture, 20 deg, rough, undulating,	Н	26.5-27.15' - dark yellowish orange	1
1				tight 24.15' - Fracture, 70 deg, rough, undulating,	Ш	to moderate yellowish brown, (10YR	Driller's Remark: Soft
-				24.15 - Fracture, 70 deg, rough, undulating, 1/4" open	1	6/6 to 10YR 5/4), fine to medium	drilling at 27-28'
-			>10	26.75' - Fracture, 10 deg, rough, undulating,		grained, mild HCl reaction, extremely	П -
-				open -	\vdash	weak (R0), voids to 1/16" cover 40%	_
	R3-NQ		>10	26.9-27.15' - Fracture zone, subangular	Н	of core surface, 5-10% cavities up to 1/4" diameter, possible bioturbation	
-	5 ft 48%	0		limestone rock fragments up to 1-1/2"	Ш	at 26.9'; trace silt infill, trace	1
l	4070			diameter	Ш	recrystallization in void space, poorly	1
30 <u> </u>				27.9-28.4' - Fracture zone, fragments from coarse sand size to 3/4" diameter,	₽	fossiliferous	
12.3			NR	subangular to angular		Silt (ML)	
				28.5' - Fracture, vertical, rough, undulating,	Н	27.15-27.9' - grayish orange, (10YR	R3: 8 minutes
-	0.4.5			tight	╁┼	7/4), wet, soft, nonplastic, very rapid	1
-	31.5			28.6-28.7' - Fracture zone, rock fragments	田	dilatancy, moderate HCl reaction, with 10% fine to coarse sand-sized	-
-			1	28.8' - Fracture, 85 deg, rough, undulating	\vdash	- limestone fragments	<u> </u>
1			Ι΄.	31.9' - Fracture, 20 deg, smooth to rough, undulating, open	Н	Limestone	Driller's Remark: Soft at
1 -				andulating, open	Ш	27.9-28.75' - Same as 26.5-27.15'	32.0-32.5', hard at 32.5'
1 -			1	32.9' - Fracture, 20 deg, rough, undulating,	╫	28.75-28.9' - pale yellowish brown to	-
I -				1/2" open .	₽₩	_ dark yellowish orange, (10YR 6/2 to	1
1	R4-NQ		,	33.7, 34.0' - Fractures (2), 20 deg, rough,	Ш	10YR 6/6), very fine to fine grained,	
1 -	5 ft 91%	82	3	undulating to stepped, open up to 1/2",	Н	 strong HCl reaction, weak (R2), voids (1/16") over 1% of core 	1
	3170			<1/16" sand infill	╁┼┤	surface, poorly fossiliferous	1 1
35			1	34.45' - Fracture, 10 deg, smooth, planar,	Ш	— No Recovery 28.9-31.5'	1 -
7.3			L	tight	\mathbb{H}	Limestone	
1 -			1	35.6' - Fracture, horizontal, rough, undulating,	Н	31.5-32.15' - yellowish gray to	R4: 21 minutes
-			-	open up to 1"	団	- moderate yellow, (5Y 7/2 to 5Y 7/6),	1
-	36.5		NR	36.0' - Fracture, 70 deg, rough, undulating,	\Box	very fine to fine grained, mild HCl	Drillaria Damarii: 0-#
Ι _			>10	open (missing half of fracture surface)	Н	reaction, very weak (R1), small voids – (1/16") over 2% of core surface, 2	Driller's Remark: Soft drilling from 36.5-38', hard
1			1 10	36.65-36.85' - Fracture zone, subangular to	Ш	possible cavities up to 3/4" diameter,	at 38.0', soft at 38-38.5',
1 -				subrounded rock fragments with rough to smooth and undulating surfaces	П	very poorly fossiliferous, black	hard at 38.5'
-			>10	37.3' - Fracture, 20 deg, rough, undulating,	₽₩	 staining covers 40% of surface, also 	4
I _				up to 1/4" open	Н	trace iron staining orange-red yellow	
1	R5-NQ		0	37.35, 37.5, 37.7' - Fractures (3), 25 deg,	口	color	1
-	5 ft	16	ND	rough, undulating, open up to 1/2", trace sand	ш	_	1 1
-	42%		NR	infill	\vdash	_	1 -
40				37.85' - Fracture zone, rock fragments	口		
							-



PROJECT NUMBER:

338884.FL

BORING NUMBER:

CT-02

SHEET 3 OF 4

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724719.3 N, 456342.2 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION: Vertical

CORING	IVIL IT IOD AI	ND EC	ZUILIA	MENT: CME 550 S/N 1860/3, mud rotary, NQ tools, NW	Casing		ORIENTATION : Vertical
WATER	LEVELS: 6.1	I ft bg	s on 1	1/30/07 START: 11/29/2007 END: 12	2/1/200	7 LOGGER : D. Whitaker	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		m	DESCRIPTION	- 100	DOOK TYPE OOLOD	†
OFF	Z Z Z	<u></u>	FRACTURES PER FOOT	DESCRIPTION	- □	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
HAE HAE	SE 문	Q D (%)		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
F 두 것	NG NG NG NG NG NG NG NG NG NG NG NG NG N	a	AC R	PLANARITY, INFILLING MATERIAL AND	Æ	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
교외교	SHR	Ř	E H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	δ	CHARACTERISTICS	BROI 6, TEOT REGGETS, ETG.
2.3				38.0' - Fracture, 20 deg, rough, undulating,	ш	Limestone	
-				up to 1/2" open	╂┼┼	- 32.15-36.05' - light olive gray, (5Y	R5: 7 minutes
I -			NR	38.15' - Fracture, 20 deg, rough, undulating	┟┴┨	2/2), fine to medium grained,	K5. / Illillutes
l .	41.5			38.2' - Fracture, 10 deg, rough, undulating	ш	moderate HCl reaction, weak (R2),	
-						- voids 1/16" diameter cover 10% of	1
-			2		╂┴╂	core surface, 5-10% cavities up to 1" diameter, highly fossiliferous	-
l _				42.25' - Fracture, 20 deg, rough, undulating,	H	- (molds/casts)	
				tight	Ш	No Recovery 36.05-36.5'	
-			>10	42.35' - Fracture, horizontal, rough,	ш	Limestone	-
-				undulating, up to 1" open	╀┼	- 36.5-38.6' - moderate olive brown,	_
	R6-NQ			42.9' - Fracture, 20 deg, rough, undulating,	Н	(5Y 4/4), fine to medium grained,	
I -	5 ft 40%	25		trace sand infill	ш	mild HCl reaction, extremely weak	1
	70/0			43.15-43.5' - Fracture zone, fine to coarse gravel-sized subangular to subrounded rock	╂┯╂	(R0), voids up to 1/16" diameter over	-
45 -2.7			NR	fragments —	╂┼┼╂	50% of core surface, 10% cavities up to 1/4", moderately fossiliferous	
-2./					Ш	(fossils), trace molds and casts, 5%	
I -						silt infill in void space, 5%	R6: 7 minutes
I -					╂┴╂	recrystallization, trace black material	-
l -	46.5				┸	_ (possible fossils or organics)	_
			ر ا	46.8' - Fracture, horizontal, rough, undulating,	Н	No Recovery 38.6-41.5'	
			2	tight to 1/4" open, trace black staining on	Н	Limestone	1
-				surfaces		_ 41.5-43.5' - Same as 36.5-38.6' ☐ No Recovery 43.5-46.5'	_ -
l -			4	47.5, 47.65' - Fracture (2), horizontal, rough,		Limestone	_
				undulating, tight to 1/4" open, black organic	Н	46.5-47.65' - moderate yellowish	
	R7-NQ			staining covers 5% fracture surfaces	Ш	brown, (10YR 5/4), fine grained, mild	1
-	5 ft	40	>10	47.95' - Fracture, 40 deg, rough, undulating		HCl reaction, weak (R2), voids	-
l -	92%			to stepped, eroding fracture surface 47.95-48.7' - Fracture zone, horizontal, many	₽₩	(1/16") over up to 30% of core	_
50			. 10	bedding plane fractures, fissile/easily broken _	Н	surface, 10% cavities up to 1/2" size,	
-7.7			>10	material		highly fossiliferous (molds)	
I -				48.7' - Fracture, 70 deg, smooth to rough,	╂┴╂	Silty Sand (SP) 47.65-48.0' - moderate yellowish	R7: 11 minutes
l -			1	undulating, eroding fracture surface	╀┼	brown, (10YR 5/4), wet, fine to	-
	51.5	L	NR	48.7-49.25' - Fracture zone, sand to coarse	口	coarse grained, medium plasticity	
				gravel-sized rock fragments	Ш	Limestone	Driller's Remark: Hard
-			>10	49.15' - Fracture, vertical, rough, stepped,	╂┼┼	48.0-49.1' - moderate yellowish	drilling at 52'
-			<u> </u>	open 49.8' - Fracture, 80 deg, rough, stepped,		 brown, (10YR 5/4), fine grained, mild 	_
1			0	open	Щ	HCl reaction, extremely weak (R0),	
I -			ا ا	49.8-50.2' - Fracture zone, silt to fine	H	voids (1/16") over 5% of core	1
1 -	R8-NQ			gravel-sized rock fragments	╁┼┼	surface, mostly poorly competent	-
l -	5 ft	38	3	50.2' - Fracture, 80 deg, rough, stepped,	╓	with silt infill 49.1-51.1' - moderate yellowish	_
	62%		Ĺ	open	H	brown, (10YR 5/4), fine grained, mild	
55			0	50.6' - Fracture, 10 deg, rough, stepped, tight to 1/4"open, <1/16" silt infill	++	HCl reaction, very weak (R1), small	1
-12.7				51.5-52.2' - Fracture zone, rock fragments	田	(1/16") voids over 2% of core	_
-			NR	from fine to coarse gravel-sized, subangular	╂┯╂	surface, many cavities up to 3/4",	D0: 40
1			'"`	to subrounded	┟┼┤	moderately fossiliferous (molds)	R8: 16 minutes
I -	56.5			52.2' - Fracture, 0-10 deg, rough, undulating,		No Recovery 51.1-51.5'	
-	00.0			open	╂┼┼	Limestone 51.5-52.2' - pale yellowish brown to	1
l -			0	53.7' - Fracture, horizontal, smooth to rough,	╂┷╂	moderate yellowish brown, (10YR 6/2	_
				planar, tight	口	to 10YR 5/4), fine grained, mild HCl	
I -				54.05' - Fracture, 10 deg, rough, undulating, tight	П	reaction, extremely weak to very	1
-			1	54.25' - Fracture, horizontal, rough,	╂┴╂	weak (R0 to R1), voids (1/16") over	-
I -				undulating, fossil prints in black staining on	┦┼┼	5% of core surface, cavities up to	_
1	R9-NQ		_	fracture surface		3/4"x1/2", fossiliferous, trace molds,	
I -	5 ft 98%	70	3	58.4' - Fracture, horizontal, rough, undulating,	$\parallel \parallel$	trace organic staining (2% coverage)	1
-	90%			open, 1" sand and silt infill, black staining on	╂┼┼	-	-
60				1% of fracture surface	芦		_
L		L			L l		
			_		_		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

CT-02

SHEET 4 OF 4

ROCK CORE LOG

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724719.3 N, 456342.2 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

WATER	LEVELS : 6.1	l ft has	s on 1	1/30/07 START : 11/29/2007 END : 12	/1/20	1/2007 LOGGER : D. Whitaker	
		n by	J 0/1 1	DISCONTINUITIES		LITHOLOGY COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS ROCK TYPE, COLOR, SIZE AND DEPTH OF CAS FLUID LOSS, CORING RATE SMOOTHNESS, CAVING F DROPS, TEST RESULTS, I	E AND ROD
-17.7	61.5 R10-NQ 5 ft 100%		0 NR 1 1 1 1 1 1	58.9' - Fracture, horizontal, rough, undulating, tight to 1/4" open 59.15' - Fracture or mechanical break, rough, undulating, fissile surfaces, tight 59.25' - Fracture or mechanical break, rough, stepped, tight 59.6' - Fracture, horizontal, rough, undulating, 1/4" open 59.8' - Fracture, horizontal, rough, undulating, 1" of silt and sand infill between the two fracture surfaces 60.2' - Fracture, horizontal, rough, stepped, tight 62.1' - Fracture, 10 deg, smooth, undulating, tight to 1/4" open 63.05' - Fracture or mechanical break, horizontal, smooth, undulating, tight 64.0' - Mechanical break 64.35' - Fracture, 45 deg, rough, undulating, tight, black fossils 2% coverage 65.35' - Fracture, 0-20 deg, rough, undulating, tight 65.9' - Fracture, horizontal, rough, undulating, tight, coral mold on fracture surface		Limestone 52.2-53.7' - pale yellowish brown to moderate yellowish brown (10YR 6/2 to 10YR 5/4), very fine to fine grained, moderate to strong HCI reaction, weak (R2), small voids (1/16") cover 5% of core surface, poorly fossiliferous, 2% black staining, 5% recrystallization 53.7-54.2' - pale yellowish brown to moderate yellowish brown (10YR 6/2 to 10YR 5/4), fine grained, strong HCI reaction, extremely weak (R0), poorly fossiliferous 54.2-54.6' - pale yellowish brown to moderate yellowish brown (10YR 6/2 to 10YR 5/4), fine grained, strong HCI reaction, very weak (R1), voids (1/16") cover 10% of core surface, cavities up to 1/2" diameter, moderately fossiliferous with black fossils, 2% black staining No Recovery 54.6-56.5' Limestone 56.5-59.15' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine grained, strong HCI reaction, very weak (R1), voids (1/16") cover 40% of core surface, very fossiliferous, with cavities up to 3/4" diameter, black fossils and fossil molds, trace fossil casts, siti with sand-sized limestone fragments at 58.4-58.5' and 57.8-57.9' 59.15-59.9' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine grained, strong HCI reaction, weak (R2), voids (1/16") cover 16% of core surface, cavities up to 3/4"x1/2", moderately fossiliferous with black fossils 59.9-60.4' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine to very fine grained, strong HCI reaction, weak (R2), voids (1/16") cover 15% of core surface, cavities up to 3/4"x1/2", moderately fossiliferous (molds) 60.4-61.4' - Same as 59.9-60.4' except no voids or cavities, black staining over 15% of core No Recovery 61.4-61.5' Limestone 61.5-61.9' - Same as 60.5-59.15' except more fossiliferous (molds), more large cavities (up to 1"x1-1/2"), increasing with depth Bottom of Boring at 66.5 ft bgs on 12/1/2007	



PROJECT NUMBER:	BORING NUMBER:	
338884.FL	CT-03	SHEET 1 OF 4

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724626.2 N, 456581.9 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit

					,	ry, cameau, Avvo rous, 5-7/0			Official Vertical		
WATER	LEVELS	: 3.0 ft bo	gs on 12/	03/07	START : 12/2/2007	END : 12/5/2007	LOGGE	₹ : D.	Whitaker, T. Borton		
>				STANDARD		SOIL DESCRIPTION		ā	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				SYMBOLIC LOG			
표원한		RECOVE	ERY (ft)	120111200210		E, USCS GROUP SYMBOL, C		일	DEPTH OF CASING, DRILLING RATE,		
FAZ A						CONTENT, RELATIVE DENS CY, SOIL STRUCTURE, MINE	8	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION			
989			#TYPE	6"-6"-6" (N)	CONSISTENC	51, SOIL STRUCTURE, MINE	RALUGY	Ĭ Š	INSTRUMENTATION		
40.8	0.0			(14)	Tanasil			7/1/2			
40.6	0.0			400	Topsoil	ish black, (5YR 2/1), organi	rs /-		_		
		1.2	SS-1	1-2-2 (4)	Poorly Graded						
-	4.5			(4)	0.4-1.15' - vello	wish gray, (5Y 7/2), moist, v	erv loose.		∤		
-	1.5				very fine to fine	grained, no HCl reaction, si	ilica sand,	1	-		
-					\5% organics, tra	ace nonplastic fines		1	_		
								1			
1 7								1			
-							-	1	<u> </u>		
-							-	1	-		
								1]		
								1			
5	5.0							1			
35.8	5.0				No Recovery 5.	0-6.5'		1			
				3-2-3	140 Hecovery 5.			1	_		
		0.0	SS-2	(5)			-	1			
1 7	6.5			(-/				1]		
1 -	<u> </u>				Fat Clay With S	Sand (CH)			Driller's Remark: Medium chatter at 6.5'		
-			00.0	NA	↑ 6.5-6.9' - liaht ol	live grav. (5Y 6/1), wet, very	/ soft, high	1	Due to no recovery at previous interval,		
_		0.4	SS-3	(NA")	\ plasticity, slow o	dilatancy, no HCI reaction, 1	5% fine /	1	another sample was collected at 6.5-8.0'		
	8.0			, ,	\silica sand			1	SPT results not recorded		
							-	1	_		
-							-	1	-		
-								1	-		
I _								1	_		
10	10.0							1			
30.8	10.5	0.2	SS-4	50/5.5	→ Silt (ML)		Г	ш	Driller's Remark: Moderate chatter and hard		
-	10.5			(50/5.5")	\ 10.0-10.2' - mod	derate yellow to dusky yellov	w, (5Y 7/6	1	at 10.0'		
-					nonplastic fines	to moderate HCI reaction, 7	70% / .	1	-		
I _					monplastic lines			1	_		
								1			
-							•	1			
-							-	1	-		
-								1	_		
1 7							•	1	Driller's Remark: Light chatter at 13.5-15.0'		
1 -								1	 		
-								1	-		
15	15.0						,	НП	_		
25.8					Sandy Silt And	Limestone Fragments (ML	-)				
]		1.2	SS-5	27-13-14	orange (10YR)	le yellowish orange to dark 8/6 to 10YR 6/6), wet, very s	yellowisti stiff_high]		
-	10.5			(27)	dilatancy, mode	rate HCl reaction, 15-20% f	ine to	ш	-		
-	16.5				coarse grained:	sand and gravel size limest		1	-		
_					fragments			1	_		
								1			
1 7							•	1]		
-								1	-		
-								1	-		
_							-	1			
1								1			
00							-	1	Driller's Remark: 19.5-20.0' soft		
20		-	-				_	+	_		
								1			
1				<u> </u>							



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-03	SHEET	2	OF	4	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724626.2 N, 456581.9 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit

ORIENTATION : Vertical

					_	/, cathead, AWJ rods, 3-//			ORIENTATION : Vertical
WATER	LEVELS	: 3.0 ft bo	gs on 12/0	03/07 I	START : 12/2/2007	END : 12/5/2007	LOGGEF	} : D.	Whitaker, T. Borton
30=1				STANDARD PENETRATION		SOIL DESCRIPTION		g	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	RECOVE		TEST RESULTS	SOIL NAME,	USCS GROUP SYMBOL, CONTENT, RELATIVE DEI	COLOR,	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH SURFA ELEVA			#TYPE	6"-6"-6" (N)		Y, SOIL STRUCTURE, MIN		SYMB	INSTRUMENTATION
20.8 - -	20.0 20.8	0.7	SS-6	3-50/3.5 (53/9.5")	20.0-20.7' - dusky	Limestone Fragments (y yellow, (5Y 6/4), wet, v ained, mild to moderate ines; 40% fine gravel-siz	rery dense, - HCl reaction, √		Driller's Remark: Very hard at 20.5'
- - - - - 25_ 15.8	25.0 26.1	0.7	SS-7	9-30-50/1.5 (80/7.5")	Silty Gravels (GI 25.0-25.7' - dark very dense, fine t	M) yellowish orange, (10YF to coarse grained, mode ate sand, 24% nonplasti			Driller's Remark: Heavy chatter at 22.0' Driller's Remark: 22.0-23.0' 100% loss of circulation Driller's Remark: Regain circulation after mixing more mud at 23.5' Driller's Remark: Dropped 3 inches from 25.5-25.75' (soft or possible void)
- - - - 30_ 10.8	30.0	0.6	SS-8	29-50/3.5 (79/9.5")	\ mild to moderate	Silty Sand y yellow, (5Y 6/4), wet, v i HCl reaction, gravel siz SM) similar to 25.0-25.7'	rery dense, ed grains,		Drillor's Romark: Hoavy Chatter at 21.5'
- - - - 35_ 5.8	35.0 35.6	0.5	SS-9	40-50/0.75 (90/6.75")	Limestone With 35.0-35.5' - Same Begin Rock Corir See the next she	e as 30.0-30.6	- - - - - -		Driller's Remark: Heavy Chatter at 31.5' Driller's Remark: Heavy chatter at 32.5' Driller's Remark: Soft at 33.0-34.5' Driller's Remark: Heavy chatter at 34.5' Driller's Remark: Loss of circulation at 35.0' Water level is 3.0' below ground surface at 07:53 on 12/3/07
- - - - - 40							- - - - - -		- - - - -



PROJECT NUMBER:

338884.FL

BORING NUMBER:

CT-03 SHEET 3 OF 4

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724626.2 N, 456581.9 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, NQ tools, NW casing

WATER	LEVELS : 3.0	ft bg	s on 1:	2/03/07 START : 12/2/2007 END : 12	2/5/20	D7 LOGGER : D. Whitaker, T. Borton	n
>00	<u></u>			DISCONTINUITIES	ŋ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-	35.5 R1-NQ 1.5 ft 80% 37.0	50	>10 1 NR	35.5-35.85' - Fracture zone, fine to coarse angular gravel sized fragments 35.85' - Fracture, 60 deg, rough, undulating, open 36.6' - Fracture, 70 deg, rough, undulating, open 1/16"-1/8", organic infilling		Limestone 35.5-36.7' - dusky yellow to light olive gray, (5Y 6/4 to 5Y 5/2), very fine to fine grained, mild HCI reaction, weak (R2), voids 1/16" diameter over 1% core surface. 2 cavities up to 1/2"x1-	Begin rock coring at 35.5' R1: 8 minutes
- - - - 40 0.8	R2-NQ 5 ft 96%	78	0 1	37.0-37.15' - Fracture zone, angular fine gravel sized fragments 37.65' - Fracture, horizontal, smooth, undulating, 1/4" open 37.75' - Fractures (3), 40-50 deg, smooth, undulating, 2 open, 1 tight 39.1' - Fracture, horizontal, rough, planar, open up to 1/4"		1/2" possibly both fossil molds, black staining over 15% core surface No Recovery 36.7-37.0' Limestone 37.0-41.0' - light olive gray to dusky yellow, (5Y 2/2 to 5Y 6/4), very fine to fine grained, mild to moderate HCI reaction, weak (R2), voids 1/16" diameter over 2% core surface from	- - - -
-	42.0		1 2 NR 3	39.5, 40.25' - Mechanical break (2) 40.6' - Fractures, horizontal, rough, stepped, tight 41.35, 41.7' - Fractures (2), horizontal, rough, undulating, fissile up to 1/2" open 42.1' - Fracture, 15 deg, rough, undulating, tight, fissile		diameter over 2% core surface from 37.0-38.5' to over 5% from 38.5-40.0' and 10% from 40.0-41.0', grain size coarsening with depth, number and size of cavities increasing with depth, up to 1"x1- 1/2", highly fossiliferous molds/casts, trace possible black fossils	R2: 18 minutes
- -45 -4.2	R3-NQ 5 ft 45%	11	>10 1	42.7, 42.8' - Fractures (2), horizontal, rough, undulating, open up to 1/2", fissile 43.0, 43.3' - Fractures (2), 0-10 deg, rough, undulating, open up to 1/2" 43.4-43.55' - Fracture zone, coarse sand to fine gravel size subrounded fragments 43.8, 44.0, 44.3' - Fractures (3), horizontal, rough, undulating, tight to 1/2" open		41.0-41.8' - dusky yellow, (5Y 6/4), fine to medium grained, mild HCl reaction, extremely weak (R0), voids 1/16" over 30% of core surface, cavities up to 3/4"x1-1/2", highly fossiliferous with molds and casts, 1% organics No Recovery 41.8-42.0' Limestone 42.0-44.25' - Same as 41.0-41.8'	
- - -	47.0		2	47.15' - Fracture, horizontal, rough, undulating, open 47.41' - Fracture, horizontal, smooth to rough, undulating, open up to 1/2"		except moderate yellowish brown, (10YR 5/4), number of cavities increasing with depth No Recovery 44.25-47.0' Limestone 47.0-48.2' - dusky yellow to light olive gray, (5Y 6/4 to 5Y 5/2), fine grained, mild HCI reaction, weak (R2), voids	R3: 3 minutes
- 50_ -9.2 -	R4-NQ 5 ft 24%	16	NR			1/16" over 40% of core surface; 10-20% cavities up to 1/2" diameter, highly fossiliferous with molds, casts and fossils, 10% recrystallization in 1/16" voids No Recovery 48.2-52.0'	R4: 18 minutes
- - - -	52.0		5 >10	52.15' - Fracture, horizontal, rough, planar to rough stepped, open up to 1/2", organic infilling, 1/16" thick 52.4' - Fracture, horizontal, rough, stepped, tight, organic infilling, 1/16" thick 52.6' - Fracture, horizontal, rough, undulating,		Limestone 52.0-52.55' - dusky yellow, (5Y 6/4), fine grained, mild HCl reaction, weak (R2), black organic laminations 1/32"-1/2" thick cover over 40% of surface, most are 1/32" thick, poorly	Water level 3' 2" below ground surface at 07:20 on 12/4/07
55 -14.2	R5-NQ 5 ft 40%	0		open up to 1/2", silt infilling 52.8-52.9' - Fracture zone, 0-10 deg, rough, undulating, open		fossiliferous 	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-03	SHEET	4	OF	4	

ROCK CORE LOG

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724626.2 N, 456581.9 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

WATER	LEVELS: 3.0	ft bg	s on 12	2/03/07 START : 12/2/2007 END : 12	2/5/20	D7 LOGGER : D. Whitaker, T. Borton	1
≳Q.⊋	(%			DISCONTINUITIES	ا بر	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AN SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-	57.0		NR	53.15' - Fracture, 70 deg, rough, undulating, open 53.15-53.5' - Fracture zone, gravel sized rock fragments		Limestone 52.55-54.0' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, extremely weak to very	R5: 7 minutes
- - -			>10	53.65' - Fracture, horizontal, rough, undulating, tight 57.0-57.35' - Fracture zone, coarse sand to coarse gravel size subangular rock fragments with black organic material on fracture surfaces		- weak (R0 to R1), strength decreases with depth, voids cover 5% of core surface, cavities that are 1/8"-1/4" - diameter, 5% recrystallization (white), 1% black organics, 5% linear 2"x1/16" thick, gray material from	
60_ -19.2	R6-NQ 5 ft 50%	30	1	58.45-58.8' - Fracture zone, coarse sand to coarse gravel size subangular to subrounded rock fragments, fracture surface are 20 deg at 58.45' and 70 deg at 58.8', rough, undulating to stepped		 52.8-53.2' No Recovery 54.0-57.0' Limestone 57.0-59.5' - moderate yellowish brown, (10YR 5/4), fine grained, mild 	Driller's Remark: Soft at 57-59.6', hard at 59.5-62'
- - -	62.0		NR	59.25' - Fracture, 15 deg, rough, undulating, tight		HCl reaction, weak to extremely weak (R2 to R0), voids 1/16" cover 20% of core surface, cavities up to 3/4" diameter and 1-1/2"x2", highly fossiliferous with molds and casts,	R6: 8 minutes Original boring CT-03
- - -			0	62.4' - Mechanical break or bedding plane, <5 deg, rough, undulating, tight		1% black organic material throughout core No Recovery 59.5-62.0' Limestone 62.0-64.5' - medium light gray to yellowish gray mottled, (N6 to 5Y	abandoned at 62' due to casing problems; replacement boring located 5' north of original boring Replacement boring blind
65_ -24.2	R7-NQ 5 ft 100%	88	3	64.55' - Bedding plane, <5 deg, smooth, undulating, tight — 64.65' - Bedding plane, <5 deg, smooth,		yellowish gray infolled, (No to 31 7/2), medium to fine grained, moderate to strong HCl reaction, medium strong (R3), voids <1/1/0"-1/2" Silty Limestone	drilled to 62'
-	67.0		1	undulating, open to <1/16", fine infilling 64.9' - Mechanical break, <5 deg, rough, undulating, tight 66.25' - Mechanical break or bedding plane, <5 deg, rough, undulating, tight		64.5-64.65' - yellowish gray to olive gray, (5Y 7/2 to 5Y 3/2), very fine to fine grained, mild HCl reaction, weak (R2)	R7: 19 minutes
-			3	67.25, 67.67, 67.8' - Mechanical break (3), <5 deg, rough, undulating, tight		Limestone - 64.65-67.0' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), medium to coarse grained, moderate HCI - reaction, very weak to weak (R1 to	
70	R8-NQ 5 ft 84%	57	1	69.1' - Mechanical break or bedding plane, <5 deg, rough, planar, open <1/16"		R2), voids <1/16" over 30-40% of core surface, trace organics, irregular bedding with depth 67.0-71.2' - yellowish gray to dusky	
-29.2 -	07/0		2	70.0' - Fracture, 5-10 deg, rough, undulating, tight 70.9' - Mechanical break or bedding plane,		yellow, (5Y 7/2 to 5Y 6/4), medium to coarse grained, mild HCI reaction, voids up to 1/2" over 5% of core surface predominately from	R8: 6 minutes
-	72.0		NR	<5 deg, rough, undulating, open 1/8"	Ħ	68.8-69.8', voids <1/16" over 45-55% of core surface, trace organics, moderately to highly fossiliferous (casts/molds)	Total depth of boring 72.0'
-						No Recovery 71.2-72.0' Bottom of Boring at 72.0 ft bgs on 12/5/2007	
_				_			



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-04	SHEET	1	OF	3	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724456.6 N, 456923.6 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLIN	DRILLING METHOD AND EQUIPMENT : CME 45B S/N 351574, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical											
WATER	WATER LEVELS : 4.0 ft bgs on 11/30/07											
>				STANDARD	SOIL DESCRIPTION	COMMENTS						
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION						
H H H		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND						
PTT- JRF/ EVA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	INSTRUMENTATION						
40.8	0.0			(N)		<i>l</i> ,						
40.6	0.0			0-2-2	0.0-0.2' - brownish black (5VR 2/1) organics (roots	· · · · · · · · · · · · · · · · · · ·						
_		0.8	SS-1	(4)	\wood) /							
_	1.5				Poorly Graded Sand (SP) 0.2-0.55' - very light gray to yellowish gray. (N8 to 5Y							
_					8/4), moist, very loose, very fine to fine grained silica	_						
_					sand, trace nonplastic fines, 30% organics (wood and rootlets)	_						
_					Poorly Graded Sand With Silt (SP-SM)	_						
_					0.55-0.75' - dark yellowish orange, (10YR 6/6), moist, very loose, very fine to fine grained, silica sand, 15%	_						
_					nonplastic fines, trace organic particles	_						
_					_	-						
5 35.8	5.0				di Will o L(OL)							
35.8				1-2-3	Lean Clay With Sand (CL) 5.0-5.6' - greenish gray and light olive gray, (5G 6/1	//						
_		0.9	SS-2	(5)	and 5Y 6/1), mottled, moist, firm, low to medium	<u> </u>						
_	6.5				plasticity, slow dilatancy, 15-20% very fine to fine							
_					Silty Gravel (limestone) With Sand (GM)	-						
_					5.6-5.85' - white to yellowish gray, (N9 to 5Y 8/1), wet, loose, strong HCl reaction, very fine to coarse gravel,	-						
-					25-30% fine to coarse sand sized, 15% nonplastic							
_					fines, appears to be fossiliferous	_						
_					_	_						
_					_							
10	10.0				Oilte Oand And Lineartens (ON)	Til Dellada Barrado 500/ materilas at 40						
30.8				14-34-50	Silty Sand And Limestone (SM) 10.0-11.3' - yellowish gray, (5Y 8/1), moist, very	Driller's Remark: 50% water loss at 10'						
-		1.3	SS-3	(84)	dense, fine to coarse grained, strong HCl reaction,	-						
-	11.5				15-20% nonplastic fines, 40-50% fine to coarse limestone fragments, 50-60% SM, all carbonate	<u> </u>						
-												
_					4	_						
_					_	_						
_					_	_						
]						
15	15.0				Oth (All)	_ _						
25.8				13-30-33	Silt (ML) 15.0-16.3' - grayish yellow, (5Y 8/4), moist to wet,							
		1.3	SS-4	(63)	hard, nonplastic, slow dilatancy, mild HCl reaction,							
	16.5			. ,	10% fine to medium sand-sized, <5% limestone fragments to 1/2", all carbonate materials	<u>_</u>						
					Tragmonto to 172, an octivoriate materials							
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	CT-04	SHEET	2	OF	3

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724456.6 N, 456923.6 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLIN	G METHO	DD AND	EQUIPME	ENT : CME 45B S	/N 351574, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone	bit		ORIENTATION : Vertical
WATER	LEVELS	: 4.0 ft bo	s on 11/3	30/07	TART : 11/29/2007 END : 11/30/2007 LOGG	ER:	: T.	
 ≥□⊋				STANDARD PENETRATION	SOIL DESCRIPTION	4	ЭG	COMMENTS
ELO ON (f	SAMPLE	INTERVA		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,	١	IC LC	DEPTH OF CASING, DRILLING RATE,
TH B FACI		RECOVE			MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	١	SYMBOLIC LOG	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	CONSISTENCT, SOIL STRUCTURE, MINERALOGY	١	SYIV	INSTRUMENTATION
20.8	20.0			04.00.00	Silt With Sand And Limestone (ML) 20.0-21.2' - grayish yellow, (5Y 8/4), wet, hard,	1		
		1.2	SS-5	24-32-30 (62)	nonplastic, rapid dilatancy, mild to moderate HCl	1		_
_	21.5			` '	reaction, 15% fine to medium sand-sized, 15-20% fine rounded limestone grains, some are knobby	/‡	ш	_
-					connections, carbonate materials	4		_
_						4		-
-						4		-
_						4		-
-						+		-
25	25.0					1		-
15.8	25.3	0.0	SS-6	50/3	No Recovery 25.0-25.3'	\pm		-
-				(50/3")		1		1
-						1		1
						1		1
]		
								_
_						4		_
_						4		_
30 <u> </u>	30.0				Silty Sand (SM)	4	HIL	_
10.5		4.0	00.7	38-51-45	30.0-31.3' - grayish yellow, (5Y 8/4), wet, very dense,	+		-
_		1.3	SS-7	(96)	fine to coarse grained, moderate HCl reaction, 30% nonplastic fines, 10-15% fine limestone fragments	+		-
_	31.5				and grains, carbonate materials	7		-
_						1		-
-						1		-
-						1		1
_	35.0					1		1
-	35.1	0.0	SS-8	50/1.5 (50/1.5")	No Recovery 35.0-35.1'	7		_
35				(50/1.5")				
5.8					Begin Rock Coring at 35.0 ft bgs See the next sheet for the rock core log			11/30/07 08:00 continue drilling \Water level 4.0' below ground surface
					See the flext sheet for the fock core log			- Valer level 4.0 below ground surface
_						4		_
_						4		_
-						4		_
-						4		
-						4		-
-						+		-
-						+		-
40						+		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

CT-04

SHEET 3 OF 3

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724456.6 N, 456923.6 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 45B S/N 351574, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

COMING	IVILITIOD AI	ND EC	JUIPIV	MENT : CME 45B S/N 351574, mud rotary, NQ tools, NW	casırı	l <u>y</u>	ORIENTATION : Vertical
WATER	LEVELS: 4.0	ft bgs	s on 1	1/30/07 START : 11/29/2007 END : 11	/30/2	007 LOGGER : T. Borton	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
5.8	35.0 R1-NQ 1 ft 36.0 90%	42	>10	35.45-35.65' - Fracture zone, fine infilling (20-30% of zone)	E	Limestone - 35.0-35.45' - yellowish gray, (5Y 7/2), fine to coarse grained, mild HCl	Begin rock coring at 35.0' R1: 2 minutes
-			3	35.7' - Bedding plane, <5 deg, <1/16" open 35.8' - Bedding plane, <5 deg, <1/16" open 36.2' - Fracture, <5 deg, rough, undulating,		reaction, very weak to weak (R1 to R2), voids to 1/8" (predominantly <1/1/16") over 20-30% of surface,	-
-	R2-NQ 5 ft 78%		2	open to 1/4" 36.6' - Bedding plane, <5 deg, rough, undulating, tight	F	fossiliferous (casts/molds) 35.45-35.9' - Same as 35.0-35.45' except extremely weak (R0)	-
-		28	3	36.75' - Fracture, 70-75 deg, rough, undulating, tight - 36.9' - Mechanical break or fracture, <5 deg, _		No Recovery 35.9-36.0' Limestone 36.0-39.9' - yellowish gray, (5Y 7/2), fine to coarse grained, mild HCl	-
40 0.8			0	rough, undulating, tight 37.25' - Bedding plane, <5 deg, rough, undulating, fine to coarse sand sized infill, no opening, open 1/8"-1/2"	Ē	reaction, very weak to weak (R1 to R2), with zones of extremely weak (R0) rock at 36.5-36.6' and	R2: 8 minutes
-			NR	37.7' - Bedding plane, <5 deg, rough, undulating, tight 38.2' - Bedding plane, <5 deg, rough,	Ħ	- 37.5-38.15', voids to <1/16" over 15-25% of surface, fossiliferous (casts/molds), <5% possible laminar	-
-			>10	undulating, open 3/16", fine to coarse sand-sized infill, 100% of opening filled 38.55' - Fracture, 60-70 deg, rough,	E	L bedding planes No Recovery 39.9-41.0' Limestone	Driller's Remark: 100%
-	R3-NQ 5 ft 84%		53 0 41. (pre	undulating, open - 38.9' - Mechanical break - 41.15' - Bedding plane, <5 deg, rough,		41.0-41.55' - Same as 36.0-39.9' except moderately fossiliferous - 41.55-45.2' - yellowish gray	water loss at 42' -
-		53		undulating, open <1/16" 41.3-41.55' - Fracture zone, fragments to 1" (predominately <1/2")	Ħ	transitioning to pale olive with depth, (5Y 7/2 to 10YR 6/2), very fine to fine grained, strong to moderate HCI reaction, weak to medium strong (R2	-
45 -4.2			0	42.1' - Fracture, 65-70 deg, smooth, planar 42.3' - Mechanical break or bedding plane, <5 deg, rough, undulating, open to 1/16",		to R3), trace voids (<1/16"), fossiliferous (casts and molds), burrow or solution cavity (3/16"	R3: Run time not recorded
_	46.0		NR 2	trace fine infilling 45.1' - Mechanical break, 65-75 deg, rough, undulating, tight 45.2' - Fracture, 5 hairline fractures from		diameter) at 42.28' No Recovery 45.2-46.0' Limestone	
-			3	45.2' to end of core 46.85' - Bedding plane, <5 deg, rough, planar, trace fine infilling, open 1/4"	Ħ	46.0-50.0' - Same as 41.55-45.2' - except zone of weak (R2) rock from 46.8-46.95', voids (<1/16") increasing	
-	R4-NQ 5 ft	62	0	46.95' - Mechanical break, <5 deg, rough, undulating, tight 47.45' - Fracture, 5-15 deg, rough,	E	with depth, 1" solution cavities at 47.35' and 47.7', trace irregular bedding planes	
-	94%		1	undulating, open 47.75' - Fracture, <5 deg, closed, does not go all the way through	Ħ	- - -	
50 -9.2 -	51.0		2 NR	47.85' - Mechanical break or bedding plane, <5 deg, rough, undulating, tight 49.55' - Mechanical break or bedding plane, <5 deg, rough, undulating, open <1/16"		50.0-50.7' - yellowish gray, (5Y 7/2), medium to coarse grained, mild HCl reaction, very weak to weak (R1 to	R4: Run time not recorded Total depth of boring is
- - - - -	51.0		NK	50.0-50.1' - Fracture or bedding plane, <5 deg, rough, undulating, open, one large 0.1' angular fragment 50.5' - Mechanical break or bedding plane, <5 deg, rough, undulating, open <1/16"		R2), voids <1/16" over 30-40% of surface, fossiliferous (casts and molds) No Recovery 50.7-51.0' Bottom of Boring at 51.0 ft bgs on 11/30/2007	51.0' Driller's Remark: Water level is 3.5' below ground surface



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-05	SHEET	1	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723052.6 N, 456340.9 E (NAD83)

ELEVATION: 41.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

WATER	LEVELS	: 4.4 ft bo	gs on 11/	14/07	START : 11/12/2007 END : 11/14/2007 LOGGER : J. Schaeffer, T. Borton
				STANDARD	SOIL DESCRIPTION COMMENTS
AND (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	0713
ACE,		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6"	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
<u>оош</u> 41.5	0.0			(N)	Poorly Graded Sand With Organics (SP) Begin drilling on 11/12/07 at 16:00
-	• • • • • • • • • • • • • • • • • • • •	0.9	SS-1	1-1-2	0.0-0.9' - pale yellowish brown, (10YR 6/2), moist,
-	1.5	0.5	00 1	(3)	\silica sand, trace nonplastic fines, 5-10% organics / \bigci_
-	1.0				\and roots -
-					
-					1
-					1
] [
_					
5	5.0				
36.5				2-2-2	Poorly Graded Sand With Clay (SP-SC) 5.0-5.5' - dark yellowish orange, (10YR 6/6), moist to wet yer loose fine grained 9% moderate plasticity 5.5-6.0' SS-2B
_		1.0	SS-2	(4)	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
-	6.5				Fat Clay (CH)
-					5.5-6.0' - grayish blue green, (5BG 5/2), moist, soft, high plasticity, no dilatancy, no HCl reaction, 5-10%
-					very fine to fine silica sand, trace rootlets
-					
-					
-					
10	10.0				1
31.5					Silty Sand (SM) 10.0-10.2 SS-3A
		0.9	SS-3	2-3-5 (8)	\ \ 10.0-10.2' - light greenish gray, (5GY 8/1), wet, loose, \ -\ fine to coarse grained, strong HCl reaction, sand is \ -\ \\\ \\ \\ \\ \\ \\ \\\ \\ \\ \\ \\ \\ \\ \\ \\\ \\\ \\ \\ \\ \\\ \\ \\ \\\
	11.5			(=)	\predominately fossil fragments, 20% nonplastic fines \\ \silty \text{Sand (SM)} \\
_					10.2-10.9' - yellowish gray, light greenish gray, and
_					light bluish gray, (5Y 8/1, 5GY 8/1, and 5B 7/1), wet, loose, irregularly bedded sands, predominately very
-					fine to fine silica sands, up to 25% fine to coarse sand
-					as in 10.0-10.2' (fossils), 15% nonplastic fines, strong HCl reaction in fossil materials
-					
15 <u> </u>	15.0	0.7	00.4	34-50/2	Silt And Limestone (ML)
-	15.7	0.7	SS-4	(84/8")	15.0-15.7' - grayish orange, (10YR 7/4), wet, hard, - │ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │ │
-					\ 49% coarse sand-sized and fine gravel-sized \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
-					\limestone fragments, strong HCI reaction in the \ - \ \limestone, all carbonate materials \ - \ \
					<u> </u>
]
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L		L	l .		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-05	SHEET	2	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723052.6 N, 456340.9 E (NAD83)

ELEVATION: 41.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLIN	G METH	OD AND	EQUIPM	ENT : CME 45B S	/N 351574, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical						
WATER	LEVELS	: 4.4 ft b	gs on 11/	14/07	TART : 11/12/2007 END : 11/14/2007 LOGGER : J. Schaeffer, T. Borton						
I				STANDARD	SOIL DESCRIPTION COMMENTS						
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION						
HH		RECOVE	ERY (ft)	1.2011.2002.70	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND						
H A F			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY						
SUI			"	(N)	⟨S						
21.5	20:9	0.4	SS-5	26-50/0.5	Silt And Limestone (ML) Resume drilling at 08:12 on 11/13/07 20.0-20.4' - grayish orange, (10YR 7/4), wet, hard,						
				(76/6.5")	20.0-20.4' - grayish orange, (10YR 7/4), wet, hard, nonplastic, rapid dilatancy, mild HCl reaction, 60% silt						
					and 40% limestone, limestone is fine to coarse						
_					sand-sized fragments, friable, mild HCl reaction, one / - 1/2" iron concretion						
-					08:47 3" NW casing installed to 20.0'						
-					1 						
-					1 						
-					- 1						
-					- 						
25 <u> </u>	25.0				Silt With Sand And Limestone (ML) Possible slough top of sample, 3 angular to						
-			00.0	29-45-27	25.0-26.2' - grayish orange, (10YR 7/4), wet, hard, - III subangular fragments up to 1.0", strong HCl						
-		1.2	SS-6	(72)	nonplastic, rapid dilatancy, mild HCl reaction, 15-25% reaction fine to medium sand-sized varies throughout sample,						
- ا	26.5				25% fine gravel-sized limestone fragments, carbonate /						
_					\materials \ \ _						
l _											
_] 						
					11						
_					11						
30	30.0				11						
11.5	33.3				Limestone Fragments And Silt (ML) 20 blows first 6.0" then rods fell 11.0",						
-		0.5	SS-7	20-0-4	30.0-30.4' - grayish orange, (10YR 7/4), 75% Solution Ablows last inch Driller's Remark: Cavity in rod drop zone Ablows last inch Driller's Remark: Cavity in rod drop zone Ablows last inch Driller's Remark: Cavity in rod drop zone Ablows last inch Driller's Remark: Cavity in rod drop zone Ablows last inch Driller's Remark: Cavity in rod drop zone Ablows last inch Driller's Remark: Cavity in rod drop zone Ablows last inch Driller's Remark: Cavity in rod drop zone Ablows last inch Driller's Remark: Cavity in rod drop zone Ablows last inch Driller's Remark: Cavity in rod drop zone Ablows last inch Driller's Remark: Cavity in rod drop zone Ablows last inch Driller's Remark: Cavity in rod drop zone Ablows last inch Driller's Remark: Cavity in rod drop zone Ablows last inch Driller's Remark: Cavity in rod drop zone Ablows last inch Driller's Remark: Cavity in rod drop zone Ablows last inch Driller's Remark: Cavity in rod drop zone Ablows last inch Driller's Remark: Cavity in rod drop zone Ablows last inch Driller's Remark: Cavity in rod drop zone Ablows last inch Driller's Remark: Cavity in rod drop zone Ablows last inch Driller's Remark: Cavity in rod drop zone	-	31.5			(4)	mild HCI reaction, 25% silt which is wet, soft,
-	31.3				\nonplastic, rapid dilatancy, mild HCl reaction, cavity at 30.4-31.4' based on soil sample appearance and driller's note						
-					Assumed Cavity 30.4-31.4'						
-					Sandy Silt (ML) 10:03 Casing advanced to 30'						
-					31.4-31.5' - grayish orange, (10YR 7/4), wet, soft, nonplastic, rapid dilatancy, mild HCl reaction, 35%						
-					fine to coarse sand-sized, carbonate materials						
-					<u> </u>						
-											
35 6.5	35.0				Silty Sand With Limostone (SM)						
0.5		1.2	SS-8	23-51-50/2.5	Silty Sand With Limestone (SM) 35.0-35.5' - grayish orange, (10YR 7/4), wet, very 35.0-35.5' SS-8A						
-	36.2	'		(101/8.5)	\ dense, fine to coarse grained, moderate HCl reaction, / ∐						
-					\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\						
_					Silty Sand (SM)						
l _					35.5-36.2' - dark yellowish orange, (10YR 6/6), wet, very dense, fine to coarse grained, moderate HCl						
_					reaction, 30-35% nonplastic fines, 5-10% fine						
					gravel-sized limestone fragments, all carbonate Driller's Remark: 100% water loss at 38.0'						
					materials						
l -					11						
40					11						



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-05	SHEET	3	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723052.6 N, 456340.9 E (NAD83)

ELEVATION: 41.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

WATER	LEVELS	: 4.4 ft bo	gs on 11/	14/07	TART : 11/12/2007 END : 11/14/2007 LOGGER : J.	Schaeffer, T. Borton	
				STANDARD	SOIL DESCRIPTION	COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND	
H H		RECOVE	ERY (ft)	12011120210	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		
PTF JRF4	#TYPE 6"-6"			6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	INSTRUMENTATION	
월 3 1.5	40.0			(N)			
1.5	40.0			15-8-6	Silty Sand (SM) 40.0-41.3' - moderate yellowish brown to dark	-	
_		1.3	SS-9	(14)	yellowish brown, (10YR 5/4 to 10YR 4/2), wet, medium dense, fine to coarse grained, mild to	1	
_	41.5				moderate HCl reaction, 25% nonplastic fines, 10-15%	1	
_					fine gravel-sized limestone fragments, all carbonate materials	-	
_					Inaterials		
_					_	-	
_					_	Drillaria Damaniu Chattar et 40 Fl	
_					_	Driller's Remark: Chatter at 43.5'	
_	45.0				_	-	
45 -3.5	45.2	0.0	SS-10	50/2.5	No Recovery 45.0-45.2'		
-5.5	43.2			(50/2.5")	Begin Rock Coring at 45.0 ft bgs See the next sheet for the rock core log	-	
-					See the flext sheet for the rock core log	-	
-					-	-	
_					-	-	
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50 -8.5					-	-	
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-					1	1	
60					1	1	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

CT-05

SHEET 4 OF 5

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723052.6 N, 456340.9 E (NAD83)

ELEVATION: 41.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 45B S/N 351574, mud rotary, NQ tools, NW casing

ORIENTATION : Vertical

CORING	NETHOD A	ND E	JUIPIV	MENT: CME 45B S/N 351574, mud rotary, NQ tools, NW	Casin	y	ORIENTATION : Vertical
WATER	LEVELS: 4.4	I ft bg	s on 1	1/14/07 START : 11/12/2007 END : 11	/14/20	DO7 LOGGER : J. Schaeffer, T. Borton	n
				DISCONTINUITIES	П	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)			 	SYMBOLIC LOG		
HAN S	₹ΑΣ	_	FRACTURES PER FOOT	DESCRIPTION	J o	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
표함	S F, A	Q D (%)	158	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	5	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
E E E S	#20 850	۵	24	PLANARITY, INFILLING MATERIAL AND	l ĕ	AND ROCK MASS	SMOOTHNESS, CAVING ROD
		8	F.E.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-3.5	45.0 R1-NQ				+ -	Limestone	Casing set at 45.0'
	1 ft	33	3	45.35, 45.58' - Mechanical break (2), 10-15	Н	- 45.0-46.5' - light olive gray, (5Y 6/1),	Begin coring with NQ, hard -
	46.0 100%	00	"	deg, rough, undulating, tight	\Box	fine to medium grained, moderate	formation bit
I -	40.0			45.76' - Bedding plane, <5 deg, rough,	Н	HCl reaction, weak (R2), strong HCl	Driller's Remark: Water
-			>10		₽₩	 reaction where pulverized, highly 	level approximately 7.0'
				46.15-46.3' - Fracture zone, subangular	Н	fossiliferous (casts/molds over	below ground surface
-]			limestone fragments (up to 1-1/2")		40-50% of sample), voids (up to	08:11 Begin drilling first run
-			1	46.45' - Bedding plane, <5 deg, rough,	ш	 1/16") over 10-15% of surface, trace 	on 11/14/07 –
l -				undulating	Н	voids up to 1/2"	First run only 1 foot to set
	R2-NQ			46.8' - Fracture, 80-90 deg, rough, undulating	М	46.5-50.5' - Same as 45.0-46.5'	stroke
_	5 ft	57	2	47.1' - Mechanical break or bedding plane,	ш	 except fine grained, very weak (R1), transitions to yellowish gray (5Y 5/2) 	R1: 4 minutes –
-	90%			<5 deg, smooth, stepped 48.1, 48.5, 48.85' - Mechanical break (3), <10	Н	with depth (by 48.9'), 15-25% fossils	-
]		3	deg, rough, undulating	Н	- (casts/molds), voids (up to 1/16")	
50			'	49.0' - Mechanical break or bedding plane,	Ш	over 5-10% of surface increasing to	Driller's Remark: Softer at
-8.5			2	<10 deg, rough, undulating		15-25% with depth	49.5'
-			\vdash	49.5, 49.6' - Mechanical break or bedding	ш	<u>'</u>	R2: 27 minutes
	51.0		NR	plane (2), <10 deg, rough, undulating	Н	No Recovery 50.5-51.0'	
I -				50.0' - Fracture, 5-15 deg, rough, undulating	ш	Limestone]
-			0	50.4' - Mechanical break, 5-10 deg, rough,	Ш	51.0-53.85' - yellowish gray to dusky	-
I -				undulating	H	yellow, (5Y 7/2 to 5Y 6/4), fine to	
			آ ۽ ا		Н	medium grained, mild to moderate	Driller's Remark: Soft at
-			2	52.5' - Mechanical break, <5 deg, rough,	ш	- HCl reaction, very weak (R1),	52.0'
-	DO NO			undulating, tight	Н	fossiliferous (casts/molds), voids (up to 1/16") over 15-25% of surface	-
_	R3-NQ 5 ft	39	>10	52.75' - Mechanical break or bedding plane,	Н	L 1/10) Over 13-25 % of Surface	
	57%	39		<5 deg, rough, undulating, tight	Ш		
-	0.70			53.15-53.75 - Fracture zone, general		No Recovery 53.85-56.0'	-
l -				orientation 75-85 deg with multiple breaks <5	ш	_	-
55			NR	deg, possibly many mechanical breaks or bedding planes along a long fracture, —	Н		
-13.5]		' ' ' '	limestone fragments up to 2-1/2"	1		R3: 9 minutes
-				imiodono nagmonto ap to 2 m2	ш	=	Driller's Remark: Harder at -
l -	56.0				╆┼		55.0', no circulation
				56.1, 56.5' - Bedding plane (2), <5 deg,	Н	Limestone	
-			2	rough, undulating, tight to open <1/16"	ш	 56.0-61.0' - yellowish gray, (5Y 7/2), fine to medium grained, mild to 	1
-				-	Н	moderate HCl reaction, very weak to	-
_			2	_	Н	- weak (R1 to R2), weak (R1) rock at	_
			-	57.7' - Mechanical break, 1-5 deg, rough,	Ш	58.5-58.8', fossiliferous (casts and	
1 -	R4-NQ			undulating, tight		trace molds), voids (up to 1/16") over	1
-	5 ft	62	2	57.9' - Bedding plane, <5 deg, rough, planar,	ш	- 5-15% of surface decreasing with	-
	100%	02		tight	H	depth	
I -				58.3' - Fracture, 5-10 deg, smooth, planar,	Ш]
I -			2	open <1/16", trace infill (fines)	Ш	-	
60				58.9' - Mechanical break, <5 deg, rough,	\vdash	_	
-18.5				undulating, tight	Н		R4: 11 minutes
-]		3	59.55' - Bedding plane, 5-10 deg, rough,	\sqcap	<u> </u>	1
-	61.0			undulating, open 1/8" 59.75' - Mechanical break or bedding plane,		61.0.66.01 Vallowich areside disales	-
l _			2	59.75 - Mechanical break of bedding plane, <5 deg, rough, undulating, tight	Ш	61.0-66.0' - yellowish gray to dusky - yellow, (5Y 7/2 to 5Y 6/4), fine to	
			-	60.1' - Fracture, <5 deg, rough, undulating,	Н	medium grained, mild to moderate	I -
1 -				open 1/8"		HCl reaction, very weak to weak (R1	Driller's Remark: Water
I -			5	60.3' - Mechanical break, <5 deg, rough,	Ш	- to R2), very weak (R1) rock	level at 4.4'
				undulating, tight	$\vdash\vdash$	transitions with depth to weak (R2)	
I -	R5-NQ			60.8' - Fracture or bedding plane, <5 deg,	H	rock, voids (up to 1/16") over 5-15%]
I -	5 ft	52	2	rough, undulating, open 1/4"-1/2", less than	Ш	 of surface decreasing with depth, 	-
I .	100%			1/2" fragment in opening	口	trace fossils (casts/molds)	
				61.07' - Mechanical break or bedding plane,	ш		
			>10	1-5 deg, rough, undulating, open <1/16"	$\vdash \vdash$	-	-
65					H		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-05	SHEET	5	OF	5	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723052.6 N, 456340.9 E (NAD83)

ELEVATION: 41.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 45B S/N 351574, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

WATER	WATER LEVELS : 4.4 ft bgs on 11/14/07 START : 11/12/2007 END : 11/14/2007 LOGGER : J. Schaeffer, T. Borton									
			DISCONTINUITIES		Т	Т	LITHOLOGY	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLICLIOG	IMBORIO EQ	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.		
33.5	SHR	ŭ	E E	THICKNESS, SURFACE STAINING, AND TIGHTNESS	ζ.)	CHARACTERISTICS	· ·		
-23.5			0	undulating, tight	片	╪		-		
-23.5	66.0		0	61.8' - Mechanical break, <5 deg, rough, undulating, tight 62.1' - Mechanical break or bedding plane, <5 deg, rough, undulating, tight 62.25' - Mechanical break, <5 deg, rough, undulating, tight 62.9, 63.0' - Mechanical break or bedding plane (2), <5 deg, rough, undulating, tight 63.15' - Bedding plane, <5 deg, rough, undulating, tight 63.7, 64.1' - Mechanical break (2), <5 deg, rough, undulating, tight 64.43' - Mechanical break or bedding plane, <5 deg, rough, undulating, open 1/8" 64.72-65.05' - Fracture zone, no orientation, limestone fragments up to 1/2"			Bottom of Boring at 66.0 ft bgs on 11/14/2007	R5: 10 minutes Total depth of boring 66.0', work plan criteria met Total 20 bags Portland Type I/II coated bentonite chips from 23.0-16.0' below ground surface 3/4 bag bentonite, 100 gallons of water 17:11 Grout to surface		
-					1	-		-		
					†	Ť				
						\perp				



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-06	SHEET	1	OF	7	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722977.3 N, 456619.7 E (NAD83)

ELEVATION: 41.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8" drag bit

ORIENTATION : Vertical

,					/N 1860/3, mud rotary, cathead, AWJ rods, 3-//8" drag bit OHIENTATION: Vertical
WATER	LEVELS	: 0.5 ft bg	gs on 11/	13/07	START: 11/12/2007 END: 11/14/2007 LOGGER: P. De Sa'rego
200				STANDARD	SOIL DESCRIPTION g COMMENTS
ANC (#	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	
뿝빙은		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
SU				(N)	
41.4	0.0			0.4.0	Topsoil 0.0-0.2' - wood chips, no roots, silica sand
		1.5	SS-1	3-4-6 (10)	Poorly Graded Sand (SP)
	1.5			(- /	0.2-1.5' - pale yellowish brown, (10YR 8/2), moist,
					loose, fine grained, no HCl reaction, silica sand, trace / nonplastic fines, organic matter at 0.2-0.4'
-					1 1
-					1 1
-					
-					
	F 0				
5 36.4	5.0				Poorly Graded Sand (SP)
-		1.1	SS-2	3-4-5	5.0-6.1' - very pale orange to grayish orange, (10YR - 🕌
-		1.1	33-2	(9)	8/2 to 10YR 7/4), wet, loose, fine grained, no HCI reaction, silica sand, trace nonplastic fines, trace
-	6.5				roots /-
-					
-					
_					-
_					<u> </u>
_					_
_					_
10	10.0				
31.4				4.4.5	Poorly Graded Sand (SP) 10.0-11.4' - yellowish gray, (5Y 8/1), wet, loose, fine
		1.4	SS-3	4-4-5 (9)	grained, no HCl reaction, silica sand, trace nonplastic
	11.5			. ,	fines
]
					1
1 7					11
-					1
15	15.0				
26.4	10.0				Sand Silt (ML)
-		1.3	SS-4	4-5-6	15.0-16.3' - light gray, (N7), wet, stiff, nonplastic, no HCl reaction, 38% fine grained silica sand
-	16.5			(11)	Troi reaction, 65 /6 file grained sinca sand
-	10.5				
-					
-					
-					-
-					
-					
-					
20					
					I I



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-06	SHEET	2	OF	7	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722977.3 N, 456619.7 E (NAD83)

ELEVATION: 41.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND FOLIPMENT: CME 550 S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8" drag bit

DRILLIN	G METH	DIAND	EQUIPME	ENT : CME 550 S	S/N 186073, mud rotary, cathead, AWJ rods, 3-7/8" drag bit	ORIENTATION : Vertical
WATER	LEVELS	: 0.5 ft bo	s on 11/1	13/07	START : 11/12/2007	
				STANDARD	SOIL DESCRIPTION (5) COM	MMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
BEL ON 10N		RECOVE	BY (ft)	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, 으 DEPTH OF CASI	NG, DRILLING RATE,
FAC VAT			#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR DESCRIPTION OF DESCRIPTION O	LOSS, TESTS, AND MENTATION
SUF			#IYPE	(N)	Solver 2 1001, 2012 2 11 1001 2 11 12 2 2 2 2 2 2 2 2	
21.4	20.0				Sandy Fat Clay (CH) Stop SPT for the da	y 11/12/07 at 17:00
_		1.3	SS-5	3-4-2	20.0-20.5' - very light gray with very pale blue mottling, (N8 with 5B 8/2), wet, medium stiff, high	/13/07 at 08:00
-	04.5		000	(6)	plasticity, no dilatancy, no HCl reaction, 25-30% very Water level 0.5' below	ow ground surface
-	21.5				\fine to fine grained silica sand	-
-					Silty Sand (SM) 20.5-21.3' - very light gray, (N9), wet, loose, fine	-
-					grained, no HCl reaction, silica sand, 30% low	-
_					plasticity fines	-
_]]	-
_					<u> </u>	
25	25.0				11	-
16.4					Fat Clay (CH) Weight of hammer of	drove SS-6 (25.0-25.6')
		0.6	SS-6	0-0-0	25.0-25.6' - pale brown, (5YR 5/2), wet, soft, medium through all 18" for S to high plasticity, slow dilatancy, no HCl reaction,	۲۱ -
-	26 5			(0)	trace fine grained silica sand, final 0.05' of sample	-
-	26.5				consists of compacted silica sand or fine grain	
-					sandstone	-
-					- Drillar's Pomark: 25	% loss of circulation at
_					27.5', some drill cha	
_						-
					<u> </u>	_
30	30.0					
11.4		0.6	SS-7	31-50/4.5	Silt (ML)	
-	30.9	0.6	55-7	(81/10.5")	30.0-30.6' - grayish orange, (10YR 7/4), wet, hard, nonplastic, rapid dilatancy, mild HCl reaction, 7% fine	
-					to medium sand sized, all carbonate materials	
-						
-						
-						
-						
_						
]]	
]]	
35	35.0					
6.4					Silty Sand (SM)	
1 7		0.7	SS-8	25-32-29 (61)	35.0-35.7' - grayish orange, (10YR 7/4), wet, dense, fine to coarse grained, mild to moderate HCl reaction,	-
_	36.5			(61)	\ 25% nonplastic fines, 5-10% fine gravel-size \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	-
-	50.5				\limestone fragments, all carbonate material	
-					1 1	-
-					1 1	-
-						-
-	40.0				- End SPT soil sampl	ina
-	40.0	0.1	SS-9	50/3.5	Limestone Fragments /= Switching to rock co	ıng ring at 09:20 (refusal
				(50/3.5")	\\dagger 40.0-40.1' - moderate yellowish brown, (10YR 5/4), blow count, limestor	
40					mild HCl reaction, fragments up to 1/2"	
					Begin Rock Coring at 40.0 ft bgs	
					See the next sheet for the rock core log	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

CT-06

SHEET 3 OF 7

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722977.3 N, 456619.7 E (NAD83)

ELEVATION: 41.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

WATER	LEVELS: 0.5	ft bg	s on 1	1/13/07 START: 11/12/2007 END: 11	/14/20	DO7 LOGGER : P. De Sa'rego				
≥0≎	(%			DISCONTINUITIES	၂ ၂	LITHOLOGY	COMMENTS			
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.			
1.4 - -	40.0 R1-NQ 1.5 ft 40% 41.5	29	1 NR	40.2' - Mechanical break 40.4-40.8' - Fracture, 80 deg, rough, undulating, open		Limestone 40.0-40.8' - grayish orange, (10YR 7/4), fine grained, moderate HCl reaction, weak (R2), voids (1/16") over 10% of core surface, trace casts	Begin coring from 40.0' at 10:30, 11/13/07 - (depth of coring start adjusted to remove 0.5' of slough counted on the field -			
- - - - 45	R2-NQ 5 ft 0%	0	NR	- - - -		to 1/4" No Recovery 40.8-46.5'	log) R1: 8 minutes Driller's Remark: No resistance to drilling at 41.5-46.5', no circulation loss Driller's Remark: Stop to clean mud at 11:30, too much silt/fines			
-3.6 - -	46.5					- -	R2: 3 minutes			
-			5	46.6' - Mechanical break 46.7-46.8' - Fracture, 45 deg, rough, undulating, open 47.1-47.2' - Fracture (3), horizontal, rough,		Limestone 46.5-48.5' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, weak to medium strong (R2 to R3), trace to	Driller's Remark: Soft at 47.0-48.5', 100%			
-	R3-NQ 5 ft	13	4	undulating, loose fragments 1" in size, open 47.4' - Fracture, 30 deg, rough, planar, 1/4" open		 10% voids up to 1/16", trace cavities up to 3/4"x1-9/16", partly infilled with fossiliferous carbonate material No Recovery 48.5-56.5' 	circulation lost at 47.0'			
-50_ -8.6 -	40%	10	NR	47.7' - Fracture, horizontal, smooth, undulating, <1/16", open, related to cavity at 47.7' 47.9' - Fracture, horizontal, rough, undulating, open 47.9-48.1' - Fracture, 60 deg, rough, undulating, 1/8" relief			R3: 16 minutes			
- - -	51.5			48.4' - Fault, horizontal, smooth, planar to undulating, <1/8" relief		- - -	Driller's Remark: Soft throughout run R4, still no circulation			
- - 55_ -13.6	R4-NQ 5 ft 0%	0	NR	-		- - -	- - -			
-	56.5					-	R4: 4 minutes			
-			3	56.65' - Fracture, horizontal, rough, undulating, 1/8" open 56.9' - Fracture, 10 deg, rough, undulating, 1/8" open		Limestone 56.5-57.4' - grayish orange, (10YR 7/4), fine to medium grained, mild HCl reaction, weak (R2), voids to	-			
- - - 60	R5-NQ 5 ft 18%	0	NR	57.0' - Mechanical break 57.0' - Mechanical break 57.1-57.3' - Fracture, 60 deg, rough, undulating to planar, black staining over 80% of surface		HCI reaction, weak (R2), voids to 1/16" over 15% of core surface, trace fossil casts and cavities up to 3/8" at 56.5-56.8' No Recovery 57.4-61.5'	- - -			
					П					



PROJECT NUMBER:

338884.FL

BORING NUMBER:

CT-06

SHEET 4 OF 7

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722977.3 N, 456619.7 E (NAD83)

ELEVATION: 41.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

WATER	LEVELS : 0.5	ft bas	s on 1	1/13/07 START : 11/12/2007 END : 1	1/14/2	.007 LOGGER : P. De Sa'rego	
				DISCONTINUITIES	Т	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S.	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	OIZE AND DEDTH OF GARING
H H H	P.H.A.	(%) _Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	1 5	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
THE YEAR	ORE SNG1	ΩØ	SAC ER F	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	8.2	ď	E.E.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	်	CHARACTERISTICS	21.6. 6, 1201 1126216, 216.
-18.6					⊬]
l _					oxdot		R5: 10 minutes
l _	61.5						
			0			Silt With Sand (ML) - 61.5-62.9' - grayish orange, (10YR	No SPT taken
						7/4), wet, hard, nonplastic, mild HCl	
			0		1111	reaction, 15% fine to very fine sand-sized particles, all carbonate	1
					1111	material	1
-	R6-NQ	•			1111	No Recovery 62.9-71.5'	1
-	5 ft 28%	0			1111	[1
65			NR		1	<u> </u>	1
-23.6				_	1	Γ	
-					1111	Ī	R6: 8 minutes
1 -	66.5				1	<u> </u>	Stop for day 11/13/07 at
-	00.0				1111	Ī	17:00 - Resume coring on
-					1111	<u> </u>	11/14/07 at 8:00; depth is
-					1	<u> </u>	66.5' Water level 4.0' below
-					1111	-	ground surface
-	R7-NQ				1	-	Casing advanced to 65.0' – Driller's Remark:
-	5 ft 0%	0	NR		$\parallel \parallel$	-	Circulation returned
70 -	076				1111	-	1 1
70 <u> </u>				_	╢╟	 -	
-					$\ \ $	 	R7: 26 minutes
-	74.5			71.1' - Fracture, horizontal, rough, undulating,	1	 	Driller's Remark: Rock -
-	71.5			1/4" open	₩	Limestone	fragments lodged in core barrel, likely destroyed
-			>10	71.8-72.0' - Fracture zone, rock fragments	╁	- 71.5-75.5' - grayish orange, (10YR	sample -
-				72.3' - Mechanical break	厈	7/4), medium grained, mild HCl reaction, extremely weak (R0), no	Driller's Remark: Soft at 71.5-74.5', increased
-			2	72.8' - Fracture, horizontal, rough, undulating,	片	- visible voids or cavities	resistance from 74.5-76.5'
-	R8-NQ		\vdash	1/2" open 73.1' - Mechanical break	╀┴	 	-
-	5 ft	0	2	73.2' - Fracture, 0-30 deg, rough, undulating,	厂	}	-
	80%			tight, variable angle 73.9' - Fracture, horizontal, rough, undulating,	世	 	-
75 <u> </u>			0	tight	+	 -	-
-			\vdash	74.0' - Fracture, horizontal, rough, undulating, tight	F	No Recovery 75.5-76.5'	R8: 10 minutes
-			NR	74.8' - Mechanical break	炐	-	-
-	76.5			74.9' - Mechanical break	世	Limestone	Driller's Remark:
-			2	76.7' - Fracture, horizontal, rough, undulating,	\vdash	- 76.5-78.2' - grayish orange, (10YR	Circulation loss (100%) at
-				1/8" open 77.45' - Fracture, 10 deg, rough, undulating,	厂	7/4), fine to medium grained, mild HCl reaction, weak (R2), trace voids	76.0' Driller's Remark: Medium
-			>10	1/8" open	世	up to 1/16", trace cavities to 3/4"x3/8"	resistance from 76.5-78.5'
-	DO NO			77.7-77.85' - Fracture zone, fine to coarse sand-sized and gravel-sized fragments	╀	78.2-79.6' - grayish orange, (10YR	Driller's Remark: Hard at 78.5-81.8'
-	R9-NQ 5 ft	23	2	78.3' - Fracture, horizontal, rough, undulating,	F	7/4), fine to medium grained, mild HCl reaction, extremely weak (R0),	Driller's Remark: Soft at
-	62%			1/4" open	ļ;	no visible voids or cavities	81.5-83.0' Driller's Remark: Hard at
80			0		\vdash	No Recovery 79.6-81.5'	83.0-84.5'
					1		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

CT-06

SHEET 5 OF 7

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722977.3 N, 456619.7 E (NAD83)

ELEVATION: 41.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

	LEVELS : 0.5			1/13/07 START: 11/12/2007 END: 1		007 LOGGER : P. De Sa'rego	
		, it by:	JUIT	DISCONTINUITIES	Т	LITHOLOGY	COMMENTS
AND Z	, ND ×		S.	DESCRIPTION		ROCK TYPE, COLOR,	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
LEV	ENG	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-38.6	075	<u>~</u>	шФ	78.9' - Fracture, horizontal, rough, undulating,	S	OFFICIONO	
-			NR	tight	丰	-	R9: 11 minutes
-				79.5' - Fracture, 20 deg, rough, undulating, 1/8" open	岸	-	-
-	81.5			81.5-82.1' - Fracture zone, fine to coarse	世	Limestone	-
-			>10	sand-sized and fine to coarse gravel fragments	世	- 81.5-83.1' - grayish orange, (10YR 7/4), fine grained, mild HCl reaction,	1
-			1	82.1-82.4' - Fracture, 70 deg, rough,	₩	weak (R2), trace voids to 1/16"	1
-			<u> </u>	undulating, opposing face fractured 82.4-82.5' - Fracture, 45 deg, rough,	╨	L No Recovery 83.1-86.5'	1
-	R10-NQ			undulating, 1/4" open 83.0' - Mechanical break	ፗ	-	1
-	5 ft 32%	8		83.0 - Mechanicai break	ፗ	_	1
85			NR		」		Driller's Remark: Soft at 84.5-85.5'
-43.6				_	上	_]
l _					\perp	_	R10: 6 minutes
-	86.5				\vdash	<u></u>	Driller's Remark: Hard at 85.5-86.5'
_			>10	86.5-87.1' - Fracture zone, two dominant 60 deg fractures, at 86.5-86.7' and 86.7-87.0',	厈	Limestone - 86.5-90.2' - grayish orange, (10YR	Driller's Remark: Medium
l _				rough and undulating surfaces, multiple	片	7/4), fine grained, moderate HCl	drilling at 86.5-88.0'
-			1	fragments of fine gravel size	片	reaction, weak (R2), 10-15% coverage of voids up to 1/16", trace	Dellada Damandu Handat
-	D44 NO			88.05' - Fracture, horizontal, rough, undulating, opposite face at 60°; open	世	cavities up to 3/8"x-9/16", cavities increasing in frequency with depth	Driller's Remark: Hard at -
-	R11-NQ 5 ft	32	>10	88.5-88.8' - Fracture zone, several medium gravel-sized fragments, terminates at 60 deg	╀	- Increasing in frequency with depth	-
	74%			face	₽	_	-
90 <u> </u>			0	89.1-89.4' - Fracture zone, medium to coarse _ gravel-sized fragments	┲	H., .	-
-				g.a.o. o. <u>e</u> oa nag.none	┰	No Recovery 90.2-91.5'	R11: 15 minutes
-	04.5		NR		世	-	1
-	91.5			91.5-91.9' - Fracture zone, medium to coarse	世	Limestone	1
-			>10	gravel-sized fragments 92.2' - Fracture, horizontal, rough, undulating,	士	- 91.5-92.5' - grayish orange, (10YR 7/4), fine grained, moderate HCl	
-				1/4" open	Ъ	reaction, weak (R2), 15% coverage	1
-					\vdash	of voids up to 1/16", trace cavities/fossil molds up to 1/4"x3/16"	1
	R12-NQ	0			片	No Recovery 92.5-96.5'	1
	5 ft 20%	U	NR]#	_]
95			INIX	_	片		
-53.6					片	_	
_					╨	_	R12: 6 minutes
-	96.5				F	- 	_
-			>10	96.7-97.2' - Fracture zone, coarse	म	Limestone - 96.5-96.7' - Same as 91.5-92.5'	Driller's Remark: Rock fragments stuck in core
-			NR	gravel-sized fragments	厂	96.7-97.2' - very pale orange, (10YR	barrel at 98.0'; removed
-					士	8/2), fine grained, mild HCl reaction, medium strong (R3)	barrel to clear, resumed coring 98.0-101.5'
-	R13-NQ		1	98.1' - Fracture, 10 deg, rough, undulating, open	士	No Recovery 97.2-97.9' Limestone	Core loss assumed to be
-	5 ft	35	>10	98.6' - Fracture, horizontal, smooth,	+	- 97.9-99.3' - Same as 96.7-97.2'	97.2-97.9'; lithologic description intervals
	86%			undulating, 1/4" open	F	except 2 large cavities (3-7/8"x3/8") at 98.9-99.2'	adjusted accordingly _
100					屵		+
1			1		1		ı

APPENDIX 2BB-725 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

CT-06

SHEET 6 OF 7

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722977.3 N, 456619.7 E (NAD83)

ELEVATION: 41.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION: Vertical

CORING	NETHOD A	ND EC	אורוע	MENT: CME 550 S/N 186073, mud rotary, NQ tools, NW	casin	y	ORIENTATION : Vertical
WATER	LEVELS: 0.5	ft bg	s on 1	1/13/07 START : 11/12/2007 END : 11	/14/2	007 LOGGER : P. De Sa'rego	
				DISCONTINUITIES	(0	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		m	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE OOLOD	
H N N N N	N. 4 K		FRACTURES PER FOOT	BEOOK!! HOW	$\overline{\circ}$	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
HASE		Q D (%)		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
- - - - - - - - - - - - - - - - - - -		Ø	N N	PLANARITY, INFILLING MATERIAL AND	Ĭ	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	225	œ		THICKNESS, SURFACE STAINING, AND TIGHTNESS	်	CHARACTERISTICS	,
-58.6			>10	99.1-99.3' - Fracture zone, fine to large	ш	Limestone	
-				gravel-sized fragments	╁	- 99.3-101.5' - moderate yellowish	R13: 15 minutes
l -			1	99.7-99.9' - Fracture zone, gravel-sized fragments		brown, (10YR 5/4), fine grained, mild HCl reaction, weak (R2), 15%	-
l -	101.5			100.3' - Fracture, 30 deg, rough, undulating,	╨	- coverage of voids to 1/16", trace	_
l				tight	Н	casts/cavities to 3/8x1-3/16"	
-	1		1	101.9' - Fracture, horizontal, rough,		101.5-105.5' - pale yellowish brown,	_
-				undulating, 1/8" open	╨	- (10YR 6/2), fine grained, mild HCI	-
-			>10	102.8-102.9' - Fracture zone, gravel-sized	╁┼	reaction, weak (R2), trace to 10% coverage of voids up to 1/8", trace	_
l _				fragments		- cavities up to 1/4x1/4", large	
	R14-NQ		_	103.1' - 30 deg, rough, undulating, 1/8" open	H	(2-3/8x1-9/16") cavity at 101.8 to	
1 -	5 ft 80%	28	3	103.1-103.4' - Fracture, vertical, rough, undulating, 1/8" open		102.0'	1
-	0070		<u> </u>	103.4' - Fracture, horizontal, rough,	厂	-	
105_			>10	undulating, 1/4" open	╀	_	
-63.6			L	103.8' - Fracture, 40 deg, rough, undulating,			
Ι -				1/8" open	<u> </u>	No Recovery 105.5-106.5'	R14: 9 minutes
-	400 5		NR	104.0' - Fracture, 40 deg, rough, undulating, 1/8" open	╁	-	
-	106.5			104.2' - Mechanical break	\Box	Limestone	-
_			>10	104.5' - Fracture, 10 deg, rough, undulating,	╀	- 106.5-109.2' - grayish orange, (10YR	_
1			' ' '	1/8" open	H	7/4), fine grained, mild HCl reaction,	
-	1			104.8-105.0' - Fracture zone, coarse	ш	weak (R2), 10% coverage of voids	
-			2	gravel-sized fragments 105.1-105.3' - Fracture, 60 deg, rough,	╂┬╴	 up to 3/16", trace cavities 3/8"x2-3/8" 	_
-	D45 NO			undulating, tight		_	_
l -	R15-NQ 5 ft	17	>10	106.5-107.4' - Fracture zone, gravel-sized	╨	_	_
1	54%	"		fragments	Н	No Recovery 109.2-111.5'	
110				107.5-107.6' - Fracture, 60 deg, rough,			
-68.6				undulating, 1/8" open 108.4' - Fracture, horizontal, rough,	╨	_	
			NR	undulating, open		_	D45: 5 minutes
l -				108.7-109.2' - Fracture zone, gravel-sized	┢	_	R15: 5 minutes
1	111.5			fragments	\vdash		
-				111.6-111.7' - Fracture zone		Limestone	_
-			>10	<u>-</u>	╁	- 111.5-112.6' - grayish orange, (10YR	-
-				112.1-112.2' - Fracture zone	╀	7/4), fine grained, mild HCl reaction,	_
l _			lacksquare		Д	weak (R2), 10% coverage of voids - up to 1/16", single 1-9/16"x1-9/16"	
					\vdash	cavity at 111.9', deep spherical cavity	
I -	R16-NQ			-	广	(1-3/16" diameter) at 112.1'	1
-	5 ft	15		-	╨	- No Recovery 112.6-116.5'	-
-	22%		NR	-	\vdash	_	-
115_				_	⊏		
-73.6					\vdash		
-				-	仜	-	R16: 3 minutes
-				-	 	-	
-	116.5			116 F 117 Fl. uppoppelidated silts/sand-	.	Moll Craded Sand (CM)	-
l _			0	116.5-117.5' - unconsolidated silts/sands	J	Well Graded Sand (SW) - 116.5-117.5' - grayish orange, (10YR	
						7/4), wet, loose, fine to coarse	
Ι -	1			·	ഥ	□ arained, mild HCl reaction, trace □	1 7
-			>10		╂┯	- \nonplastic fines, all carbonate	
-	D47.10			tight 118.0-119.5' - Fracture zone or mechanical		_ \material	-
l _	R17-NQ 5 ft	0	>10		\Box	Limestone	
	64%	J	10		\vdash	117.5-118.1' - grayish orange, (10YR 7/4), fine grained, mild HCl reaction,	
120			1	-		weak (R2), trace voids to 1/16"	
120			\vdash		1		
					1		
			<u> </u>				<u> </u>



PROJECT NUMBER:

338884.FL

BORING NUMBER:

CT-06

SHEET 7 OF 7

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722977.3 N, 456619.7 E (NAD83)

ELEVATION: 41.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

WATER	LEVELS: 0.5	ft bgs	s on 1	1/13/07 START : 11/12/2007 END : 11	: 11/14/2007 LOGGER : P. De Sa'rego						
≥ ∩ ⊕	(9)			DISCONTINUITIES	G	LITHOLOGY	COMMENTS				
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,				
TH BE	E RU STH, OVEF	(%) O	FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD				
DEPT SURF	COR	ROI	FRAC PER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMI	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.				
-78.6	0	_		119.5' - Fracture, horizontal, rough,		Limestone					
-			NR	undulating, open	Ш	 118.1-119.5' - Same as 117.5-118.1' except extremely weak (R0) 	R17: 7 minutes				
-	121.5			-	Н	119.5-119.7' - Same as 117.5-118.1'	-				
-	12110		_	- 121.7' - Fracture, horizontal, rough,	H	 No Recovery 119.7-121.5' Limestone 	_				
			3	undulating, open 122.35' - Fracture, horizontal, rough,	H	121.5-124.4' - very pale orange mottled with medium light gray,					
			4	undulating, open	Ħ	(10YR 8/2 with N6), fine grained,					
_				122.4' - Mechanical break 122.85' - Fracture, horizontal, rough,	H	mild HCl reaction, weak (R2), 10% coverage of voids up to 3/16" at	_				
_	R18-NQ 5 ft	17	0	undulating, open 123.0-123.1' - Fracture, 60 deg, rough, 3/16"x3/8") at 123.7-123.9'		121.5-122.5', 10% fossil casts (up to	_				
_	58%					No Recovery 124.4-126.5'	-				
125 <u> </u>				123.1-123.2' - Fracture, 70 deg, rough, undulating, open	H	_	_				
-			NR	123.3' - Fracture, 60 deg, rough, undulating,	Ш	-	R18: 9 minutes				
-	106 F			open 123.6' - Mechanical break	Н	_	Total Depth of boring				
-	126.5			124.0' - Mechanical break	Н	Bottom of Boring at 126.5 ft bgs on	126.5'				
-				-	1	- 11/14/2007	-				
-				-		-	-				
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	CT-07	SHEET	1	OF	5

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722823.9 N, 456814.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT : CME 45B S/N 351574, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit

ORIENTATION: Vertical

					START : 11/16/2007 END : 11/27/2007			OniENTATION : Vertical
WATER	LEVELS	: 3.5 ft bo	JS 011 11/2		START : 11/16/2007 END : 11/27/2007 SOIL DESCRIPTION	LUGGEF		De Sa'rego, T. Borton COMMENTS
≩Q≆ I	CAMPIE	INTERVA	1 (4)	STANDARD PENETRATION	GOIL DEGONIF HON		00	OliviiviLiv1O
ELO ON (SAMPLE		. ,	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COL	.OR.	IC L	DEPTH OF CASING, DRILLING RATE,
H B		RECOVE	<u> </u>		MOISTURE CONTENT, RELATIVE DENSITY	Y OR	BOL	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERA	LOGY	SYMBOLIC LOG	INSTRUMENTATION
42.0	0.0			(11)	Poorly Graded Sand With Organics (SP)			
-		1.4	SS-1	1-1-2	0.0-1.4' - moist, very loose, brownish gray (5Y	′R 8/1) -		-
-		1.4	33-1	(3)	from 0.0-0.5', very light gray (N5) from 0.5-1.4 silica sand, trace nonplastic fines, 20% roots/o	r, fine organic		-
-	1.5				matter over 0.0-0.5'			-
-						-		-
-						-		-
_						-		-
_						-		_
_						-		_
_						_		_
5	5.0							
37.0				2-1-1	Poorly Graded Sand With Silt (SP-SM) 5.0-5.8' - grayish orange, (10YR 7/4), wet, ver	v loose -		_
_		0.8	SS-2	(2)	acksim no HCl reaction, fine silica sand, 5-10% nonpl		T!T	_
_	6.5			. ,	\fines	/ _		_
						_		
						_		
						_		
						_	1	
-						_	1	1
10	10.0					_	1	1
32.0					Limestone Fragments With Silty Sand		П	Advanced 15.0' NW casing
-		1.3	SS-3	8-3-6	10.0-11.3' - very pale orange, (10YR 7/4), silty wet, loose, moderate HCl reaction, fine to coa	/ sand is - urse		-
_	11.5			(9)	sand-sized, 35-40% low plastic fines, all carbo	onate, $\bar{}$	Ы	1
-	11.0				\ 70% fine to coarse gravel-sized limestone frag \ 30% silty sand	gments, /-	1	-
-					co /o ciny cana	/ -	1	-
-						-	1	1
-						-	1	
-						-	1	
-						-		
45	15.0					-		
15 <u> </u>	15.0				Silty Sand (SM)			Continue drilling 11/27/07
-		1.0	SS-4	2-2-2	15.0-16.0' - yellowish gray, (5Y 8/1), wet, very	loose, -		Driller's Remark: 10:08 water level at 3.5'
-	46-	1.0	55-7	(4)	strong HCl reaction, 20% fines, fine to coarse sand-sized grains, all carbonate materials incl	luding /		below ground surface
-	16.5				\one limestone fragment (1") subrounded to	_ /-		-
-					\subangular			-
-						-		-
-						-		-
-						-		-
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-						-		-
20							Ш	
			l					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-07	SHEET	2	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722823.9 N, 456814.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT : CME 45B S/N 351574, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

					START At the least and the little start and the least and
WATER	LEVELS	: 3.5 ft b	gs on 11/2	2//07 S	START: 11/16/2007 END: 11/27/2007 LOGGER: P. De Sa'rego, T. Borton
 				STANDARD PENETRATION	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
A ACE		RECOVE	ERY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, WHILLING HATE, DRILLING FLUID LOSS, TESTS, AND
LEV.			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
22.0	20.0			(N)	Sandy Clay (CH) Tricone bit (3-7/8")
	20.0	l		2-3-50/5.5	20.0-20.85' - transitions from light bluish gray to light - SS-5A from 20.0-20.85'
_		1.4	SS-5	(53/11.5)	gray, (5B 7/1 to N7), moist, medium stiff, medium to high plasticity, moderate HCl reaction, 20-25% very
_	21.5				\\fine to fine silica sand
_					Silt (ML)
_					20.85-21.35' - grayish yellow, (5Y 8/4), moist, hard, nonplastic, rapid dilatancy, mild HCl reaction, trace
_					fine to medium sand-sized grains, carbonate
					materials
]
]
25	25.0	<u></u>			
17.0					Sandy Lean Clay (CL) SS-6A from 25.0-25.4' 25.0-25.4' - mottled light bluish gray and grayish
		1.5	SS-6	2-15-31 (46)	yellow, (5B 7/1 and 5Y 8/4), wet, stiff, medium
-	26.5			(40)	\plasticity, slow dilatancy, mild to moderate HCl
-					reaction in grayish yellow areas, 20% very fine to fine saids
-					Silt (ML)
-					25.4-26.45' - grayish yellow, (5Y 8/4), moist, hard, nonplastic, rapid dilatancy, mild HCl reaction, 5-10%
-					fine to medium sand-sized grains, all carbonate
-					materials -
-					†
30	30.0				- 1
12.0	30.0				Silty Sand (SM)
-		1.0	SS-7	7-12-22	30.0-31.0' - grayish yellow, (5Y 8/4), moist, dense, mild HCl reaction, fine to coarse sand-sized, 30-35%
-	04.5		00 /	(34)	nonplastic fines, 10-15% fine gravel-sized limestone
-	31.5				\fragments, all carbonate materials / -
-					-
-					-
-					-
-					-
-					
-					
35	35.0			10	Condy Cité (MI)
7.0	35.8	0.7	SS-8	18-50/3 (68/9")	Sandy Silt (ML) 35.0-35.7' - Same as 30.0-31.0' except nonplastic,
_	33.8			(00/0/)	rapid dilatancy, 35-40% fine to coarse sand-sized
_					
_					
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-07	SHEET	3	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722823.9 N, 456814.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT : CME 45B S/N 351574, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

,	ATER LEVELS: 3.5 ft bgs on 11/27/07 START: 11/16/2007 END: 11/27/2007 LOGGER: P. De Sa'rego, T. Borton									
WATER	LEVELS	: 3.5 ft b	gs on 11/2	27/07 S	START : 11/16/2007	END : 11/27/2007	LOGGER	₹ : P.	De Sa'rego, T. Borton	
> 0 0				STANDARD		SOIL DESCRIPTION		g	COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COU NIANAT	LICCE CECLIE CVMDOL 4	COLOR	SYMBOLIC LOG	DEDTH OF CASING DOULING DATE	
불발		RECOVE	ERY (ft)		MOISTURE (E, USCS GROUP SYMBOL, (CONTENT, RELATIVE DEN	SITY OR	OLK	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND	
PTF RF/ EVA			#TYPE	6"-6"-6"		Y, SOIL STRUCTURE, MIN		MB	INSTRUMENTATION	
SU				(N)				S		
2.0	40.0			10.00.50/5	Sandy Silt (ML)	dele vellevy (EV 0/4) mediał	h haud			
		1.4	SS-9	19-26-50/5 (76/11)	40.0-41.4 - gray	rish yellow, (5Y 8/4), moist d dilatancy, mild HCl reacti	i, nard, ion 40-45%	1	_	
-	41.4			(70/11)	I fine to coarse sa	and-sized, 5% fine gravel-:	sized	1	-	
-					limestone fragm	ents, carbonate materials		f	-	
-							-	┨	-	
-							-	┨	_	
_							-	1	_	
							_		_	
]							-]	
45	45.0							1	Driller's Remark: Hard at 44.5'	
-3.0	45.0	0.0	SS-10		Limestone Frag	ments	. , ,,,,,,, <i>T</i>	Г	Switch to rock coring at 45.0'	
-				(50/0.5")	45.0-45.05' - abo recovered	out ten limestone fragmen	ts (<1/4")	1		
-						ing at 45.0 ft bgs		1	-	
-					See the next she	eet for the rock core log	-	1	-	
_							-		_	
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

CT-07

SHEET 4 OF 5

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722823.9 N, 456814.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 45B S/N 351574, mud rotary, NQ tools, NW casing

ORIENTATION: Vertical

## Particles Par	CORING	METHOD AL	ND EC	JUIPIV	IENT: CME 45B S/N 351574, mud rotary, NQ tools, NW	casın	g	ORIENTATION : Vertical
DESCRIPTION Section	WATER L	EVELS : 3.5	ft bgs	s on 1	1/27/07 START : 11/16/2007 END : 11	/27/2	007 LOGGER : P. De Sa'rego, T. Bort	ton
3.0	300	~			DISCONTINUITIES	(J	LITHOLOGY	COMMENTS
3.0	DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%	Ø	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LO	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
R3-NO 0 NR 05 ft 0% 0 NR 05 ft 72% 11 Started to get soft at 50 Soft Started to get soft at 50 Soft Started to get soft at 50 Soft Started to get soft at 50 Soft Started to get soft at 50 Soft Started to get soft at 50 Soft Started to get soft at 50 Soft Started to get soft at 50 Soft Started to get soft at 50 Soft Soft Soft Soft Soft Soft Soft Soft	-3.0 4 -4 -4 -50 -8.0	R1-NQ 1.5 ft 67% 16.5 R2-NQ 5 ft 55%	67	0 NR 3 2	46.55' - Fracture, <5 deg, rough, undulating, open 1/8" 46.8' - Fracture, 10-15 deg, rough, undulating, tight 47.4' - Fracture, 0-10 deg, rough, undulating, open 1/2" with fragments up to 1/2", subrounded to subangular 48.1' - Bedding plane or mechanical break, <5 deg, rough, undulating, open <1/16" 48.25' - Mechanical break, <5 deg, rough, undulating, tight 49.1' - Bedding plane, <5 deg, rough, planar,		Limestone 45.0-46.0' - light olive gray, (5Y 4/4), fine to medium grained, moderate HCl reaction, weak (R2), fossiliferous (10-20%) casts and molds, voids up to 1/8" (predominantly <1/16") over 5-15% of surface, one void at 45.2' (1"x1/8") No Recovery 46.0-46.5' Limestone 46.5-49.25' - light olive gray with zones of yellowish gray from 47.25-47.4' and from 48.9-49.4', (5Y 5/2 with 5Y 8/4), fine to coarse grained, mild to moderate HCl reaction, weak to medium strong (R2 to R3), voids (<1/16") over 10-20% of core, moderately fossiliferous (casts and molds)	- - - - -
56.5 1 57.3, 57.7' - Mechanical break or bedding plane (2), <5 deg, rough, undulating, tight 58.1' - Bedding plane, <5 deg, rough, undulating to planar, tight 58.1'- Bedding plane (2), <5 deg, rough, undulating to planar, tight 58.1'- Bedding plane, <5 deg, rough, undulating to planar, tight 58.1'- Bedding plane (2), <5 deg, rough, undulating to planar, tight 58.1'- Bedding plane (2), <5 deg, rough, undulating to planar, tight 58.1'- Same as 56.5'- Sand with Silt (SM) 58.1'- Sand with Silt (SM) 58.1'- Sand with Silt (SM) 58.6'-	- - - - - - 55	R3-NQ 5 ft	0	NR	- - - - -		- No Recovery 49.25-56.5	Started to get soft at 50.0'
surface Sand With Silt (SM) 58.1-59.0' - yellowish gray to grayish yellow, (5Y 7/2 to 5Y8/4), fine to coarse grained, nonplastic, mild HCl reaction No Description 59.0-59.6' Sand With Silt (SM) 59.6-59.8' - Same as 58.1-59.0' Limestone 59.8-60.1' - Same as 56.5-58.1' except very weak (R1) No Recovery 60.1-61.5' Sandy Silt (ML) 61.5-62.2' - yellowish gray, (5Y 7/2), moist, nonplastic, mild HCl reaction	- 5 - - - -	R4-NQ		2	plane (2), <5 deg, rough, undulating, tight 58.1' - Bedding plane, <5 deg, rough,		- 56.5-58.1' - yellowish gray to grayish yellow, (5Y 7/2 to 5Y8/4), fine to medium grained, mild to moderate HCI reaction, extremely weak to weak (R0 to R2), highly fossiliferous (90% casts and molds <1/16"-3/16"),	- - - - -
85-NQ 5 ft 94% 18 1 1 1 61.95, 62.1' - Bedding plane (2), <5 deg, rough, planar, tight 62.5' - Fracture or mechanical break, 70-80 deg, rough, undulating, tight 62.6' - Same as 62.5' except opposite direction of angles 63.3' - Bedding plane, <5 deg, rough, planar, tight 62.6' - Same as 56.5-58.1' except very weak (R1) No Recovery 60.1-61.5' Sandy Silt (ML) 61.5-62.2' - yellowish gray, (5Y 7/2), moist, nonplastic, mild HCl reaction	-18. 0	72%	32	0	- - - -		surface Sand With Silt (SM) 58.1-59.0' - yellowish gray to grayish yellow, (5Y 7/2 to 5Y8/4), fine to coarse grained, nonplastic, mild HCI reaction No Description 59.0-59.6'	R4: 4 minutes
65	- - - - - - 65	5 ft	18	2	rough, planar, tight 62.5' - Fracture or mechanical break, 70-80 deg, rough, undulating, tight 62.6' - Same as 62.5' except opposite direction of angles 63.3' - Bedding plane, <5 deg, rough, planar,		59.6-59.8' - Same as 58.1-59.0' Limestone 59.8-60.1' - Same as 56.5-58.1' except very weak (R1) No Recovery 60.1-61.5' Sandy Silt (ML) 61.5-62.2' - yellowish gray, (5Y 7/2),	- - - -



PROJECT NUMBER:

338884.FL

BORING NUMBER:

CT-07

SHEET 5 OF 5

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722823.9 N, 456814.3 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 45B S/N 351574, mud rotary, NQ tools, NW casing

ORIENTATION: Vertical

				TENT : CIVIE 43B 3/N 331374, Hidd Totally, NQ tools, NVV		_	ORIENTATION: Vertical
WATER	LEVELS: 3.5	ft bg	s on 1		/27/2		
≥O.⊋				DISCONTINUITIES	l g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
ᆲ빓읃	N.H. N.H.	(%) _Q	되는	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	1 💥	MINERALOGY, TEXTURE,	FLUID LOSS, CORING RATE AND
₽₽¥	#260 Second		ACT R F(PLANARITY, INFILLING MATERIAL AND	₩	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SCIE	S = 8	R Q	FR/	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-23.0			3	64.3' - Mechanical break or bedding plane,		Limestone	
-	-			<5 deg, rough, undulating, open 1/2"	F	- 62.2-63.3' - yellowish gray, (5Y 7/2),	R5: 9 minutes
-			0	64.8' - Mechanical break, 70-80 deg, rough,	╀	fine to medium grained, mild HCl	10. 9 minutes
	66.5		NR	undulating, tight 65.0' - Bedding plane or mechanical break,		reaction, very weak (R1), fossiliferous (casts and molds), voids	
1 7				45 deg, rough, undulating, tight	Ъ	(up to <1/16") over 5-10% of surface	
-	1		2	65.5' - Mechanical break or bedding plane,		Sandy Silt (ML)	
	1 1			<5 deg, rough, undulating, tight	╨	- 63.3-64.0' - Same as 61.5-62.2'	-
-			3	66.7' - Mechanical break or bedding plane, <5 deg, rough, undulating, tight	╀	Limestone	_
l _]			67.15' - Mechanical break or bedding plane,		64.0-66.2' - Same as 62.2-63.3'	_
	R6-NQ			<5 deg, rough, planar, tight	\vdash	except transitions from extremely weak to very weak (R0 to R1) at	
-	5 ft 96%	57	1	67.8' - Bedding plane, <5 deg, rough,	ш	64.3'	1
70	1 55,3			undulating, tight 68.0' - Mechanical break or bedding plane,	1—	No Recovery 66.2-66.5'	1
70 <u> </u>			1	45 deg, rough, undulating, tight		Limestone 66.5-71.3' - yellowish gray, (5Y 7/2),	-
				68.15' - Fracture, 5-10 deg, rough,	₽	fine to medium grained, mild HCl	D6: 9 minutes
1 -	.		1	undulating, tight	\Box	reaction, very weak (R1) with zones	R6: 8 minutes
	71.5		NR	69.3, 70.2 - Bedding plane (2), <5 deg, rough, planar, tight	H	of weak (R2) rock from 67.1-67.6',	
1 7			$\overline{}$	70.8' - Fracture, 20-30 deg, rough,	╁	- 68.1-69.25', and 70.35-71.3', variable voids (<1/16"-3/16") over 10-20% of	1
-	1		0	undulating, tight	厂	surface, fossiliferous casts and	1
-	1				╂┰	molds (10-15%), trace organics	-
-	.		1	72.95' - Bedding plane, <5 deg, rough,		No Recovery 71.3-71.5'	-
l _				undulating, tight	╨	Limestone - 71.5-76.25' - yellowish gray to	_
	R7-NQ	00	>10	73.75-73.95' - Fracture zone, one large		grayish yellow, (5Y 7/2 to 5Y 8/4),	
1 7	5 ft 95%	68	1/10	fragment 2-1/2" with small fragments <3/4",	\vdash	very fine to medium grained, mild	1
75	1			subrounded to subangular		 HCl reaction, very weak (R1), voids (up to <1/16") over 5-10% of surface, 	1
-33.0	1		1	74.15' - Bedding plane, <5 deg, rough, undulating, tight	╨	fossiliferous (casts and molds) <5%,	
-				74.4' - Bedding plane or mechanical break,	匸	extremely weak (R0) from 72.5-73.1	R7: 11 minutes
-			2	<5 deg, rough, undulating, tight	┢	with a trace of fines	_
1 _	76.5		NR	75.15' - Bedding plane or mechanical break,		No Recovery 76.25-76.5'	Total depth is 76.5'
					ı	Bottom of Boring at 76.5 ft bgs on	
-	1			undulating, open 1.0" with one large fragment	1	11/27/2007	1
-	1			75.95' - Mechanical break or bedding plane,	1	-	1
-	-			<5 deg, rough, undulating, open <1/16"	-	_	-
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	CT-08	SHEET	1	OF	4

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722706.4 N, 457111.8 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 45B S/N 351574, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

					S/N 351574, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical	
WATER	LEVELS	: 5.0 ft b	gs on 11/	16/07	START: 11/15/2007 END: 11/15/2007 LOGGER: T. Borton, P. De Sa'rego SOIL DESCRIPTION COMMENTS	
≷Q₽	CANAD: -	INTERVA	11 (6t)	STANDARD PENETRATION	SOIL DESCRIPTION COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE			TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	
AT AT		RECOVI	<u> </u>		MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SINSTRUMENTATION	
SUR			#TYPE	6"-6"-6" (N)	CONSISTENCT, SOIL STRUCTURE, MINERALOGY	
42.2	0.0				Topsoil ∫ Begin drilling 11/15/07, 09:00	
-		1.1	SS-1	1-2-2	\(\sqrt{0.0-0.1'} - dark gray to grayish black, (N3 to N2)\) Poorly Graded Sand With Organics (SP)	-
-	1.5			(4)	↑ 0.1-1.1' - dark gray to medium light gray with depth,	-
-	1.5				\(\(\)(N3 to N6), moist, very loose, very fine to fine grained, \(\)\(\)25% organics, rootlets decreasing with depth, sand is	-
-					Silica S	-
-						-
-					1 1	-
-					1 1	-
-					1 1	-
5	5.0				1 1	_
37.2	3.0				Silty Sand (SM)	
-		1.1	SS-2	2-2-3	5.0-6.1' - light olive brown, with <5% very light gray mottling throughout, (5Y 5/6 with N8), moist to wet,	-
-	6.5			(5)	very loose, fine grained, no HCl reaction, 19%	-
-	0.0				medium plasticity fines, trace iron concretions, sand is / - silica	-
-						-
-					1 1	-
-					1 1	-
-					1 1	-
-					1 1	-
10	10.0				1 1	-
32.2	10.0				Silt (ML)	_
-		1.0	SS-3	4-6-14	10.0-11.0' - grayish yellow, (5Y 8/4), wet, very stiff, nonplastic, rapid dilatancy, mild to moderate HCl	-
-	11.5			(20)	reaction, 10-15% very fine to medium sand-sized, all	-
-	11.0				\carbonate material \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	_
-					1 1	_
-					1 1	_
-					1 1	_
-					1 1	_
-					1 1	_
15	15.0				1 1	_
27.2	15.4	0.4	SS-4	50/5	Silt (ML)	
-				(50/5")	15.0-15.42' - yellowish gray, (5Y 8/1), moist, hard, nonplastic, rapid dilatancy, mild to moderate HCl	_
-					\reaction, 4% very fine to medium sand-sized, all	_
-					carbonate material	-
-					1 1	-
-					1 1	-
-					1 1	7
-					1 1	-
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20					1 1	_



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	CT-08	SHEET	2	OF	4

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722706.4 N, 457111.8 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 45B S/N 351574, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 5.0 ft b	gs on 11/	16/07	START : 11/15/2007 END : 11/15/2007 LOGGEF	R : 1	Г. Borton, P. De Sa'rego		
				STANDARD	SOIL DESCRIPTION	ا ر	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COLL NAME TIGOG CECTED OVANDOL COLOR	SVMBOLICIOS	DEDTIL OF CACING DRILLING DATE		
A BE		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	\ \frac{2}{5}	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND		
EV.			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	N	INSTRUMENTATION		
22.2	20.0			(14)	Silt (ML)	П	09:44 Installing casing to 20.0'		
-		1.3	SS-5	26-33-50/4 (83/10")	20.0-21.25' - Same as 15.0-15.42' except grayish yellow to yellowish gray, (5Y 8/4 to 5Y 8/1)	$\parallel \parallel$	-		
-	21.3			(83/10)	yellow to yellowish gray, (31 6/4 to 31 6/1)	Ш	Ц -		
-						1	1		
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l _						╛	_		
25	25.0					1	_		
17.2	25.6	0.4	SS-6	24-50/1.5 (74/7.5")	Silt With Sand (ML)	Щ	4		
-					5Y 8/1), moist, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 17% fine sand-sized grains,	-			
-					all carbonate materials	-	-		
-						┨	-		
-						┨	-		
-						┨	-		
-						┨	-		
-						┨	-		
30	30.0					┨	-		
12.2	30.0				Sandy Silt (ML)	\dagger			
-		1.5	SS-7	17-34-51 (85)	30.0-31.5' - dark yellowish orange, (10YR 6/6), moist, hard, nonplastic, rapid dilatancy, moderate HCl	111	1		
_	31.5			(65)	reaction, 35% fine to coarse sand-sized, trace fine	1	1		
					gravel-sized limestone fragments, moderate to strong HCl reaction in fragments, all carbonate materials	Τ			
]			
l _									
l -						⇃			
-						1	Dellada Dansadu Hand 1999 1040		
-						-	Driller's Remark: Hard drilling at 34.0'; alternating hard/soft zones similar to		
35 7.2	35.0 35.3	0.0	SS-8	50/3	_ No Recovery 35.0-35.3'	+	elsewhere on site		
'	00.0	0.0	33-6	50/3 (50/3")		╀	1 -		
-					to strong HCl reaction	+	-		
-						1	-		
-						1	-		
-						1	-		
-					·	1	1		
-						1	1		
-						1	1		
40						1	1		
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	CT-08	SHEET	3	OF	4

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722706.4 N, 457111.8 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 45B S/N 351574, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

	WATER LEVELS : 5.0 ft bgs on 11/16/07 START : 11/15/2007 END : 11/15/2007 LOGGER : T. Borton, P. De Sa'rego									
				STANDARD	SOIL DESCRIPTION COMMENTS					
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION					
A BE		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND					
JRF/			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY					
<u> </u>	40.0			(N)	Sandy Silt (ML)					
	+0.0	1.2	SS-9	23-29-50	40 0-41 2' - vellowish gray to light olive gray (5Y 7/2					
-		1.2	33-9	(79)	to 5Y 5/2), moist, hard, low plasticity, moderate HCl reaction, 39% fine to coarse grained sand, 6% gravel,					
-					─∖ trace of gravel-sized limestone fragments, wavy /─ Changing to rock coring >					
-					laminar bedding (grayish yellow [5Y 8/4]), all carbonate materials					
-					Begin Rock Coring at 41.5 ft bgs See the next sheet for the rock core log					
-					See the flext sheet for the fock core log					
-					11					
45										
-2.8										
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	CT-08	SHEET	4	OF	4	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722706.4 N, 457111.8 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 45B S/N 351574, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

	J WETHOD 7		2011 11	MENT . CIVIE 43B 3/N 331374, Muu Tolary, NQ 10015, NVV	casiii	9	ORIENTATION . Vertical
WATER	LEVELS: 5.0	ft bg	s on 1	1/16/07 START: 11/15/2007 END: 11	/15/2	007 LOGGER: T. Borton, P. De Sa're	ego
				DISCONTINUITIES		LITHOLOGY	COMMENTS
100円	(%)			 	8		
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
1 4 9 E	A.H.A.	(%) _Q	28	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	딩	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
E F S	#50 850	OΩ	AC.	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD
SSE	Sää	R	F.E.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SY	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	41.5					Limestone	Begin rock coring at 41.5'
l _	171.0		0	_		- 41.5-45.6' - pale yellowish brown,	begin rock coming at 41.5
					ш	(10YR 6/2), fine grained, mild HCl	
I -				-	⊢	reaction, weak to medium strong (R2	1
I -			1	-	⊬	 to R3), very weak (R1) at 45.1-45.6', trace voids up to 1/16", a 3/8"x3/8" 	l -
				43.05' - Fracture or mechanical break,	П		
	R1-NQ			horizontal, rough, undulating, <1/8" open		cavity is at 43.3' and a 2"x1-3/16"	1
-	5 ft	68	1	43.9' - Fracture, 30 deg, rough, undulating,	╙	cavity is at 44.9'	1
I -	82%			black staining over 100% of surface, open	┦	<u> </u> -	-
45							
-2.8			2	45.1-45.2' - Fracture, 45 deg, rough,	45 1-45 2' - Fracture 45 deg rough		1
-				undulating, 1/8" open	⊢	ł <u>.</u>	B1: 40 minutos
1 _			ND	45.4' - Fracture, 30 deg, rough, undulating,	Н-	No Recovery 45.6-46.5'	R1: 40 minutes
	46.5		NR	1/8" open	Ш]
1 -	10.0			46.6' - Fracture, 10 deg, rough, undulating,	—	Limestone	1
1 -			3	open - racture, 10 deg, rough, undulating,	\vdash	46.5-51.0' - pale yellowish brown,	-
1				47.05' - Fracture, 30 deg, rough, undulating,	\vdash	(10YR 6/2), fine grained, mild HCl	
1 -				1/8" open		reaction, weak (R2), becoming very	1
1 -			>10	47.2' - Fracture, 30 deg, 1/8" open, fine	щ	- weak to weak rock at 49.8-51.5',	-
-				gravel-sized fragments	⊢	trace voids up to 3/16" throughout	-
	R2-NQ			47.55' - Fracture, 10 deg, rough, undulating,		run, 15% voids to 1/8" from 49.4-49.8', 10% cavities up to 1"x3/8"	
-	5 ft 90%	58	0	tight -	ш	from 49.4-49.8'	1
-	3070			47.55-47.95' - Fracture, vertical, rough,	⊢	- 110111 49.4-49.0	I -
50			2	undulating, 1/8" open 47.95-48.35' - Fracture zone, fine	-		_
-7.8			_	gravel-sized fragments			
1 -			0	49.8' - Fracture or mechanical break,	Ь—	F	R2: 12 minutes
-			_	horizontal, rough, undulating, tight	Н	No Recovery 51.0-51.5'	Total depth of boring 51.5',
I -	51.5		NR	50.5' - Mechanical break			on 11/15/07 at 16:00
					l	Bottom of Boring at 51.5 ft bgs on	Recovery and RQD criteria
-				-	1	- 11/15/2007	\met
-	-			-	ł	-	11/16/07 at 08:15, water
I -				_		_	level is 5.0' below ground -
					ı		surface
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PROJECT NUMBER:	BORING NUMBER:	
338884.FL	D-01	SHEET 1 OF 6

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724095.5 N, 457510.2 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6" tri-cone bit ORIENTATION : Vertical

						iry, carriedu, invvo rous, o li			ONIENTATION : Vertical
WATER	LEVELS	: 3.0 ft b	gs on 5/2	2/07 S	START : 5/22/2007	END : 5/23/2007	LOGGE	:R : F	1
>				STANDARD		SOIL DESCRIPTION		نِ 🌡	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	AL (ft)	PENETRATION TEST RESULTS				SYMBOLICLOG	
표공한		RECOVE	ERY (ft)	1	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR				DEPTH OF CASING, DRILLING RATE,
YFA VA			#TYPE	6"-6"-6"		CONTENT, RELATIVE DEI CY, SOIL STRUCTURE, MIN		ĕ	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			#ITPE	(N)	001101012110	5 1, 5 5 1 <u>2</u> 5 11 15 5 1 5 1 1 <u>2</u> , 11		S	
40.8	0.0			. ,	Poorly Graded	Sand W/ Organics (SP)		+	Boring offset 11.5' SE of staked location due
-			00.4	1-1-3		light gray to dark yellowis	h brown, (N8	+	to fallen tree at location.
-		0.8	SS-1	(4)	to 10YR 4/2), m	noist, very loose, very fine	to fine	+111	<u>-</u>
	1.5				nonplastic fines	rganic matter, less with de	eptn, trace		
					Silty Sand (SM)	*		1	
-					0.55-0.85' - dark	, k yellowish orange, (10YF	R 6/6), moist,	1	1
-					very loose, very	fine grained, less than 20	0% fines, 5%	1	1
-					organics, silica	sand		1	Rapid, easy drilling. Water encountered at
_								4	3.0' below ground surface. Wood at 3.0' in
_								_	mud pit.
									1
5	5.0							1	1
35.8	3.0				Sand (SP)		_	+	∄ ∹
-			00.0	5-8-8	5.0-5.8' - very lig	ght gray, (N8), wet, mediu		1	-
_		0.8	SS-2	(16)		nonplastic fines, trace very	fine grained	+	1
_	6.5				\black particles		/]	_
								1	1
-								1	1
-								-	-
-								4	4
								1	
10	10.0							1	1
30.8	10.0				Clayey Sand (S	SC)		1//	₫
-			000	5-6-7	10.0-11.2' - yello	owish gray, (5Y 7/2), wet,	medium,	-1//	
_		1.2	SS-3	(13)		grained, 30% moderate p	olastic fines,	1//	4
	11.5				silica sand		/	<u> </u>	_
								1	_
-								1	-
-								-	-
-								1]
_								1	
									1
15	15.0							1	1
25.8	13.0			1	Clayey Sand (S	SC)		1//	∄
-		1,0	00.4	8-8-10	15.0-16.2' - San	ne as 10.0-11.2' except 4	" sandy clay	1//	∄
-		1.2	SS-4	(18)	lens (CH) at 15.	.6-15.9', moderate plastic	ity	1//	4
_	16.5							1′′	
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-01	SHEET	2	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724095.5 N, 457510.2 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6" tri-cone bit

ORIENTATION : Vertical

,						, cathead, NWJ rods, 6" tri-			ORIENTATION: Vertical
WATER	LEVELS	: 3.0 ft b	gs on 5/2:	2/07 	START : 5/22/2007	END : 5/23/2007	LOGGE	R : R.	
3 0 ≘				STANDARD PENETRATION		SOIL DESCRIPTION		ğ.	COMMENTS
N (#	SAMPLE	INTERVA	AL (ft)	TEST RESULTS	COIL NAME I	LICCE CROUR CVMPOL	COLOR	200	DEDTIL OF CACING DRILLING DATE
H H H		RECOVE	ERY (ft)		MOISTURE CO	USCS GROUP SYMBOL, (ONTENT, RELATIVE DEN	COLOR, ISITY OR	Ö	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6"		, SOIL STRUCTURE, MIN		SYMBOLIC LOG	INSTRUMENTATION
20.8	20.0			(N)	Clayey Sand (SC	`		s ////	Rapid, easy drilling. SS-5 is less plastic than
20.0	20.0	l		4-4-5	20.0-20.45' - light	olive green, (5Y 6/1), we	et, loose,	<i>[///</i>	SS-3 and SS-4
_		0.4	SS-5	(9)		rained, 40% low to mode	erate / .	-	-
_	21.5				\plasticity fines, sill	ica sano		1	_
_									_
_									
							-	1	
25_	25.0						-	1	1
15.8	20.0				Silty Sand (SM)			Ш	
-		1.3	SS-6	5-5-6	25.0-26.3' - Same plastic fines	e as 20.0-20.45' except 2	25-30% low	1111	_
-	26.5			(11)	plastic filles			Ш	-
-	20.5				1			1	-
-							-	1	-
-							-	┨	-
-							-		-
-							-	1	-
-								┨	-
-								-	-
30 <u> </u>	30.0				Silty Sand (SM)			11.17	_
10.6				3-4-4		e as 25.0-26.3' except 40)-45%	1	_
_		1.2	SS-7	(8)	nonplastic to low	plastic fines	-	1111	-
_	31.5							1	_
_								1	_
_									
							•		
								1	
35	35.0							1	1
5.8	- 21.				Organic Soil With		[))) 	Slightly slower drilling.
-		0.4	SS-8	5-3-4	35.0-35.2' - grayis	sh black, (N2), moist, firn atancy, 20% very fine to	n, high fine silica	1 _	
	36.5			(7)	\sand, trace limest	tone rounded pebbles		1	
-	55.5				Silty Sand (SM)	olivo grav (EV 6/1) wat	looce years	1	-
-					fine to fine grained	olive gray, (5Y 6/1), wet, d, 30% low plastic fines,	silica sand.	1	-
-					<1/2" thick organi	c clay (OH) seam at 35.3	35'	1	-
-								1	-
-								1	-
-								1	-
-								1	-
40								\vdash	
				ĺ	1				



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-01	SHEET	3	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724095.5 N, 457510.2 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

DRILLIN	G METH	DD AND I	EQUIPMI	ENT : Dietrich D-5	0 S/N 232, mud rotary, cathead, NWJ rods, 6" tri-cone bit		ORIENTATION : Vertical	
WATER	LEVELS	: 3.0 ft bo	s on 5/22	2/07 S	TART : 5/22/2007 END : 5/23/2007 LOGGER	<u> </u>		
≥□⊋				STANDARD PENETRATION	SOIL DESCRIPTION	20	COMMENTS	
ELO ON (f	SAMPLE	INTERVA		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,	IC LC	DEPTH OF CASING, DRILLING RATE,	
TH B FACE		RECOVE			MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCT, SOIL STRUCTURE, MINERALOGI	SYN	INSTRUMENTATION	
0.8	40.0			48-48-50/4	Silt With Sand (ML) 40.0-40.9' - olive gray, (5Y 3/2), moist, hard, low -	П	Hard, slow drilling. No chatter.	
_		0.9	SS-9	(100)	\neg plasticity, rapid dilatancy, moderate HCl reaction,	Щ		
_	41.3				<20% fine to medium-sized limestone fragments, trace fine gravel-sized limestone		_	
_					_		1	
-					-	-	-	
-					-	ł	1	
-					-	l	1	
-					-		1	
45	45.0				_	l	1	
-4.2		0.7	SS-10	50-50/3	Sandy Silt (ML) 45.0-45.65' - olive gray, (5Y 3/2), moist, hard, low to]	
_	45.8			(100")	\ moderate plasticity, rapid dilatancy, moderate HCl /	Ш	1]	
_					reaction, 25-30% fine sand-sized limestone fragments	l	1	
-					-	l	-	
-					-	-	-	
-					-		Very light, intermittent chatter.	
-					-	l	1	
-					-		1	
50	50.0				_	1	1	
-9.2	50.7	0.5	SS-11	48-50/2 (100")	Sandy Silt And Limestone Lenses (ML) 50.0-50.5' - olive gray, (5Y 3/2), wet, hard, low to]	
_	50.7			(100)	moderate plasticity, moderate HCl reaction, <30%]	
-					limestone lenses, 35% fine to coarse sand-sized limestone fragments		1	
-						l	-	
-					-		1	
-					-	l	1	
-						1	1	
					1	1	1	
55	55.0] 1	
-14.2		0.8	SS-12	48-50/5.5	Silt With Sand (ML) 55.0-55.8' - light olive gray, (5Y 5/2), moist to wet,	\prod]	
	56.0	0.0	30 12	(100")	¬ hard, low plasticity, rapid dilatancy, moderate HCl ¬	Ш	1	
-					reaction, 20% fine to medium sand sized, 40% organics as seams <1/4" thick and laminations, black	-	100% circulation loss. Removed NWJ rod	
-					\(\(\(\N1\)\)	-	and 6" tri-cone, set HW casing to 59.0' below -	
-	-			-	1	ground surface. Regain 100% circulation at 57.5' below ground surface with HW casing.		
-	60.0 60.1 0.1 SS-13 50/1.5			☐ Limestone Fragments	H	Stop drilling at 17:30 5/22/07 after setting the casing		
-				(50/1.5")	60.0-60.1' - light olive gray, (5Y 5/2), moderate HCl reaction, fragments <1" diameter, voids <1/16" over	, / - 		
					40% of surface			
60_								
					Begin Rock Coring at 60.0 ft bgs See the next sheet for the rock core log			
ldot					TIT III TONG GROOT IS AND TOOK GOT ONG	<u> </u>		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-01	SHEET	4	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724095.5 N, 457510.2 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS: 3.0	ft bg	s on 5/	22/07 START : 5/22/2007 END : 5/2	23/20	07 LOGGER : R. Bitely	
≥o⊋	<u> </u>			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(9	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
STH E	RE R VGTH	RQD(%)	ACTU 7 FO	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	MBOL	WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
		RQ	FR/ PEF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-19.2	60.0 R1-NQ 1 ft	40	0	_	口	Limestone	Continue drilling at 0800 5/23/07, water level at 2.2'
_	61.0 40%		NR	_	F	60.0-60.4' - yellowish gray, (5Y 7/2), fine grained, weak to moderate HCl	below ground surface.
-			>10	61.1, 61.3' - Fracture or mechanical break, <10 deg, rough, undulating, open <1/2"	口	reaction, weak (R2), voids 1/16" over 50% of surface, poorly fossiliferous,	Clean out HW casing to 59.0' below ground -
-				61.4, 61.65, 61.7, 61.75, 61.8, 61.85'	口	_ few cavities <1/4" diameter	surface, tri-cone with 3-7/8" _ bit to 60.0'
-			0	Fractures or mechanical break, 30 deg and 40 deg, rough, undulating, tight, open <1/4"	世	No Recovery 60.4-61.0' Limestone	Light Chatter -
-	R2-NQ			61.9' - Fractures or mechanical break, horizontal, rough, undulating, tight, open	士	61.0-62.4' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction,	Remove AWT rod and 3- 7/8" tri-cone
-	5 ft 28%	9		<1/4"	世	weak to medium strong (R2 to R3), voids <1/16" over 20-30% of surface,	Set NQ tooling to 60.0' - Advance HW casing to
-			NR	62.2' - Mechanical break		trace cavities <1/4" diameter, poorly	seat in top of rock at 60.0'
65				_	\mathbb{H}	fossiliferous, trace organics, trace silts at 62.4', possible soil zone at	R1: 25 seconds -
-24.2					H	62.4-66' No Recovery 62.4-66.0'	R2: 7 minutes
-	66.0			-	F	_ `	_
-			4	66.35' - Mechanical break or fracture, 60 deg,	F	Limestone - 66.0-67.7' - yellowish gray, (5Y 7/2),	-
-				rough, undulating, tight, open <1/4" 66.45' - Mechanical break or fracture,		fine grained, moderate HCl reaction, weak to medium strong (R2 to R3),	-
-			0	vertical, rough, undulating, tight		voids <1/16" over 30-40% of surface,	-
-	R3-NQ		NA.	66.6' - Fracture or mechanical break, 50 deg, rough, undulating, open <1/4"	IIII	many cavities <1/4" diameter, moderately fossiliferous with molds	Driller's Remark: 100% _ circulation loss at 68.0'
-	5 ft 67%	25	NR	66.95' - Fracture or mechanical break, horizontal, rough, undulating, open <1/4"	1111	- \<1/4" diameter Silt And Limestone Interbeds (ML)	-
-				67.7-69.6' - poorly indurated silts and limestone fragments (8")	1111	67.7-70.45' - yellowish gray, (5Ŷ 7/2),	-
70			1	• , ,]	 hard, fine to medium grained, strong HCl reaction, very weak (R1), 	
-29.2			NA	69.9' - Fracture or mechanical break, 80 deg, rough, undulating, tight	Щ	limestone interbeds are 1" thick, partial no recovery in interval	R3: 5 minutes
-	71.0		NR	70.45-71.0' - poorly to moderately indurated silt (1")	$\ \ $	Carbonate Silt (ML)	_
-				-	$\ \ $	70.45-71.0' - yellowish gray, (5Y 7/2), hard, moderate to strong HCl	-
-				-	$\ \ $	reaction, friable No Recovery 71.0-73.6'	-
-			NR	-	lIII	F	-
-	R4-NQ			-		†	-
_	5 ft 48%	34	3	73.85' - Bedding plane (3), horizontal,	世	Limestone	1
-			4	smooth, undulating, tight, 3+ bedding plane fractures in indurated silts/extremely weak	П	73.6-73.85' - yellowish gray, (5Y 7/2), very fine to fine grained, extremely	
75_ -34.2				limestone 74.9-75.05' - Fractures or mechanical break	\perp	weak (R0), laminated 73.85-76.0' - yellowish gray, (5Y 7/2),	D4. 2 minutes
-34.2			3	(4), rough, undulating, intersecting angles	士	 moderate HCl reaction, strong to 	R4: 3 minutes
-	76.0			75.7-75.8' - Fractures or mechanical break (3), 50 deg, rough, undulating, tight, 3	\vdash	medium strong (R4 to R3), voids <1/16" over 30-40% of surface, few	-
-			>10	intersecting fractures	\perp	_ cavities <1/2" diameter, poorly fossiliferous	-
-				76.0-76.15 - Fracture zone, rough, undulating, gravel sized fragments <1"	Ь	76.0-78.0' - yellowish gray, (5Y 7/2),	-
-			>10	diameter - 76.45' - Fractures or mechanical break (2),	F	fine grained, strong HCl reaction, medium strong to strong (R3 to R4),	-
-	R5-NQ			45 deg, rough, undulating, tight	F	strengthening with depth, voids <1/16" over 30-40% of surface,	1
	5 ft 60%	28	NR	76.8' - Fractures or mechanical break (4), 70 - deg, rough, undulating, tight, open <1/4"	H	variable, few cavities <1/4" diameter,	
_			INIX	77.75-78.0' - Fracture zone, rough, undulating, gravel sized fragments <2" -	F	poorly fossiliferous No Recovery 78.0-80.0'	
80				diameter	H		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-01	SHEET	5	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724095.5 N, 457510.2 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 3.0) ft bgs	s on 5/	/22/07 START : 5/22/2007 END : 5/	23/20	007 LOGGER : R. Bitely
≥∩≘	(%)			DISCONTINUITIES	ပ္ခ	LITHOLOGY COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-39.2 _	81.0		NA 5			Fat Clay (CH) 80.0-80.3' - high plasticity, no to slow dilatancy, strong HCl reaction, <10%
-	01.0		>10	80.9-81.0' - Fracture zone, rough, undulating, gravel sized fragments <1" diameter 81-81.1' - Fracture zone, rough, undulating,		Imestone fragments of medium
-			0	gravel sized fragments <1-1/2" diameter 81.45' - Fracture or mechanical break, <10 deg, rough, undulating, 3+ gravel sized	H	80.3-81.0' - yellowish gray, (5Y 7/2), fine grained, strong HCl reaction, extremely weak to very weak (R0 to
-	R6-NQ 5 ft 94%	70	0	fragments <1/2" diameter, open <1/2" 81.75' - Fracture or mechanical break, 40 deg, rough, undulating, open <1/2"		R1), voids <1/16" over <10-30% of surface, increasing with depth, no cavities <1/2" diameter, poorly
- - 85			1			fossiliferous 81.0-83.25' - very light gray to moderate yellowish brown, (N8 to
-44.2 _	86.0		1 NR	84.95' - Mechanical break or fracture, <10 — deg, rough, undulating, tight 85.15' - Fracture or mechanical break, <10	E	10YR 5/4), very fine to fine grained, medium strong to strong (R3 to R4), voids <1/16" over <5-30% of surface,
_			>10	deg, rough, undulating, open <1/4" 86.8' - Fracture or mechanical break, <10		variable, many cavities <1/2"x1-1/2" diameter, 80% (with secondary recrystallized infill), trace organics,
-	R7-NQ 5 ft 92%		>10	deg, rough, undulating, open <1/2" 86.9-87.05' - Fracture zone, rough, undulating, gravel sized fragments <1-1/2"		poorly fossiliferous
-		50	1	diameter 87.45, 87.8, 88.05, 89.2' - Fracture or mechanical break, <10 deg, rough,	Ħ	moderate yellowish brown, (N8 to 10YR 5/4), very fine to fine grained, low to moderate plasticity, rapid to
90			3	undulating, 1/2" silt lens at 87.8', <1/4" gaps 88.5' - Mechanical break, for hardness test 89.55, 90.0, 90.2, 90.35' - Mechanical break		moderate dilatancy, strong HCl reaction Limestone
-49. <u>2</u> -	91.0		2 NR	or fractures, <10 deg, rough, undulating, fractures through cavities, open <1"	H	83.35-85.7' - very light gray to R7: 4 minutes moderate yellowish brown, (N8 to 10YR 5/4), very fine to fine grained,
-			0			strong HCl reaction, extremely weak to very weak (R0 to R1), strengthening with depth, voids
-	DO NO		0	92.35, 92.55' - Mechanical break or fractures, <10 deg, rough, undulating, tight, open <1/4"	Ė	<pre>- <1/16" over 15-30% of surface, few - cavities <1"x1/2" diameter, with - partial secondary recrystallized infill, - poorly fossiliferous, trace laminated</pre>
-	R8-NQ 5 ft 100%	64	0		Ħ	- organics No Recovery 85.7-86.0' Limestone
95 <u> </u>			1	94.95, 95.05, 95.1, 95.65' - Bedding plane or		- 86.0-90.6' - yellowish gray to dark yellowish brown, (5Y 7/2 to 10YR - 4/2), 5b 7/1, fine to medium grained, R8: 5 minutes
-	96.0		3	mechanical break, <10 deg, smooth, undulating, tight	Ħ	moderate to weak HCl reaction, weak to strong (R2 to R4), mottled light bluish gray (5B 7/1) at
-					1	- 86.0-87.8', voids <1/16" over 20-30% of surface, many cavities, <2" diameter, poorly to moderately
-					1	- fossiliferous, 1/2" carbonate silt lens at 87.8', trace laminated organics - No Recovery 90.6-91.0'
-					1	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-01	SHEET	6	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724095.5 N, 457510.2 E (NAD83)

ELEVATION: 40.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 3.0	ft bgs	s on 5/	/22/07 START: 5/22/2007 END: 5/2	23/20	07 LOGGER : R. Bitely	
				DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
ELO E ANI	AND 3Y (%		ZES T	DESCRIPTION	C Lo	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH B FACE	E RL GTH, OVEF	.%) O	CTUF F00	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOLI		FLUID LOSS, CORING RATE AND
DEP SUR ELE	COR	R Q	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND	SAMBOLIC LOG	AND ROCK MASS	SMOOTHNESS, CAVING ROD
						[
					_		_



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-02	SHEET	1	OF	3	

ORIENTATION: Vertical

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724164.5 N, 457585.0 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

WATER	LEVELS	: 1.0 ft bo	gs on 04/2	20/07	START: 4/20/2007 END: 4/20/2007 LOGGER: T. Stewart
				STANDARD	SOIL DESCRIPTION O COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
H H H		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
THE A			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
				(N)	
41.3	0.0			1-2-2	Topsoil (OL/OH) \[\sqrt{0.0-0.2'} \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
l _		1.2	SS-1	(4)	Poorly Graded Sand With Organics (SP)
l _	1.5			, ,	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
l _					organics, roots, sand is silica
l _					Silty Sand (SM)
					\\ 0.6-1.2' - dark yellowish orange, (10YR 6/6), moist to \\ wet, very loose, fine grained, 15-20% nonplastic fines, \\ _
					sand is silica
]]]
_					1 1
5	5.0				1 1
36.3					Poorly Graded Sand (SP)
-	1	0.8	SS-2	6-7-7 (14)	5.0-5.8' - white, (N9), wet, medium dense, very fine to fine grained, trace nonplastic fines, trace black
-	6.5			(14)	\particles, sand is silica
-					1 1
_	1				1 1
-					1 1
-	1				
_	1				
-	-				
10	10.0				
31.3	10.0				Sandy Lean Clay (CL) Driller's Remark: Hard drilling at 12.0'
-	1	1.2	SS-3	5-4-4	10.0-11.2' - greenish gray w/ pale green and olive gray with pale green and olive gray mottling, (5GY
-	11.5			(8)	├ 6/1, 10G 6/2, and 5Y 3/2), wet to moist, stiff, low to
-	11.5				\ medium plasticity, slow dilatancy, 40% very fine silica \ / - \ \sand
-	1				- Sanu
-	1				
-	-				
-					
-					-
	1				
15 26.3	15.0				Sandy Silt And Limestone (ML)
-	-	1.3	SS-4	7-4-15	15.0-16.3' - grayish yellow, (5Y 8/4), wet, very stiff,
-		1.3	33-4	(19)	low plasticity, rapid dilatancy, mild to moderate HCl reaction, 35-40% fine to coarse sand, 20% fine to
-	16.5				coarse gravel-sized limestone fragments; carbonate, 🖊 🚻
-					\all carbonate \ / _
-					
-					
-	-				
-	-				-
-					-
20					



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	D-02	SHEET	2	OF	3

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724164.5 N, 457585.0 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

,						, cathead, NW rods, 3-7/8"			ORIENTATION: Vertical
WATER	LEVELS	: 1.0 ft b	gs on 04/2		START : 4/20/2007	END: 4/20/2007 SOIL DESCRIPTION	LOGGE	R : I.	Stewart COMMENTS
≥Q⊋	CANADIT	INTERVA	1 (4)	STANDARD PENETRATION		JOIL DEJUNIT HUN		00	OUNINIENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	RECOVE		TEST RESULTS	SOIL NAME, MOISTURE C	USCS GROUP SYMBOL,	COLOR, ISITY OR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH SURF/ ELEVA			#TYPE	6"-6"-6" (N)		/, SOIL STRUCTURE, MIN		SYMB	INSTRUMENTATION
21.3 - - -	20.0	1.2	SS-5	42-50-38 (88)	nonplastic, rapid	sh yellow, (5Y 5/4), mois dilatancy, moderate HCl se sand, 20% fine to coal stone fragments, all carb	reaction, rse	- - - -	- - -
- - - - 25	25.0 25.2							- - - -	Driller's Remark: 22.5' got hard, then began soft drilling within next few inches -
16.3	25:2	0.0	SS-6	50/2 (50/2")	No Recovery 25.	0-25.2'			-
- - - - -								- - - -	- - - - - - -
30 <u> </u>	30.0	1.3	SS-7	22-22-12	Sandy Silt (ML) 30.0-31.3' - dark	yellowish orange, (10YR rapid dilatancy, moderat	6/6), wet,	$\frac{1}{1}$	Driller's Remark: 27.5' soft drilling to 30.0'
- - - - -	31.5			(34)	reaction, 35% fine	e to coarse sand, 10% fi stone fragments, all carb	ne	<u>-</u> - - - - -	- - - - -
- -	35.0							-	Driller's Remark: Hard again at 34.5'
35 6.3 - - - - - - - - 40	35.1	0.1	\SS-8_	50/1.5 \((50/1.5")	and gray yellowis 5Y 8/4), olive cold particles, disc sha Begin Rock Corir	olive gray to moderate ol sh fragments, (5Y 5/2 to ored fragments have 10- aped	5Y 4/4 and	- - - - - -	- - - - -



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-02	SHEET	3	OF	3	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724164.5 N, 457585.0 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

COMING	J IVIL IT IOD AI	ND L	ZOII IV	IENT: CME 550 S/N 186073, mud rotary, NQ tools, NW	Casin	1	ORIENTATION : Vertical
WATER	LEVELS: 1.0	ft bg	s on 0	4/20/07 START : 4/20/2007 END : 4/	20/200	D7 LOGGER : T. Stewart	
				DISCONTINUITIES	(5	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ω l	DESCRIPTION	SYMBOLIC LOG		†
N A A	N. A.Y.	· ·	FRACTURES PER FOOT	DESCRIPTION	힐	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
E E E	L E E E	(%) Q	L F	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
- ER-	N N N N N N N N N N N N N N N N N N N	Ø	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ×	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
		22	шД	THE NAME OF THE PROPERTY OF TH	S		
6.3	35.0		1		Н	Limestone	Driller's Remark: 100% circulation -
	1		' '		Ш	- 35.0-39.8' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction,	- Circulation
-	1			35.95' - Fracture, 60 deg, rough, undulating,	Н	weak to medium strong (R2 to R3),	-
-	-		0	tight	Н	 decreasing to very weak (R1) below 	-
I -				36.6' - Mechanical break, horizontal, rough,	Ш	38.5', 5-20% voids <1/16", poorly	_
	R1-NQ	96	0	undulating, tight	Н	fossiliferous (clasts up to 3/16"), trace yellowish gray (5Y 7/2)	
1 7	5 ft 96%	96	0		Ш	mottling, secondary recrystallization	_
-	1			-	ш		-
-	1		0		Н	-	-
-						-	-
1 _]		0		Н		R1: 6 minutes
40	40.0		NR.		Ш	No Dogovory 20 9 40 0	1
1.3	1.0.0			_	\mathbb{H}	No Recovery 39.8-40.0' Limestone	Driller's Remark:
1 -	1		2	40.5' - Fracture or mechanical break, 60 deg,	⇈	40.0-41.5' - light olive gray, (5Y 5/2),	Maintained full circulation -
-			\vdash	rough, undulating, tight	μП	 moderate to strong HCl reaction, 	-
1 -			1	40.6' - Fracture or mechanical break, 70 deg,	\vdash	very weak (R1), 5-10% voids <1/16", non-fossiliferous, transitional to	I -
				rough, undulating, tight 41.4' - Fracture or mechanical break, 0-10	\Box	non-rossiliterous, transitional to	
1	R2-NQ			deg, rough, planar, tight	Ш	41.0-44.5' - light olive gray, (5Y 5/2),	1
-	5 ft	86	>10	42.0-42.2' - Fracture zone	ш	fine grained, moderate to strong HCl	-
-	90%			42.4' - Mechanical break, horizontal, rough,	Н	reaction, very weak (R1), 15-40%	-
_			0	undulating, tight	Н	voids <1/16" and increasing to <3/16" with depth, poorly fossiliferous with	
l _					Ш	increasing cavities with depth (up to	R2: 4 minutes
			0		Н	1/2" elongate), secondary	
45	45.0		NR			recrystallization	Total Depth at 45.0' on
-3.7	45.0				Н	No Recovery 44.5-45.0'	4/20/07
-	-				1 1	Bottom of Boring at 45.0 ft bgs on 4/20/2007	-
_					1	-	_
					П		
]				1		<u> </u>
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PROJECT NUMBER:

33884.FL

BORING NUMBER:

D-03 SHEET 1 OF 4

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724234.5 N, 457645.5 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-7/8" and 6" tri-cone bits ORIENTATION: Vertical

					S/N 186073, mud rotar					ORIENTATION: Vertical
WATER	LEVELS	: 1.5 ft bo	gs on 3/24		START : 3/24/2007	END : 3/26/200		ER	: T. S	Stewart COMMENTS
≥Q₽	044451	INITED	1 (4)	STANDARD PENETRATION	-	SOIL DESCRIPTION	IN	-	90	COMMENTS
DN (SAMPLE	INTERVA	. ,	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,					DEPTH OF CASING, DRILLING RATE,
H B		RECOVE	RY (ft)		MOISTURE (CONTENT, RELATIV	E DENSITY OR	SYMBOLIC LOG	DRILLING FLUID LOSS, TESTS, AND	
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	CONSISTENC	CONSISTENCY, SOIL STRUCTURE, MINERALOGY				INSTRUMENTATION
42.0	0.0			(1.1)	Topsoil	Topsoil				08:45 Start drilling
-		1.2	SS-1	1-2-2		gray to grayish blac oarse gravel sized		A		24" split spoon, using N-rod
-	1 5			(4)	fragments	oarse graver sizeu	Tools and wood	//		Driller switches to a 6.0" tricone roller drill bit
-	1.5					Sand With Organic		7/1		for run between SS-1 to SS-2
-					fine to fine grains	ight gray, (N8), moi ed, 5% nonplastic fi	st, very loose, very ines. 15%	//-		Mix mud (added 3/4 of 50-lb bag quick Gel
-					roots/organics, s	ilica sand		┚┪		brand bentonite) -
-								-		-
-								-		-
-								-		-
	5 0							-		-
5 37.0	5.0				Silty Sand (SM)				Π	_
-		0.7	SS-2	6-5-4	5.0-5.7' - modera	ate yellowish brown 4 to 10YR 4/2), wet		\forall		-
-	6.5	0.7	002	(9)	to fine grained, s	silica sand, 15% noi	nplastic fines,	/-		-
-	0.5				trace very fine to	fine sand-sized bla	ack particles	┚┪		-
-								-		-
-								-		-
-								-		-
-								-		-
-								-		-
10	10.0							-		-
32.0	10.0				Silt (ML)			\neg	Ш	Driller's Remark: Maintaining full mud
-		1.2	SS-3	11-11-11	10.0-11.2' - gray	ish yellow, (5Y 8/4) ncy, moderate HCl	, wet, nonplastic,	-		circulation -
-	11.5			(22)	very fine to fine s	sand-sized grains, o		A	Щ	7
-	11.0				materials			/		7
-								1		-
-								1		7
-								- 1		-
-								-		7
-								-		7
15	15.0							-		7
27.0				40.00 =0.45	Silt (ML)	40.0			Ш	Driller's Remark: Spoon unseated before
-		1.2	SS-4	18-32-50/4" (82/10")	15.0-15.9' - Sam	e as 10.0-11.2'				measure of last 6", drilled down to 18.0' to install 20.0' of 6" diameter casing, then
-	16.3			(=/	Sandy Silt (ML)	erate yellow, (5Y 7/	/6) moist	A	Ш	switched over to 4-7/8" drill bit and continued
					nonplastic, rapid	dilatancy, moderat	te HCl reaction,	/1		to 20.0' to take SS-5 (20.0-21.5') Driller's - Remark: Only 15.0' of 6" diameter
						5.9', 25% fine to co ents, all carbonate	arse sand-sized	/1		
					l limestone magnin	cs, an samonate		- 1		1
-								1		7
								1		7
-								1		1
20								٦		7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

D-03

SHEET 2 OF 4

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724234.5 N, 457645.5 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-7/8" and 6" tri-cone bits ORIENTATION: Vertical

						ry, cathead, NW rods, 4-7/8		ORIENTATION : Vertical			
WATER	LEVELS	: 1.5 ft bo	gs on 3/24		START : 3/24/2007	END: 3/26/2007 SOIL DESCRIPTION	LOGGEI	₹∶⊺. T	Stewart COMMENTS		
≥Q∉ 	044451	INTERVA	1 (6)	STANDARD PENETRATION	-	SOIL DESCRIPTION		8	CONTINIEN 15		
ON (SAMPLE		. ,	TEST RESULTS	SOIL NAME	, USCS GROUP SYMBOL	ICL	DEPTH OF CASING, DRILLING RATE,			
H B		RECOVE			MOISTURE CONTENT, RELATIVE DENSITY OR				DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION		
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	CONSISTENC	Y, SOIL STRUCTURE, MII	SYMBOLIC LOG	INSTRUMENTATION			
22.0	20.0	0.1	\ SS-5 /	50/1	│ Limestone Frag	ments	Γ	Ť	11:57 at 20.0' currently 15' 6" diameter		
-				(50/1")	20.0-20.1' - gray	rish yellow to moderate y erate HCl reaction, poorly	ellow, (5Y 8/4	1	casing in place, using 5.0' N-rod lengths to - advance a 4-7/8" tricone roller drill bit		
-					(molds), trace (1	1/2") dusky yellowish bro	wn (10YR	1	Driller's Remark: Very hard drilling		
-					2/2) concretions	<u> </u>		1	-		
-								1	-		
-								1	-		
-								1	-		
-								1	-		
-								1	-		
25	25.0							1			
17.0	25.4	0.4	SS-6	50/5	Limestone Frag	gments			-		
-				(50/5")		lerate yellowish brown, (10YR 5/4),	\vdash	-		
-					limestone fragm	ents, poorly fossiliferous	(casts and	1	1		
-					\molds)			1	1		
-								1	1		
-								1	1		
-								1	1		
-								1	1		
-							,	1	1		
30	30.0							1	1		
12.0	30.4	0.4	SS-7	50/5	Silt With Sand (ऻऻऻ	Driller's Remark: Hard drilling and a lot of		
-				(50/5")		k yellowish orange, (10YF d dilatancy, moderate HC		₩	chatter, very slow drilling advancement -		
-					20-25% fine to n	medium sand-sized mate	rial, all	1	Driller's Remark: 15:25, set 3' NW casing to		
-					\carbonate Begin Rock Cori	ing at 31.0 ft bgs		1	30' then switch to core runs -		
-					See the next she	eet for the rock core log	•	1	Driller's Remark: 15:33 tape measured depth		
							•	1	of boring is 31.0' NQ core barrel assembly		
							•	1	NQ drill bit is a hard rock formation drill bit NW casing advancer w/ retractable tricone		
								1	roller drill bit accessary (serial # 83963-CN)		
								1	Switch to rock coring at 31.0'		
35											
7.0											
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

D-03 SHEET 3 OF 4

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724234.5 N, 457645.5 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION : Vertical

CORING	INIL ITIOD AI	ND L	אורוטג	IENT: CME 550 S/N 186073, mud rotary, NQ tools, NW	Casin		ORIENTATION : Vertical
WATER	LEVELS: 1.5	ft bg	s on 3	/24/07 START: 3/24/2007 END: 3/	26/20	D7 LOGGER : T. Stewart	
				DISCONTINUITIES	(,	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		w	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE OOLOD	1
HHH	N, 4 K	(9	FRACTURES PER FOOT	BEOOK!! HOW	일	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
H A A	RES	%	L 로 교	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30L	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
		Q D (%)	ER Z	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Į≅	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
Оνш		<u>~</u>			S		
1	31.0 R1-NQ	0	>10	31.0-31.2' - Fracture zone, fragments of core,	Н	Limestone	R1: 2 minutes
-	1 ft 32.0 20%	0	NR	disc-shaped	П	 31.0-31.2' - grayish yellow mottled with minor light olive brown, (5Y 5/4 	
-	32.0 2070				П	with 5Y 5/6), moderate to strong HCl	1 -
-			1	22 El Frantissa EE 00 des emeeth	₽₩	- reaction, medium strong (R3), gray	-
Ι.]			32.5' - Fracture, 55-90 deg, smooth, undulating, open 1/8"	Ш	staining, poorly fossiliferous (casts),	
				J	Н	spherical voids (up to 1/16") over	
1 -	1		2	33.3' - Fracture, 80 deg, smooth, undulating, open 1/8"	Н	 10% of surface No Recovery 31.2-32.0' 	1
-	R2-NQ			33.5' - Fracture or mechanical break,	ш	Limestone	-
-	5 ft	84	1	horizontal, rough, undulating, open 1/4"	Н	 32.0-36.7' - grayish yellow, (5Y 8/4), 	-
35	94%			34.15' - Fracture, 50-60 deg, rough,	Н	very fine grained, strong HCl	
7.0				undulating, tight	Ш	reaction, poorly fossiliferous with	
1 -	1		1	35.5' - Bedding plane or mechanical break,	1	 several large (up to 1" elongate) cavities/molds, some with secondary 	1
-				horizontal, rough, undulating		infilling, variable voids (<1/16") over	R2: 7 minutes
-			0	26 El Machanical bra-li	₽₽	 3-20% of surface increasing with 	-
-	37.0		NR	36.5' - Mechanical break	Ш	depth, medium strong (R3) from	
						32.0-34.8', abruptly very weak (R1) below 34.8']
-	1		3	37.55' - Bedding plane, horizontal, rough,	Ш	No Recovery 36.7-37.0'	1
-	1			undulating, open 1/2"	口	Limestone	1
-			1	37.7' - Fracture, 60-70 deg, rough,	Н	_ 37.0-37.55' - Same as 32.0-36.7'	-
l _]			undulating, tight 38.0' - Bedding plane or mechanical break,	Н	except very weak (R1), voids (<1/16") over 3% of surface	
1	R3-NQ			horizontal, rough, undulating, open up to 1"	ш	_ 37.55-40.7' - dark yellowish orange,	
40	5 ft 74%	50	0	38.8, 39.5, 39.8, 40.0' - Mechanical break (4)	Н	(10YR 6/6), fine grained, moderate	1
2.0	1,			_		HCI reaction, weak (R2), voids (up to	_
-	-		2	40.25' - Fracture or mechanical break,	₽	_ 3/16") over 25-35% of surface, trace fine grained organic particles	-
1 -				horizontal, rough, undulating, tight 40.35, 40.6' - Mechanical break or bedding	Ш	No Recovery 40.7-42.9'	
Ι.]		NR	plane (2), horizontal, rough, undulating, tight	Н	_	R3: 4 minutes Stop Drilling for the day at -
1	42.0			p = 1 (),			17:00
-				-	ш	=	Driller's Remark: 1.5' below
-	1		NR	-	Н	=	ground surface water level -
-				-		Sand With Silt (SM)	in 6" casing, 08:05 on
Ι.]					42.9-46.4' - very pale orange, (10YR	3/25/07 will install 6" diameter casing down to
1	R4-NQ					8/2), very fine to fine grained, mild	2.0' increasing circulation
1 -	4.5 ft	0				HCl reaction, rounded, clean sands,	around 15.0' of 6" diameter
l	80%		NA		1111	 10-15% pale yellowish orange (10YR 5/6) fine grained particles, abrupt 	casing, will then install 3"
45 -3.0	.		14/ \	_	-	contact at 46.4'	NW casing to 41.0' R4: 8 minutes
-3.0	.					-	Core barrel locking during –
							run (possible sands)
1 7	46.5						1
-	DE NO	100	2	46.6' - Bedding plane or mechanical break,	П	Limestone	Only 4.5' - unable to reach – full 5.0' stroke
-	177.0 0.5 ft			horizontal, rough, undulating, tight	H	46.4-46.5' - light olive gray, (5Y 5/2),	Install 3" NW casing down
-	\100%/		3	46.7" - Mechanical break		moderate HCl reaction, medium strong (R3), moderately fossiliferous	to 46.0'
1 _]			47.0' - Bedding plane or mechanical break,	Щ	_ (few molds, mostly casts), voids	R5: 2 minutes
1				40-50 deg, rough, undulating, gray stains on surface, open to tight	Ш	(<1/16") over 10-15% of surface,	1
1 -	1		3	47.45' - Fracture or mechanical break,	П	trace black particles up to 1/2"	1
-	R6-NQ	20		vertical, tight	₽	_ (possibly organics) 46.5-47.0' - Same as 46.4-46.5'	1 -
-	4.5 ft 100%	30	>10	47.85' - Fracture or mechanical break,	ш		1 4
50] 100 /6			horizontal, rough, undulating, tight 48.05' - Bedding plane or mechanical break,	\mathbb{H}		
-8.0				48.05 - Bedding plane or mechanical break, horizontal, rough, undulating, tight			
-	1		>10	48.25, 48.65' - Mechanical break (2)	Ш	-	R6: 9 minutes
				, , , , , , , , , , , , , , , , , , , ,	\vdash		



PROJECT NUMBER:

33884.FL

BORING NUMBER:

D-03 SHEET 4 OF 4

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724234.5 N, 457645.5 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: M. Griffin

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

WATER	LEVELS: 1.5	ft bgs	s on 3/	/24/07 START : 3/24/2007 END : 3/2	26/20	07 LOGGER : T. Stewart	
≥0€	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
ELO ON (F	RUN, H, AND ERY (%)		ZES IT	DESCRIPTION	J O	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	51.5		>10	49.20' - Fracture or mechanical break,	Ш	Limestone - 47.0-51.5' - yellowish gray, (5Y 7/2),	
-			0	horizontal, rough, undulating, tight 49.25' - Fracture, horizontal and 60-70 deg, rough, undulating, tight 49.9-50.3' - Fracture zone		mild to moderate HCl reaction, weak (R2), very weak (R1) zone at 50.0', spherical voids (1/16") over 20-30%	-
-	R7-NQ		4	50.65' - Fracture, 80-90 deg, rough, undulating, tight 50.95-51.5' - Fracture zone or mechanical		of surface, poorly fossiliferous, casts/molds (up to 1/2"), up to 15% brownish black particles as laminations (up to 1/16" thick)	-
55 -	5 ft 100%	85	0	break, vertical, tight 52.3, 53.0' - Mechanical break (2) 53.15-53.35' - Fracture zone		51.5-56.5' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild to moderate HCl reaction, weak to	-
-13. 0 -			0	54.9' - Fracture or mechanical break, 40-50 deg, rough, undulating, tight		medium strong (R2 to R3), spherical voids (up to 1/16") over 5-10% of surface, black laminotons (<1/16"	R7: 16 minutes
-	56.5 R8-NQ	465			厂	thick) across entire interval, trace coarse grained black particles	
-	57.0 R8-NQ 0.5 ft 100%/	100	0	-	H	(possible organics) 56.5-57.0' - Same as 51.5-56.5'	R8: 1 minute -
-	(100 %)		2	57.5, 57.8, 59.0' - Fracture (3), <10 deg, rough, undulating, open 1/4"-1/2"		57.0-61.35' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), fine grained, moderate HCl reaction,	-
-	R9-NQ		0			weak to medium strong (R2 to R3), voids (<1/16") over 20-30% of surface, few fossil molds and casts up to 1/2" elongate	-
60	5 ft 87%	75	2	59.5, 59.6' - Mechanical break (2)		L up to 1/2 elongate	-
-18.0 -			2	59.95' - Fracture or mechanical break, 25-35 deg, rough, undulating, open 1/2" 60.35' - Fracture, 20-30 deg, rough,	E	- - -	-
-	62.0		0 NR	undulating, open 1/8" 60.8' - Fracture or mechanical break, horizontal, smooth, undulating	Ħ	- No Recovery 61.35-62.0' Bottom of Boring at 62.0 ft bgs on	R9: 10 minutes Complete boring 3/25/07, Total Depth 62.0' 08:03 3/26/07 water level
-				-		- 3/26/2007	2.5' below ground surface to top of mud surface level
-						- -	10:00 3/26/207 finished abandonment Grout seeping up out of ground surface 3' away
-						_	from hole
_					1	- -	-
-						-	-
-						- -	
-				- -	-	_	-
				-		-	-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-04	SHEET	1	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723150.5 N, 457831.9 E (NAD83)

ELEVATION: 41.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

						auto hammer, AWJ rods			ORIENTATION: Vertical
WATER	LEVELS	: 2.0 ft b	gs on 3/2	8/07 T	START : 3/28/2007	END : 4/4/2007	LOGG	ER : F	R. McComb
≥∩ ∵				STANDARD PENETRATION	SC	OIL DESCRIPTION		—	COMMENTS
N A N	SAMPLE	INTERVA	AL (ft)	TEST RESULTS	COIL NAME LIG	SCS GROUP SYMBOL,			DEDTIL OF CACING DOLLING DATE
### ###		RECOVE	ERY (ft)		MOISTURE CON	NTENT, RELATIVE DEN	ISITY OR	Ş	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	CONSISTENCY, S	SOIL STRUCTURE, MIN	ERALOGY	- BOLDHORNS	INSTRUMENTATION
<u>оош</u> 41.9	0.0			(N)	─ Topsoil (OL)			7/	
-	0.0		00.4	2-3-2	\0.0-0.2' - black, (N1), moist, roots, wood o	debris /	/ -	- Trace level. 2.0 below ground surface
-		0.8	SS-1	(5)	Poorly Graded San	nd (SP) lark gray, (N4), moist, l	laana fina	Æ	
-	1.5				grained, silica sand	, 10-15% organic mate	erial, roots	′ -	-
-								-	-
-								-	-
-								4	-
_								4	-
-								4	-
-								4	-
5	5.0				D 1 0 1 10	1.(00)		4.	_
36.9				4-4-4	Poorly Graded San √ 5.0-5.95' - very light	id (SP) t gray grading to light g	ray, (N8 to	\mathbf{H}	
-		1.0	SS-2	(8)	N7), wet, loose, fine	e grained, silica sand, t	trace	/ 4	_
_	6.5				(SM) with 25% low	dually increasing to sil	ty sand		_
_					((-)	,		1	_
_								1	_
l _								1	_
l _									_
l _								1	_
l _									_
10	10.0								_
31.9				5 00 00	Sand With Limesto	o ne (SP) eenish yellow, (10Y 8/2	2) wot	P.	_
_		1.3	SS-3	5-22-28 (50)	loose, fine to coarse	e grained, strong HCI r	eaction,	$\ \mathbf{J} \ $	
_	11.5			(,		one fragments, 25% fir 15% nonplastic fines	ne to coarse	Щ	-
l _					Clavey Sand (SC)				_
					10.2-10.35' - pale o	live, (10Y 6/2), wet, me	edium		
					25-30% low plastic	um grained, strong HC fines, carbonate	i reaction,		
					Silt (ML)				
						rate yellow and grayish t, nonplastic, rapid dila]]
					HCl reaction, carbo		,,]]
15	15.0							1]
26.9					Silt (ML)	- 10 0E 11 0l 1 5	100/		
		1.2	SS-4	23-33-26 (59)	fine sand-sized grai	as 10.35-11.3' except 5 ins	-10% very	1	
-	16.5			(00)				┦╜	-
								1]
-								1]
-								1]
-								1]
-								1	_
-								1]
20								1]
								十	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-04	SHEET	2	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723150.5 N, 457831.9 E (NAD83)

ELEVATION: 41.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

DRILLIN	G METH	DD AND	EQUIPMI	ENT : CME 550X	S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 2.0 ft bo	gs on 3/28	8/07	START : 3/28/2007 END : 4/4/2007 LOGGER : R. McComb
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
표유한		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DEPTH OF CASING,
PTH EVA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
				(N)	
21.9	20.8	0.3	SS-5	50/3.5 (50/3.5")	Silt (ML)
				(30/3.3)	fine sand-sized grains, trace medium to coarse
					sand-sized grains
-					1
-					1 1
-					
-					- 1
-					
-					
25 <u> </u>	25.0				Silt With Sand And Limestone (ML)
-				10-13-21	25.0-26.2' - grayish yellow. (5Y 7/2). nonplastic, rapid - │ │ │ │ │ │ │ │ │ │ │
_		1.2	SS-6	(34)	dilatancy, mild to moderate HCl reaction, 20% fine to coarse sand-sized grains, 15% fine to coarse
-	26.5				gravel-sized limestone, carbonate
_					
_					
l _					Driller's Remark: Chatter at 27.5'
-]
30	30.0				1
11.9	30.0				Silt With Sand (ML)
-		1.5	SS-7	24-32-38	30.0-31.45' - Same as 25.0-26.2' except 20-25% very fine to fine sand-sized grains, no gravel-sized
_	31.5			(70)	fragments
-	01.5				-
-					- 1
-					- 1
-					
-					
-					
-					4
35 6.9	35.0				Condy Silt (MI.)
0.9				13-19-14	Sandy Silt (ML) 35.0-36.3' - light olive brown to moderate olive brown, -
-		1.3	SS-8	(33)	(5Y 5/6 to 5Y 4/4), wet, low plasticity, rapid dilatancy,
_	36.5				mild HCl reaction, 25-30% fine to coarse sand-sized grains, trace fine gravel-sized limestone, carbonate
-					materials
]
1	40.0				<u> </u>
	40.1	0.1	SS-9	50/1	Limestone Fragments
				(50/1")	\degree 40.0-40.1' - moderate olive brown to olive brown, (5Y / - Driller's Remark: Chatter at 38.5'
					fragments
40					40.0' switch over to HQ rock coring
					Begin Rock Coring at 40.0 ft bgs
1					See the next sheet for the rock core log



PROJECT NUMBER:

338884.FL

BORING NUMBER:

D-04

SHEET 3 OF 5

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723150.5 N, 457831.9 E (NAD83)

ELEVATION: 41.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

00111110			2011 11	TENT . CIVIE 330X 3/N 340233, Mud Totally, NQ tools, HV		.9	ORIENTATION : Vertical
WATER	LEVELS : 2.0	ft bgs	s on 3	/28/07 START : 3/28/2007 END : 4/4	1/2007	LOGGER : R. McComb	
>00	(9			DISCONTINUITIES	υ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	022	œ	_		Ś	CHARACTERISTICS	· · · · · · · · · · · · · · · · · · ·
1.9	40.0		>10	40.0-41.0' - Fracture zone	Н	Limestone Fragments - 40.0-40.4' - grayish yellow, (5Y 7/2),	
			NR		Ш	very fine grained, moderate HCl	
-			5	41.05' - Fracture, 40-60 deg, rough, planar, open	Ħ	reaction, very weak to weak (R1 to R2), voids (<1/16") over 10-15% of	Driller's Remark: Very hard drilling from 40.0-41.5',
-	R1-NQ 5 ft	40	2	41.15' - Fracture, rough, planar and undulating, open 41.4, 41.5' - Fractures (2), 0-60 deg, rough,	H	surface No Recovery 40.4-41.0' Limestone	42.5'
-	88%		3	undulating, open 41.3' - Fracture, 0-<5 deg, rough, undulating, open		41.0-45.0' - light olive gray, (5Y 5/2), moderate HCl reaction, medium strong (R3), voids covering 10-15%	_
l _				42.45' - Fracture, 0-60 deg, rough,	Н	of surface increasing to 20-30%	
45	45.0		4	undulating, open 42.8' - Fracture, rough, planar to undulating, - tight	H	below 42.5', partially infilled voids (1/4") from 42.2-42.4', 1-3% cavities (up to 1-9/16"), trace fossils	R1: 29 minutes
-3.1	 U.U		1	43.3' - Fracture, horizontal, rough, undulating, open		45.0-45.8' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction,	-
-				43.65' - Fracture, <5 deg, rough, undulating, open 1/2"-3/4"	口	extremely weak (R0), voids covering 5-10% of surface, many cavities up	45.8-50.0' core fell back -
-				43.9, 44.05, 44.7' - Fractures (3), <5-60 deg, -	ш	 to 3/8" long, very friable 	into borehole, upon recovering there was no
-				rough, undulating, open	Н	No Recovery 45.8-52.0'	core retrieved because of
l _	R2-NQ 5 ft	0		44.8, 44.95' - Fractures (2), <5 deg, rough, undulating, open	口	_	poor quality of rock and
	16%	U	NR	45.8' - Fracture, horizontal, rough, undulating	Н		being very friable
-					口	-	1
-				-	H	-	1
-				-	口	-	R2: 3 minutes
				-	Н	-	-
50 -8.1	50.0				₽		End 4/3/07 at 50.0'
-				-	団	-	Begin 4/4/07 –
-			NR	-	Н	-	-
-				_		_	_
l _				_	Н		_
-	R3-NQ 5 ft 60%	0	NA	-		Poorly Graded Sand (SP) 52.0-53.0' - moderate yellow to dusky yellow, (5Y 7/6 to 5Y 6/4), wet, loose,	-
-	0070		0	-	H	very fine to fine grained, strong HCI reaction, 10% silica, 90% carbonate]
-				-	Ħ	Limestone Fragments 53.0-54.0' - moderate olive brown,	R5: 6 minutes
-			0	-	H	- (5Y 4/4), mild HCl reaction, very fine	Driller's Remark: Harder
55 -13.1	55.0			_	₽	to fine gravel, silt to fine sand-sized	drilling at 54.0' bgs —
-13.1				-		with up to 1/8" limestone fragments Limestone 54.0-55.0' - moderate olive brown to	-
-				-	H	light olive brown, (5Y 4/4 to 5Y 4/6),	1
I -				-	₽₽	mild HCl reaction, extremely weak to	-
-	R4-NQ		NR	-	口	very weak (R0 to R1), carbonaceous material covering some surfaces,	-
-	5 ft	0		-	団	voids covering 30-40% of surface,	-
-	24%			-	\square	infilling with sandy texture, fine gravel-sized rock fragments	Driller's Remark: Hard
-				-	H	No Recovery 55.0-58.8'	drilling 57.9 - 60.0'
-			1	58.8' - Fracture, rough, undulating, open -	₽	- -	D4: 40it
1 -			>10	59.1' - Fracture, 0-60 deg, rough, undulating,	口	-	R4: 10 minutes
60_	60.0			open	Ш		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

D-04

SHEET 4 OF 5

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723150.5 N, 457831.9 E (NAD83)

ELEVATION: 41.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

CORING	NETHOD A	ND E	JUIPIV	IENT: CME 550X S/N 340253, mud rotary, NQ tools, HV	v Casi	ng	ORIENTATION : Vertical
WATER	LEVELS: 2.0	ft bg	s on 3	/28/07 START: 3/28/2007 END: 4/	4/200	7 LOGGER : R. McComb	
	_			DISCONTINUITIES		LITHOLOGY	COMMENTS
중무분	%		·0	DECORIDATION	SYMBOLIC LOG		
N A E	Ĭ,ĕ,Ÿ		띘	DESCRIPTION	_ I	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A S S S	지독	(%) Q	128	DEPTH, TYPE, ORIENTATION, ROUGHNESS,		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
[문문]	R800	OΩ	R F	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-18.1				59.4' - Fracture, 0-40 deg, rough, undulating,	+-	Limestone	
- 1			4	open	-	- 58.8-59.6' - light olive brown, (5Y	-
l				59.6' - Fracture, horizontal, smooth, planar,	ш	5/6), very fine grained, mild HCI	
				open	\top	reaction, weak (R2), voids over 1-5%	
-	1		2	60.1' - Fracture, horizontal, rough, planar,		of surface, rare 1/16"-1/8" cavities	-
-				open 60.2' - Fracture, 40 deg, rough, undulating,	\perp	59.6-60.0' - Same as 58.8-59.6'	-
l	R5-NQ	00	ا م	, 0, 0,	\vdash	except very weak (R1), gravel-sized limestone fragments, with	
-	5 ft 74%	28	2	open 60.65' - Fracture, rough, undulating, open	╁	carbonaceous material on 30% of	1
-	. 7470			60.9, 61.7' - Fractures (2), <5 deg, rough,	╢	surface	-
			2	undulating, open	╁┯	- 60.0-62.0' - light olive brown, (5Y	
				61.9' - Fracture, vertical, rough, tight	\vdash	5/6), mild HCl reaction, extremely	
_	1		ND	62.1' - Fracture, <5 deg, rough, undulating,		weak (R0), friable, voids over 5% of	-
-			NR	open	╁	- surface	-
65	65.0			62.8, 63.2' - Fractures (2), <5 deg, rough,	┵	62.0-63.7' - Same as 60.0-62.0'	
-23.1			4	undulating, open 63.7' - Fracture, <5 deg, rough, stepped,		except moderate HCl reaction, very weak to weak (R1 to R2), thin	R5: 5 minutes
Ι ΄]		4	open	\perp	carbonaceous laminae at 62.4'. rare	1
-	{		\vdash	65.25' - Fracture, <5 deg, rough, undulating,	╨	elongated cavities (up to 3/8"x3/16"),	-
Ι.			4	open	╁┯	trace organics, trace fossils, voids	1 -
l			l .	65.35' - Fracture, horizontal, rough,		increase from 5-20% where rock is	
l -	R6-NQ		l	undulating, open	1—	- stronger	-
-	5 ft	17	1	65.4-65.7' - Fracture, vertical, rough,	╂┯	No Recovery 63.7-65.0	-
	56%			undulating, open 65.8' - Fracture, 40 deg, rough, undulating,		Limestone - 65.0-67.8' - dusky yellow, (5Y 6/4),	_
				tight	ш	_ fine to very fine grained, voids	
-	1			66.0-66.4' - Fracture zone	1-	covering up to 15% surface, rare	-
-	- 1		NR	66.4-66.8' - Fracture, 70 deg, rough, stepped,	╀╧	cavities (up to 1-1/4"), thin	R6: 8 minutes
Ι.]			tight	\blacksquare	_ discontinuous carbonaceous laminae	Ro. o minutes
70	70.0			66.9' - Fracture, <5 deg, rough, stepped, tight	\vdash	from 65.0-66.0', variable strength	
-28.1			0	67.8' - Fracture, horizontal, rough, stepped,	1-	increasing with depth from weak (R2)	
-	-			open	$-\Box$	to medium strong (R3) except	-
]		NR		┢	extremely weak (R0) from 66.1-66.4', trace organic material	_
l					\vdash	No Recovery 67.8-70.0'	
l -	1				ш	Limestone	-
-	- P7 NO		0		╂┯	- 70.0-70.15' - Same as 65.0-67.8'	-
	R7-NQ 5 ft	40	3	72.4' Fracture harizantal rough undulating	┵	No Recovery 70.15-71.75'	_
I	69%			72.4' - Fracture, horizontal, rough, undulating, open		Limestone	1
Ι -	1 1			72.4-72.9' - Fracture, 80 deg, rough, stepped,	口	 71.75-75.0' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine 	1
-			1	tight	₩	grained, strong HCl reaction,	-
				72.9, 73.4' - Fractures (2), 0-10 deg, rough,		- medium strong (R3), voids (up to	l
				undulating, tight to open		1/16") over 20-40% of surface,	R7: 7 minutes
75	1,,,		2	74.1-74.6 - Fracture, 70 deg, rough, stepped,	╨	several cavities (up to 3/4") covering	1
75 <u> </u>	75.0			tight	╂┼	— 1-3% of surface predominantly at	-
-55.1			1	75.0' - Fracture, 45 deg, rough, undulating	片	73.6'	1 -
				75.7' - Fracture, <5 deg, rough, stepped,	\coprod	75.0-78.2' - Same as 71.75-75.0'	1
-	1			open	1-	 except voids below 77.0' decreasing to 18-20% of surface, few elongated 	1
-			1	·		cavities (1/4"x1/2"), most with	-
_				76.6' - Fracture, horizontal, rough, stepped,	Д	secondary infill, gradual transition to	1 -
	R8-NQ		_	tight	\vdash	78.2-79.5'	
-	5 ft	86	0		╁	-	1
Ι -	100%		<u> </u>		$-\Box$	-	-
	j l		3				1
			3	78.45, 78.55' - Bedding plane (2), horizontal,	\vdash		1
-				smooth, undulating to planar, open 78.9, 79.1' - Fractures (2), 10 deg, rough,		-	R8: 5 minutes
-			1	78.9, 79.11 - Fractures (2), 10 deg, rougn, undulating, open	厂	-	-
80	80.0			undulating, open	$oldsymbol{oldsymbol{oldsymbol{eta}}}$		
							1
					_		•

APPENDIX 2BB-753 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

D-04

SHEET 5 OF 5

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723150.5 N, 457831.9 E (NAD83)

ELEVATION: 41.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS : 2.0	ft bgs	s on 3/	28/07 START: 3/28/2007 END: 4/	4/200	7 LOGGER : R. McComb	
≥∩ ∵	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
BELOV CE ANI TION (ft	RUN, H, AND ERY (%	%)	URES OOT	DESCRIPTION	OT OT O	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-38.1 -			>10	80.0-81.1' - Fractures, 0-90 deg, rough, undulating and stepped, open	H	78.2 - 79.5' - pale yellowish orange to moderate yellow, (10YR 8/6 to 5Y	-
_			\neg			7/6), fine grained, strong HCI reaction, extremely weak to very weak (R0 to R1), dark gray 1/8"]
-	R9-NQ		0			gravel in matrix from 78.5-79.0', 5-10% voids from 78.5-79.0'	-
-	5 ft 46%	0			H	declining to 0% at 79.0', gradual transition to 79.5-80.0' 79.5-80.0' - pale yellowish orange,	
-			NR		抻	- (10YR 8/6), fine grained, strong HCl reaction, very weak (R1), voids	-
_					H	(1/16") over 18% of surface, homogeneous appearance	R9: 7 minutes
85 -43.1	85.0		1	_	崫	80.0-80.9' - light olive brown, (5Y 5/6), very fine to fine grained, mild HCl reaction, extremely weak (R0),	_
-			\dashv	85.95' - Fracture, <5 deg, rough, undulating,	E	voids over 30-40% of surface grading into cavities up to 3/8",	-
_	D40 NO		1	open 86.6' - Fracture, <5 deg, rough, undulating, tight		gravel-sized material Limey Clay (CL) 80.9-81.1' - moderate olive brown,	- Drillaria Damariu Last
-	R10-NQ 5 ft 98%	59	2	87.2' - Fracture, 30-40 deg, rough, undulating, open		- (5Y 4/4), moist, soft, low plasticity, black carbonaceous staining, silty	Driller's Remark: Lost circulation at 87.0' -
_			2	87.4-87.7 - Fracture zone, 60 deg, rough, undulating, tight 88.45-88.7' - Fracture zone, <5-60 deg,	H	Limestone - 81.1-82.3' - Same as 80.0-80.9'	-
_			2	rough, undulating, open	臣	except weak (R2), not broken into gravel-sized rock fragments - No Recovery 82.3-85.0'	R10: 9 minutes
90 <u> </u>	90.0		NR)	89.55' - Fracture, horizontal, rough, stepped, open		Limestone 85.0-89.9' - moderate yellowish	_
_			>10	89.7' - Fracture, 80-90 deg, rough, undulating, open 90.0-90.8' - Fracture zone, various		 brown to yellowish gray with depth, (10Y 5/4 to 5Y 7/2), mild to strong HCl reaction, weak to medium strong 	
-				orientations	\vdash	 (R2 to R3), voids covering 15-40% of surface grading into cavities (up to 	-
_	R11-NQ 5 ft 16%	0			H	1-3/16") with depth, mottled with zones of light limestone becoming more fossiliferous with depth	_
_	1076		NR		臣	No Recovery 89.9-90.0' Limestone	
-					Ħ	90.0-90.8' - light olive brown to dusky yellow, (5Y 5/6 to 5Y 6/4), strong HCl reaction, weak (R2), voids over	R11: 5 minutes
95 -53.1	95.0			- -	上	20-30% of surface, gravel-sized rock fragments (1/4"-2"), highly	Driller's Remark: Possible
-						fossiliferous, black carbonaceous material up to 15-20% of surface No Recovery 90.8-98.5'	void 95.0 - 96.0'; very soft - drilling 96.0 - 98.5', firmer
-			NR		H	-	drilling at 98.5'
_	R12-NQ 5 ft	6			F	Limestone]
-	30%				F	 98.5-100.0' - dusky yellow, (5Y 6/4), strong HCl reaction, weak (R2), 	
-			>10	99.0-100.0' - Fracture zone, 0-90 deg, rough,	Ħ	gravel-sized rock fragments, voids - covering 25-40% of surface, highly fossiliferous	R12: 3 minutes
100	100.0		>10	undulating, open	Ħ		
						Bottom of Boring at 100.0 ft bgs on 4/4/2007	

APPENDIX 2BB-754 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-05	SHEET	1	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723221.4 N, 457903.2 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

						ary, auto nammer, Avvi rous, 5			ORIENTATION : Vertical
WATER	LEVELS	: 2.0 ft bo	gs on 04/0	04/07 S	START : 4/4/2007	END : 4/4/2007	LOGGEF	₹ : A.	
200				STANDARD		SOIL DESCRIPTION		l g	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		45 LIGOO ODOLID OVA 4001 - 4	201.00	SYMBOLIC LOG	DEDTIL OF GARNING DRIVING DATE
불병은		RECOVE	ERY (ft)			ME, USCS GROUP SYMBOL, (E CONTENT, RELATIVE DEN		ا ا	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
H A A A			#TYPE	6"-6"-6"		NCY, SOIL STRUCTURE, MINI		MB	INSTRUMENTATION
SU			"	(N)				λS	
41.8	0.0				Topsoil (OL)			7/1/	Water level: 2.0' below ground surface
-		0.8	SS-1	0-0-2		k, (N1), organics			-
-		0.0	00 .	(2)	0 3-0 8' - brow	d Sand With Organics (SP) rnish gray, (5YR 4/1), moist,	very loose	1	-
-	1.5				very fine to fine	e grained, no HCl reaction,	silica sand,	-	-
-						tic fines, 20% organics as fir	es and	1	_
l _					roots				
-							-	1	_
-							-	1	-
-							-	1	-
-							-	-	_
5	5.0							 	
36.8					Sandy Lean C	Clay (CL) enish gray, (5G 6/1), moist t	o wet vorv		Weight of hammer for last 12"
		1.3	SS-2	1-0-0 (0)		edium plasticity, slow to rapid			
-	6.5			(0)	35-40% very fi				_
-	0.5				1			1	=
-							-	1	-
-							-	-	_
l -								1	_
-							-	1	_
-							-	1	-
-	40.0						-	1	-
10 31.8	10.0				Silty Sand (SN	\//\		1111	Appears to have fossil fragments
-				13-14-22		llowish gray, (5Y 8/1), moist	to wet,	1111	Appears to have lossii fragilients
l -		1.4	SS-3	(36)	dense, very fin	ne to coarse grained, low pla	sticity, very		Driller's Remark: Lost circulation at 12'
	11.5					/, strong HCl reaction, 20-25 nes gravel-sized	% low	1111	
					plastic trace iii	nes graver-sizeu		1	
-							-	1	-
-							-	1	-
-							-	1	-
-							-	1	_
I -							-		
15	15.0						-]
26.8					Silt (ML)			1	-
-		1.0	SS-4	1-4-26	15.0-15.8' - mo	oderate yellow, (5Y 7/6), we	t, very stiff,	$\coprod \coprod$	-
-		1.0	00-4	(30)	nonplastic, rap	oid dilatancy, moderate to st 5% very fine sand-sized, car	bonate	F	-
-	16.5				materials	o, o tory mile during dized, dai	//.	1	Set 20' HW enging
-					Limestone Fra			1	Set 20' HW casing
I _					15.8-16.0' - mo	oderate olive brown, (5Y 4/4 fine to coarse gravel-sized), strong		
					incrreaction, i	inie to coarse graver-sized]
-							-	1]
-							-	1	-
-							-	1	-
-							-	1	-
20								\vdash	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	D-05	SHEET	2	OF	5

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723221.4 N, 457903.2 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

						iry, auto nammer, Avvj rous				ORIENTATION : Vertical
WATER	LEVELS	: 2.0 ft b	gs on 04/0	U4/07 S	START : 4/4/2007	END : 4/4/2007	LOG	GER	: A.	
< D =				STANDARD		SOIL DESCRIPTION			၅	COMMENTS
AN (SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAM	ME LIGOS COOLID SVIMBOL	COLOR		CLC	DEPTH OF CASING, DRILLING RATE,
H BE ACE		RECOVE	ERY (ft)		TANDARD NETRATION IST RESULTS SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				DRILLING FLUID LOSS, TESTS, AND	
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6"		ICY, SOIL STRUCTURE, M			YME	INSTRUMENTATION
<u> </u>		0.1	SS-5	(N) 50/3	Limestana Fu				S	
21.0	20.8	0.1	33-3	(50/3")	Limestone Fra 20.0-20.3' - gra	agments ayish yellow, (5Y 8/4), fine	e to coarse	Γ-	Н	_
_					\grained, mild h	HCl reaction, fine gravel-s	ized	/_		_
l _					fragments			┚╻		
								_		
-								_		_
-								-		
-								-		-
25	25.0							-		-
25 16.8	25.0				Sandy Silt Wit	th Limestone (ML)			Ш	-
-		1.1	SS-6	17-26-31	25.0-26.1' - gra	ayish yellow, (5Y 8/4), we	t, hard,	-		-
-		'.'	33-0	(57)	nonplastic, rap	oid dilatancy, mild HCl rea limestone fragments, 35-	ction, 10% 10% fine to	7	Щ	-
-	26.5					ized, carbonate materials		/-		-
-										_
-								_		_
_								_		_
_										
30	30.0									
11.8					Sandy Silt (MI	L)			Ш	
-		1.5	SS-7	15-17-47	30.0-31.5' - Sa moderate HCl	ame as 25.0-26.1' except reaction, 30% fine to coa	mild to rse	_		_
-	31.5			(64)		ace gravel-sized		-		-
-	31.3							_	Ш	-
-								-		-
-								_		-
-								-		-
-								-		-
-								-		
-								_		
35	35.0				0 1 000	4 1 4 / 2 4 /			\parallel	_
6.8		, ,	00.0	34-24-50/2.5	Sandy Silt Wit	th Limestone (ML) ht olive gray, (5Y 5/2), we	t hard			
	36.2	1.1	SS-8	(74/8.5")	nonplastic, rap	oid dilatancy, mild HCl rea	ction, 40%			
	JU.Z				fine to coarse	sand-sized, 10% fine to c mestone fragments, carbo	oarse			
					materials	medione magnients, carbi	mate]
1 7]
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-05	SHEET	3	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723221.4 N, 457903.2 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

						ary, auto hammer, AWJ rods,				ORIENTATION : Vertical				
WATER	LEVELS	: 2.0 ft b	gs on 04/		START : 4/4/2007	END : 4/4/2007	LOGGI	<u>=R : A</u>	Teal	COMMENTS				
<u></u> \$9£1	04447	INITE-	VI (6°)	STANDARD PENETRATION TEST RESULTS		SOIL DESCRIPTION		- 8	——	CONNIVILINIO				
ELO ON (SAMPLE	INTERVA		TEST RESULTS	SOIL NAM	ME, USCS GROUP SYMBOL	0	DEPTH OF	CASING, DRILLING RATE,					
H B		RECOVI	ERY (ft)		MOISTURI	E CONTENT, RELATIVE DE	NSITY OR	l g	DRILLING F	FLUID LOSS, TESTS, AND				
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTEN	NCY, SOIL STRUCTURE, MI	SYMBOLIC LOG	INSTRUMENTATION						
1.8	40.6	0.3	SS-9	50/4	Limestone Fra	agments	4	$\overline{\mu}$						
				(50/4")	grained, mild h	ght olive gray, (5Y 5/2), fine HCl reaction	e to coarse	/-	<u> </u>					
-					Begin Rock Co	oring at 40.7 ft bgs		1		_				
-					See the next s	sheet for the rock core log		1		_				
-								1		_				
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

D-05

SHEET 4 OF 5

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723221.4 N, 457903.2 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

				TENT . CIVIE 33 3/N 3 10023, Mud Totally, NQ tools, HW C			ORIENTATION : Vertical
WATER	LEVELS: 2.0	ft bg	s on 0	4/04/07 START : 4/4/2007 END : 4/	4/200	7 LOGGER : A. Teal	
				DISCONTINUITIES	(0	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOCK TYPE COLOR	
OH H	N, A, W	(9)	FRACTURES PER FOOT	BECOM HOW	윽	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
A H E	E SYE	Q D (%)	F.S.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOL	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
F S F	RNA	Ø	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
Оωш		œ	╙╙	THIORNESS, SORI ACE STAINING, AND HOTTINESS	S		
-	40.7 R1-NQ			40.9' - Fracture, 10 deg, smooth, undulating,	╨	_ Limestone	R1: 1 minute
I _	1 ft 41.7 85%	50	3	tight	┸	40.7-41.7' - pale yellowish brown, (10YR 6/2), fine grained, moderate	_
	41.7 0570			41.0' - Fracture, 50 deg, smooth, planar, tight		HCl reaction, weak (R2), 10-20%	
-			0	41.05' - Fracture, 10 deg, smooth, undulating,	╨	void space up to 1/8", trace cavities	1 7
-				loose	╁	up to 1/4", moderately fossiliferous	-
-						_ (casts/molds)	-
			5	43.2' - Mechanical break	\vdash	41.7-43.5' - pale yellowish brown,	
	DO NO			43.5-44.5' - Fracture zone (at least 7), tight	Ш	 (10YR 6/2), fine grained, delayed moderate HCl reaction, weak to 	1
-	R2-NQ 5 ft	35	>10	but weathered fractures with fragmentation		medium strong (R2 to R3), 15-20%	1
-	88%	00	10	44 F 45 7! Franking sone fragments from	╀	 voids up to 1/8", trace cavities up to 	-
45				44.5-45.7' - Fracture zone, fragments from 1/8" to 1", subrounded —		3/16", moderately fossiliferous	
-3.2			>10	no to i , subiounided		(molds/casts)	Ι Π
1 7				45.7.40.41 E	╁	 43.5-46.1' - pale yellowish brown, (10YR 6/2), fine grained, strong HCl 	
-			>10	45.7-46.1' - Fractures (at least 4), 10 deg, open, weathered, with vertical fractures and	仜	reaction, extremely weak to very	R2: 2 minutes
-	46.7		NR	fragmentation	+	weak (R0 to R1), 10% void space up	-
				46.7-50.3' - Fracture zone, very soft material	$oldsymbol{oldsymbol{ ext{H}}}$	to 1/8", poorly fossiliferous	
			>10		ш	No Recovery 46.1-46.7'	1
-					╁	 Limestone 46.7-50.3' - pale yellowish brown, 	1 1
-					╀	(10YR 6/2), fine grained, moderate	-
I _			>10		oxdot	HCl reaction, extremely weak to very	
	R3-NQ				\vdash	weak (R0 to R1), 20-30% voids,	
-	5 ft	45	>10			trace up to 1/3" long fossil cavities	1
-	70%				╨	_ and casts	1
50 -8.2			>10	_	╆	_	_
-0.2							
			l ND		\vdash	No Recovery 50.5-51.7'	R3: 1 minute
-			NR		1	<u> </u>	Tto: 1 minute
-	51.7				┰	-	-
-					╨	_ Limestone	-
			>10	52.0' - Fracture, 10 deg, rough, undulating,		51.7-53.8' - pale yellowish brown,	
				tight 52.3-53.0' - Fracture zone, limestone	Н	 (10YR 6/2), fine grained, moderate HCl reaction, very weak to weak (R1 	
-			>10	fragments from silt to cobble-sized fragments	╁┷	to R2), 10-20% voids up to 1/16"	
-			L		\blacksquare		-
-	R4-NQ			53.8' - Fracture, 20 deg, rough, undulating,	+	- 53.8-56.0' - Same as 51.7-53.8'	_
1	5 ft	75	>10	loose	\vdash	except moderate yellowish brown,	
55	86%			54.1' - Fracture, 25 deg, rough, undulating,	Ш	(10YR 5/4)	1
-13.2			0	tight —	1-		-
-				54.2-54.7' - Fracture zone, 20 deg, same as 52.3-53.0'	亡	_	-
1 4			0	55.5' - Mechanical break	\prod		R4: 2 minutes
			NR		\vdash	No Recovery 56.0-56.7'	
	56.7					Limentone	1 1
-			0		╁	Limestone 56.7-61.3' - pale yellowish brown,	-
-						(10YR 6/2), fine grained, moderate	-
				57.01 F 00 d-	\Box	HCl reaction, very weak to weak (R1	
			1	57.9' - Fracture, 30 deg, rough, undulating, tight	\vdash	to R2), 20-25% voids up to 1/8",	1
-				ugiit		 some laminations 	1 1
-	R5-NQ	60	>10		┰	-	-
-	5 ft 92%	68	- 10	59.2' - Fracture, 70 deg, rough, undulating,	╨	<u></u>]
60	32,3			tight			
-18.2			>10	59.5-60.3' - Fracture zone, gravel-sized — fragments			7
				nagniciio	⊭		
1							



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-05	SHEET	5	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723221.4 N, 457903.2 E (NAD83)

ELEVATION: 41.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

COMING	NIETHODA	ואט בנ	ZUILIA	IENT: CME 55 S/N 316625, mud rotary, NQ tools,	, HVV Ca	ISING		ORIENTATION : Vertical
WATER	LEVELS : 2.0) ft ha	s on O	4/04/07 START : 4/4/2007 EN	ND : 4/4	/200	7 LOGGER : A. Teal	
WAILK	LL V LLO . Z.	, ir nidi	o on o		۱۵ . ۲/4	, 200		COMMITME
≥∩≘	- (°			DISCONTINUITIES		ဖွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION		SYMBOLIC LOG	ROCK TYPE, COLOR,	
HH H	₹¥#	<u>@</u>	굶			임	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
ΕÄΕ	L HES	(%) Q	달	DEPTH, TYPE, ORIENTATION, ROUGHNES: PLANARITY, INFILLING MATERIAL AND	S,	BO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
무료	RNN	ΙØ	HZ Z	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTI	NECC	Ž	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	038	ď	ᇤ묩			Ś	CHARACTERISTICS	
			1	60.5' - Fracture, 45 deg, rough, undulating	, _	Ш	Limestone	R5: 3 minutes _
				tight		-	60.0-60.3' - dark yellowish brown,	
_	61.7		NR	60.9' - Fracture, horizontal, smooth, planar	r, _	ш	(10YR 4/2), fine grained, mild HCl	_
I -				tight	/ -		reaction, extremely weak (R0)	End of boring _
							60.9-61.0' - Same as 60.0-60.3'	
-					٦		- \61.0-61.3' - Same as 56.7-61.3'	_
-					-		No Recovery 61.3-61.7'	-
I _							Bottom of Boring at 61.7 ft bgs on 4/4/2007	
							4/4/2007	
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	D-06	SHEET	1	OF	4

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723292.3 N, 457976.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

						auto hammer, AWJ rods			N.I.	ORIENTATION : Vertical	_
WATER	LEVELS	: 2.1 π D	gs on 4/2:		START : 4/23/2007	END: 4/24/2007 SOIL DESCRIPTION	LUGG	ER:	N. Y	Jarzyniecki COMMENTS	٦
≳∂€	SAMPLE	INTERVA	\I (ft)	STANDARD PENETRATION		COL BECOMM TION		\dashv	^ဉ	COMMENTE	Ⅎ
DEPTH BELOW SURFACE AND ELEVATION (ft)	0, 11,111	RECOVI		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,					DEPTH OF CASING, DRILLING RATE,	
YFAC SYFAC		I KEOOVI	#TYPE	6"-6"-6"		CONTENT, RELATIVE DI Y, SOIL STRUCTURE, M			SYMBOLIC LOG	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	
			,,,,,,	(N)				- 2	S		
41.6	0.0			1-1-1	Silty Sand (SM)	ate yellowish brown to o	olive grav		Ш		
-		0.5	SS-1	(2)	\ (10YR 5/4 to 5Y	3/2), moist to wet, very	loose, fine	/_			4
-	1.5				\grained, no HCl r	reaction, silica sand, 15 anic fines	5% nonplastic	1			4
-								4			4
-								4			4
-								+			4
-								+			-
-								+			-
5	5.0							+			+
36.6	5.0				Sandy Fat Clay ((CH)			\mathbf{z}		٦
-		1.1	SS-2	2-2-1 (3)		ue, (5PB 7/2), moist, so dilatancy, no HCl read			7		1
-	6.5			(3)	very fine to fine s	silica sand		7	4		1
					1			1			
_								1			
_								4			
-								4			_
-								4			4
-								4			4
10 31.6	10.0				_ Limestone Frag	ments		+	\Box	Driller's Remark: Stiff at 9.0'	4
-		1.1	SS-3	11-24-40	\ 10.0-10.2' - dusk	y yellow, (5Y 6/4), fine		/-	Ш	2	Н
-	11.5	'		(64)	Silt (ML)	ICI reaction, gravel-siz	ed fragments	#	Щ		4
-	11.5				10.2-11.1' - dusk	y yellow, (5Y 6/4), mois dilatancy, mild to mode	st, hard,	/1			1
-						very fine carbonate sar		1			1
-								1			1
								1			
]]
_								1			
15	15.0				0			4	\Box	07:00	_
26.6				22-50/5.75	Sandy Silt (ML) 15.0-16.0' - pale	yellowish brown, (10Yl	R 6/2), moist,	\parallel	Ш	07:38 water level at 2.1' below ground surface	4
-		1.5	SS-4	(72/11.75")	very stiff, low pla	sticity, rapid dilatancy, e grained sand, some	moderate HCI	\mathcal{H}	Ш	Driller's Remark: 08:00 borehole caved in	4
-	16.5				-∖ silica, (possibly s	slough), trace fine grave	el-sized	$/$ _ \parallel	Щ	over night; 15.0-16.0' may include slough	+
-					Silt (ML)	o', trace organics, prima	arily carbonate /	H		accounting for the discrepancy between depth of penetration and recovery length	-
-					16.0-16.5' - yello	wish gray, (5Y 5/2), mo	oist, hard,	-		,	+
-					reaction, 5-10%	rapid dilatancy, modera very fine grained sand	ate HCI	+			+
-						- · · · · ·		+			+
-								1			1
20								1			1
								\top	\exists		٦



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	D-06	SHEET	2	OF	4

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723292.3 N, 457976.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 316625, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

			gs on 4/2		START: 4/23/2007	auto hammer, AWJ rods, END: 4/24/2007			ORIENTATION : Vertical Jarzyniecki
	LEVELS	. 2.1 11 0	ys 011 4/2.		START : 4/25/2007	SOIL DESCRIPTION	LOGGE	т	COMMENTS
SP(H)	SAMPLE	INTERVA	AL (ft)	STANDARD PENETRATION					
BEL SE A		RECOVI		TEST RESULTS	SOIL NAME,	USCS GROUP SYMBOL,	COLOR,	DEPTH OF CASING, DRILLING RATE,	
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)		CONTENT, RELATIVE DEI Y, SOIL STRUCTURE, MIN		SYMBOLIC LOG	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
21.6	20.0	0.8	SS-5	21-29-3 (32)	dense, fine to coa	Limestone (SM) pale orange, (10YR 8/2) arse grained, moderate nd 40% limestone, 30%	HCI reaction, /	-	- - - -
- - - 25_ 16.6	25.0				Silty Sand With	Limestone (SM)	maiat lagge	- - - - -	- - -
- - - -	26.5	0.6	SS-6	20-8-1 (9)	fine to coarse gra to 20.0-20.8', 25%	sh orange, (10YR 6/4), lained, moderate HCl rea % fine to coarse gravel-sents, 35% nonplastic fine	ction, similar	-	- - - - - -
30 11.6 -	30.0	1.4	SS-7	6-9-15 (24)	plasticity, rapid di	y yellow, (5Y 6/4), wet, v ilatancy, mild to modera fine to coarse sand, ca	te HCI	- - - - - - - - -	08:15 Begin drilling to 35.0' During drilling to 35.0' lost circulation at 8:21 - lots of chatter during drilling
- - - - 35_ 6.6	35.0 35.2	0.0	SS-8	50/2 (50/2)	No Recovery 35.	0-35.2'		- - - - -	Casing advanced to 35.0' below ground
- - - - - -				(50/2")	Begin Rock Corir See the next she	ng at 36.0 ft bgs et for the rock core log		- - - - -	surface
40							_	_	
		l						_	I .



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-06	SHEET	3	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723292.3 N, 457976.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING	METHOD A	ND FO	JUIPN	IENT : CME 55 S/N 316625, mud rotary, NQ tools, HW c	asing	,	ORIENTATION : Vertical
	LEVELS : 2.1						Oraziri Voluda
		it bg	3 011 17	DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
_	36.0		1	-	E	Limestone - 36.0-39.15' - pale olive to light olive	10:04 Begin coring R1-NQ
-			2	36.7, 37.7' - Mechanical break (2) 36.9' - Bedding plane, <10 deg, rough, undulating, tight 37.0' - Fracture, 50 deg, rough, undulating,	Ħ	gray, (10Y 6/2 to 5Y 5/2), very fine to fine grained, strong HCl reaction, fossiliferous, fossil casts, voids over 20% of surface, up to 1/16" trace	-
-	R1-NQ 5 ft 84%	47	5	tight 37.05' - Fracture, 10-25 deg, rough, undulating, tight		dissolution, trace organic features, at 36.7' weak (R2), at 37.7' very weak to weak (R1-R2)	-
40			0	38.0-38.3' - Fracture zone, rough, undulating, intersecting bedding plane and high angle fractures, tight	H	39.15-40.2' - moderate olive brown, (5Y 4/4), moderate HCl reaction,	-
1.6	41.0		NR	38.5' - Bedding plane, same as 36.9' except open up to 1/2"	H	extremely weak (R0), laminar features of olive gray (5Y3/2)No Recovery 40.2-41.0'	R1: 9 minutes
-	41.0		0			Limestone - 41.0-41.85' - Same as 39.15-40.2' except strong HCl reaction	
-			1	42.3' - Fracture, 80 deg, rough, undulating, tight	F	41.85-44.6' - light olive gray to dusky yellow with pale olive infill, (5Y 5/2 to 5Y 6/4 with 10Y 6/2), strong HCl	_
-	R2-NQ 5 ft 73%	47	1	43.5-43.8' - Mechanical break 43.8, 44.1' - Bedding plane (2), 30 deg,		reaction, very weak to weak (R1 to R2), voids (up to 1/16") over 30% of surface, moderately fossiliferous, fossil casts up to 1/8" to 1/2", trace	-
45 -3.4			1 NR	rough, undulating, tight	Ė	organics, very similar to 36.0-39.15' 44.6-44.65' - Same as 39.15-40.2' except strong HCl reaction	R2: 6 minutes
-	46.0		INIX		Ħ	No Recovery 44.65-46.0' Limestone	-
-			0	47.451 Freedows 50 day yough undulating		 46.0-46.3' - dusky yellow to moderate olive brown, (5Y 6/4 to 5Y 4/4), fine grained, mild HCl reaction, extremely 	-
-	R3-NQ		2	47.15' - Fracture, 50 deg, rough, undulating, tight 47.55' - Bedding plane, <10 deg, rough,	Ħ	 weak (R0), voids (<1/16") over <5% of surface, trace very fine organics, few organic inclusions up to 1/2", 	-
-	5 ft 90%	43	1	undulating, open 1/4" 48.15' - Bedding plane, <5 deg, rough, undulating, tight 49.0' - Fracture, 75 deg, rough, undulating,		 very similar to overlying extremely weak rock (39.15'-40.2') 46.3-48.15' - dusky yellow to 	-
50 -8.4			2	tight 49.7' - Fracture, 50 deg, rough, undulating, tight		- moderate olive brown, (5Y 6/4 to 5Y 4/4), moderate to strong HCI reaction, medium strong (R3), 25%	R3: 3 minutes
-	51.0		NR	50.25' - Fracture, same as 49.0'	H	 fine voids predominantly <1/16", moderately fossiliferous, no longer cavities, trace organics]
-			0		Ħ	48.15-49.0' - Same as 46.0-46.3' 49.0-50.35' - Same as 46.3-48.15' 50.35-50.5' - Same as 46.0-46.3']
-	R4-NQ		2	52.5' - Bedding plane, <5 deg, smooth, undulating, tight	Ė	 No Recovery 50.5-51.0' Limestone 51.0-52.1' - Same as 46.0-46.3']
-	5 ft 100%	17	1	52.6' - Fracture, 70 deg, rough, undulating, open 1/8" 53.4' - Fracture, 50 deg, same as 52.6'		-]
55_ -13.4			1	53.5' - same as 47.55' 54.35' - Mechanical break, same as 48.15'	F	-	
-	56.0		0			-	-
I					1		1



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-06	SHEET	4	OF	5	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723292.3 N, 457976.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

				IENT: CME 55 S/N 316625, mud rotary, NQ tools, HW c	asiriy			ORIENTATION : Vertical
WATER LEV	'ELS : 2.1	ft bgs	on 4		24/20	07	LOGGER : N. Jarzyniecki	
≥0₽	- ©			DISCONTINUITIES	ပ္ထ	L	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ff)	COKE KON, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG		ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
6018.461.07028.471.0	R5-NQ 5 ft 92%	48 50	2 1 1 0 1 NR 0 3 1 >10 2 NR 0 1 1 0 1 NR	56.4' - Fracture, 50 deg, undulating, tight 56.8' - Bedding plane, <5 deg, 4" infilling of silt, tight 57.5' - Fracture, same as 56.4' 58.8' - Bedding plane, same as 56.8, except 6" thick silt infill 60.3' - Bedding plane, smooth, planar, open up to 1/8" 61.2' - Mechanical break 62.0, 62.25' - Bedding plane (2), <5 deg, smooth, undulating 62.6' - same as 62.0' 63.5' - Bedding plane, 5 deg, smooth, undulating, open up to 1/4" 64.1-64.4' - Fracture zone 65.0, 65.55' - Fractures (2), 80 deg, rough to smooth, undulating 65.8, 66.9' - Mechanical break (2) 67.45' - Bedding plane, 30 deg, open up to 1" 68.4' - Bedding plane, smooth, undulating, open <1/8", associated with organic lamination 68.5, 69.4, 70.6' - Mechanical break (3) 70.3' - Bedding plane, 10 deg			52.1-54.3' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine grained, strong HCl reaction, medium strong (R3), but weaker near transitions to over and underlying rock, voids (1/16") over 15-25% of surface, moderately fossiliferous with casts and molds up to 1/4", trace organics 54.3-56.0' - Same as 46.0-46.3' 56.0-56.2' - dusky yellow to moderate olive brown, (5Y 6/4 to 5Y 4/4), fine grained, mild HCl reaction, extremely weak (R0), voids over <5% of surface, non-fossiliferous, gradual transitions to over and underlaying layers 56.2-56.6' - Same as 52.1-54.3' except a couple of 1/2" cavities 56.6-57.0' - Same as 56.0-56.2' 57.0-58.5' - Same as 52.1-54.3' 58.5-59.1' - Same as 56.0-56.2' 59.1-60.6' - light olive gray to dusky yellow, (5Y 5/2 to 5Y 6/4), very fine grained, strong HCl reaction, strong (R4), voids over <5% of surface, few infilled cavities (1/16") that are only visible because of increased voids (10%) in infill No Recovery 60.6-61.0' Limestone 61.0-61.2' - Same as 56.0-56.2' 61.2-62.0' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), very fine grained, moderate HCl reaction, strong to very strong (R4 to R5), voids (1/16") over 5% of surface, no cavities, 1/2" thick laminations / infill of light olive gray (5Y 5/2) with no voids 62.0-62.9' - Same as 56.0-56.2' 62.9-64.1' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine grained, moderate to strong HCl reaction, weak to strong (R2 to R4), gradual transition from bounding weak (R2) rock, voids (1/16") over 10-30% of surface 64.1-64.8' - Same as 56.0-56.2' 64.8-65.95' - Same as 56.0-56.2' 64.8-65.95' - Same as 56.0-56.2' 64.8-65.95' - Same as 56.0-56.2' 64.9-64.1' - yellowish orange to yellowish gray, (10YR 6/6 to 5Y 7/2), swirled / mottled, very fine grained, strong HCl reaction, very strong (R5), voids (1/16") over 10-30% of surface 64.1-64.8' - Same as 56.0-56.0' Limestone	R5: 18 minutes R6: 14 minutes R7: 9 minutes R7: 9 minutes R7: 9 minutes
		_	_		_		· · · · · · · · · · · · · · · · · · ·	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	D-06	SHEET	5	OF	5	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723292.3 N, 457976.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: D. Buchler

CORING METHOD AND EQUIPMENT : CME 55 S/N 316625, mud rotary, NQ tools, HW casing

				ILIVI . CIVIL 33 3/14 310023, Iliud lotary,				ONIENTATION: Vertical
WATER	LEVELS : 2.	I ft bas	s on 4/	/23/07 START : 4/23/2007	END: 4/2	24/200	77 LOGGER : N. Jarzyniecki	
				DISCONTINUITIES			LITHOLOGY	COMMENTS
≳O⊋	CORE RUN, LENGTH, AND RECOVERY (%)	<u> </u>				ျှ	LITIOLOGI	COIVIIVIEIVIO
ONE	- ZZ >		ပ္သ	DESCRIPTION		4	ROCK TYPE, COLOR,	
DEPTH BELOW SURFACE AND ELEVATION (ft)	N. Y. Y.	· 00	FRACTURES PER FOOT			SYMBOLIC LOG	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
T A A	₩¥\$	Q D (%)	[녹호]	DEPTH, TYPE, ORIENTATION, ROL	UGHNESS,	፬	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
무유교	8888	٦۵	N. A.	PLANARITY, INFILLING MATERI	AL AND	ğ	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
E SC	822	ď.	[문문]	THICKNESS, SURFACE STAINING, AN	D TIGHTNESS	Š	CHARACTERISTICS	BROID, ILOT REGULTO, ETC.
						Н	67.7-69.7' - moderate yellowish	
I _					_		brown, (10Y 5/4), very fine grained,	_
						ll	strong HCl reaction, very weak to	
-					-	ll	weak (R1 to R2), voids (1/16") over	-
					_		- 5% of surface, 1/4" cavities at 68.6',	_
						ll	weak (R2) rock at 68.5' and 69.4'	
-					-	ll	69.7-70.8' - Same as 67.7-69.7'	-
I _					_		except increased variability in voids	_
						ll	from 5-30%, alternating very weak	
-					-	ll	(R1) rock to medium strong (R3)	-
I _					_		- rock	
						ll	No Recovery 70.8-71.0'	
-							Bottom of Boring at 71.0 ft bgs on	_
1 -					_		- 4/24/2007	
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-01 SHEET 1 OF 13

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723795.0 N, 457523.7 E (NAD83)

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

					SIN 340253, ITILIA TOLARY, AUTO TRAITINE, AWS TOUS, 3-7/8 TH-COTE DIT ORIENTATION : VEHICAL						
WATER	LEVELS	: 3.2 ft bo	gs on 5/30		START : 5/30/2007 END : 6/3/2007 LOGGER : B. Ellis						
				STANDARD PENETRATION	SOIL DESCRIPTION COMMENTS						
NAN (†)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,						
DEPTH BELOW SURFACE AND ELEVATION (#)		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR 🛛 💆 📗 DRILLING FLUID LOSS, TESTS, AND						
EV,			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY						
40.9	0.0			(N)	σ σ σ σ σ σ σ σ σ σ						
	0.0			1-2-3	0.0-0.3' - black, (N8), organics \dagger\ Water table encountered at 3.2' below						
-		0.8	SS-1	(5)	Silty Sand (SM) ground surface						
_	1.5				\ 0.3-0.75' - light brown to moderate brown, (5YR 5/6 to Silica sand	_					nonplastic fines, 5-10% organics
					1						
-					1						
-					1						
	5.0										
5 35.9	5.0				Silty Sand (SM)						
-		0.6	SS-2	2-2-3	5.0-5.6' - mottled moderate yellowish brown and pale						
-		0.6	33-2	(5)	green, (mottled 10YR 5/4 and 10G 6/2), moist, loose, / slow dilatancy, fine silica sand, 17% moderate						
-	6.5				plasticity fines						
-											
-					_						
_											
_											
10	10.0				1						
30.9					Silt With Sand And Limestone (ML)						
-		0.9	SS-3	9-14-24	10.0-10.9' - grayish orange, (10YR 7/4), wet, hard, nonplastic, very rapid dilatancy, moderate to strong						
-	11.5			(38)	│ HCl reaction in all materials, 15-20% very fine to │ │ │ │						
-	11.5				\medium sand-sized, 40% fine to coarse gravel-sized / -						
-					limestone, an material carbonate						
-					-						
-					Driller's Remark: Lost circulation at 13.0'						
-					- Brillion o Normani. Education at 10.0						
-											
-											
15	15.0				On the Oile Are all importance (AMI)						
25.9				1-1-8	Sandy Silt And Limestone (ML) 15.0-15.6' - grayish orange, (10YR 7/2), wet, medium						
_		0.6	SS-4	(9)	\ stiff, nonplastic, 29% fine to coarse sand, 16% fine to /						
	16.5			` ′	\coarse sized limestone \frac{1}{2} \set HW casing 5/31/07 at 16.0'						
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20											
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-01 SHEET 2 OF 13

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723795.0 N, 457523.7 E (NAD83)

ELEVATION: 40.9 ft (NAVD88)

DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

						otary, auto nammer, Avvj r			ORIENTATION : Vertical	
WATER	LEVELS	: 3.2 ft bo	us on 5/30		START : 5/30/2007	END: 6/3/2007	LOGGE	<u>Т</u>	EIIIS COMMENTS	
≥□⊋				STANDARD PENETRATION		SOIL DESCRIPTION		- 8	COIVIIVIEN 15	
ELO N (1	SAMPLE	INTERVA	. ,	PENETRATION TEST RESULTS	SOIL NAM	ME, USCS GROUP SYMBO	IC L	의 DEPTH OF CASING, DRILLING RATE,		
H BI ACE		RECOVE	RY (ft)		MOISTURE	E CONTENT, RELATIVE D	ENSITY OR	30LI	DRILLING FLUID LOSS, TESTS, AND	
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6"	CONSISTEN	ICY, SOIL STRUCTURE, N	IINERALOGY	SYMBOLIC LOG	INSTRUMENTATION	
20.9	20.0			(N)	Silt With Sand	1 (MI)		U)	Carbonate material	
20.5	20.0			6-9-13	20.0-21.4' - gra	ayish orange, (10YR 7/4)	, wet, very stiff,	4111	- Carbonate material	
-		1.4	SS-5	(22)	nonplastic, rap	old dilatancy, mild to mod 5% fine to coarse sand-s	erate HCl	4111		
_	21.5				fine gravel-size		zea, 5-10%	Щ	_	
l _					\ g			_	_	
l _										
								1]	
								1	1	
								1	1	
25	25.0							1	1	
15.9	20.0				Silty Sand (SN	M)			Carbonate material	
-		1.4	SS-6	6-11-15	25.0-26.4' - gra	ayish orange, (10YR 7/4) coarse grained, mild to n	, wet, medium	111	-	
-	00.5			(26)	reaction, 42%	nonplastic fines, 12% fin	e to coarse	1	-	
-	26.5				gravel-sized lin			+	1	
-								┨	-	
-								-	-	
-								-	-	
-								4	_	
-								1		
l _								_	_	
30	30.0								_	
10.9				4.0.0	Silty Sand Wit	th Limestone (SM) ame as 25.0-26.4'				
		1.1	SS-7	1-0-9 (9)	50.0-51.2 - 6a	anc as 25.0-20.4				
	31.5			(-)				1111		
								1]	
								1	1	
								1	1	
-								1	1	
-								1		
-								1	-	
75 -	25.0							1	-	
35 5.9	35.0				Silty Sand Wit	th Limestone (SM)		111	Carbonate material —	
-		0.5	SS-8	2-10-8	→ 35.0-35.5' - mc	oderate vellowish brown,	(10YR 5/4),		-	
-		0.5	33-0	(18)	wet, medium d	dense, fine to coarse grain reaction in all materials,	ned, mild to	-	-	
-	36.5				nonplastic fine	es, 36% fine to coarse gra		-	-	
-					limestone fragi	ments		-	Driller's Remark: Lost circulation at 37.0'	
-								-	Dilliei 3 Remaik. Lost difculation at 37.0	
-								-		
-								1	_	
								1		
_										
40								L		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-01	SHEET	3	OF	13	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723795.0 N, 457523.7 E (NAD83)

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

			gs on 5/30		START: 5/30/2007 END: 6/3/2007 LOGGER: B. Ellis	
				STANDARD	SOIL DESCRIPTION COMMENTS	
LOW AND (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	Ŏ O	
H BE ACE ATIO		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING I DEPTH OF CASING I	KATE, , AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
0.9	40.0	0.0	00.0	13-50/4	Interbedded Limestone And Sandy Silt Driller's Remark: Chatter at 40.0'	
-	40.8	0.6	SS-9	(63/10")	40.0-40.6' - dark yellowish brown and moderate yellowish brown, (10YR 4/2 and 10YR 5/4), 70% of Begin core at 41.0' 5/31/07, 10:45	-
-					sample is limestone in fine sand-sized to coarse	
					gravel-sized fragments, with mild HCl reaction and 30% of sample is sandy silt, moist, hard, low plasticity,]
					\rapid dilatancy, mild HCl reaction, with varved \\ \laphappearance	
_					Begin Rock Coring at 41.0 ft bgs	_
-					See the next sheet for the rock core log	-
-						-
- 45						-
45 <u> </u> -4.1						-
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50 -9.1					-	-
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60					++	



1

NR

60

-19.7

61.0

58.0' - Fracture, horizontal, smooth, planar,

tight, black (N1) carbonaceous film/coating

over 90-95% of surface

PROJECT NUMBER: BORING NUMBER: 338884.FL E-01 SHEET 4 OF 13

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723795.0 N, 457523.7 E (NAD83)

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER LEVELS: 3.2 ft bgs on 5/30/07 START: 5/30/2007 END: 6/3/2007 LOGGER: B. Ellis DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 41.0 Casing depth 41.0' 41.0-41.2' - Fracture zone, rounded to Limestone >10 angular limestone rock fragments (gravel 41.0-41.4' - coarse gravel (limestone and chert) size) 41.3' - Fracture, 40 deg, rough, undulating, 41.4-43.0' - pale yellowish brown, NR = No Recovery (10YR 6/2), dense, very fine grained, moderate HCI reaction, medium 1 open 42.35' - Fracture, horizontal, rough, planar, 3/4" boring in fracture, tight strong to strong (R3 to R4), cavities R1-HQ up to 2-3/8"-2-3/4"x3/4"-1-3/16". 63 1 5 ft infilled with medium grained 70% 43.9' - Fracture, 80 deg, rough, planar, 80% vesicular-textured limestone, voids 2 of surface covered by black organic coating up to 1/16" or less over 1-2% of <1/16" thick, fracture plane extends from surface, fossils rare to absent, 45 43.6-44.5 possibly bioturbated -4 Ī R1: 14 minutes NR 44.3' - Fracture, 20-30 deg, rough, stepped, . 43.0-44.5' - pale yellowish brown, open (10YR 6/2), dense, fine to medium 46.0 44.3-44.5' - Fracture, 80 deg, rough, stepped, grained, mild to moderate HCI open reaction, medium strong to weak (R3 4 46.2' - Fracture, 80 deg, rough, planar, thin to R2), voids (generally <1/16") over (<1/16") layer of black (N1) carbonaceous 3-5% of surface grading to 10% with material, open depth, fossils (molds/casts) rare to 0 46.6' - Fracture zone, 40 deg, very rough, absent planar, open No Recovery 44.5-46.0' R2-HQ 46.7' - Fracture, horizontal, rough, planar, **Limestone** 46.0-48.5' - Same as 43.0-44.5' 2 57 5 ft open 100% 46.9' - Fracture, horizontal, smooth, planar, except voids increase to 5-8%, open cavities common (typically 2 48.7' - Fracture, 10 deg, smooth, undulating, 1/16"x3/16"), fossiliferous 50 open (molds/casts) -9.1 R2: 3 minutes 48.9' - Fracture, 20 deg, smooth, undulating 49.3, 49.7' - Fractures (2), horizontal, Silty Sand (SM) 1 48.5-51.0' - grayish orange to dark yellowish brown, (10YR 7/4 to 10YR 51.0 smooth, undulating, tight 50.7' - Fracture, horizontal, smooth, 6/6), mild HCl reaction, interbedded 1 undulating, open with clay, carbonate-derived 51.0-51.3 - Fracture zone, rough, stepped, silts/clays/sand-size fragments various orientation of fractures, open, gravel (cohesive), with some black (N1) 10 to cobble sized limestone rock fragments carbonaceous/organic 52.2-52.9' - Fracture, 80 deg, rough, laminae/deposits, fossils absent R3-HQ undulating, tight 10 Limestone 51.0-53.8' - moderate yellowish brown, (10YR 5/4), mottled yellowish 5 ft 42 52.4-53.8' - Fracture zone, intersecting fractures from 50 deg to 90 deg, rough, stepped to undulating, tight to open gray (5y 7/2), fine grained, mild HCI reaction, very weak (R1), voids (up to 55 NR 1/16"-1/8") over 15-20% of surface, -14 1 R3: 5 minutes some cavities up to 3/8", some fossil molds/casts, occasionally thinly 56.0 laminated with black (N1) organic/carbonaceous material 56.3' - Fracture, 10 deg, very smooth, 2 No Recovery 53.8-56.0' undulating 56.6-57.0' - Fracture zone, rough, planar to Silty Sand (SM) undulating, large coarse gravel to cobble 56.0-56.6' - Same as 48.5-51.0' 2 size, low to high angle fracture planes, open 57.2' - Fracture, 10 deg, rough, stepped, R4-HQ 42 1 open 5 ft 57.5-58.0' - Fracture zone, rough, planar to 80% undulating, large coarse gravel to cobble size, low to high angle fracture planes, open

R4: 5 minutes



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-01 SHEET 5 OF 13

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723795.0 N, 457523.7 E (NAD83)

ELEVATION: 40.9 ft (NAVD88)

DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

COMING	NIL ITIOD A	ND EC	ZUIFIV	IENT: CME 550X S/N 340253, mud rotary, HQ tools, HV	Casi	ng .	ORIENTATION : Vertical
WATER	LEVELS: 3.2	ft bgs	s on 5	/30/07 START: 5/30/2007 END: 6/3	3/200	LOGGER : B. Ellis	
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-			>10	58.5' - Fracture, 5 deg, smooth, planar, tight, black carbonaceous film/coating over 80% of surface 59.6' - Fracture, 10 deg, rough, undulating to stepped, tight		Limestone - 56.6-60.0' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCl reaction, weak to medium strong (R2 to R3), voids 1/16" or less over	-
-	R5-HQ 5 ft 70%	45	2	61.0-61.6' - Fracture zone, rough, undulating, gravel-sized, angular to subangular limestone fragments, various fracture orientations, open 61.6' - Fracture, horizontal, rough, undulating,		5% of rock surface, some cavities generally 3/8" in diameter or less, numerous thin, wispy, discontinuous black carbonaceous laminae, rare	-
65_ -24.1	1070		1	open 61.8' - Fracture, 0-90 deg, rough to smooth, stepped, black carbonaceous film over 10% 62.4' - Fracture, horizontal, smooth,		zone of very weak to extremely weak (R1-R0) rock (typically as cavity infilling) No Recovery 60.0-61.0'	- - R5: 5 minutes
-	66.0		NR >10	undulating, tight, dark gray carbonaceous film over 50% 63.15' - Fracture, horizontal, rough, undulating, open		Limestone 61.0-61.6' - moderate yellowish brown, (10YR 5/4), medium grained, mild HCl reaction, extremely weak	Mast down at 15:15
-			2	63.7' - Fracture, 60 deg, rough, undulating 64.1' - Fracture, horizontal, smooth, undulating 66.5' - Fracture, 30 deg, rough, stepped,		(R0), friable, cavities and voids absent, fossils absent 61.6-64.5' - moderate yellowish brown becoming grayish orange with	-
- -	R6-HQ 5 ft 73%	52	3	open, silt lining <1/16" thick 66.5-67.0' - Fracture zone, irregular angles, rock fragments 67.0' - Fracture, 0-90 deg, rough, stepped,		depth, (10YR 5/4 to 10YR 7/4), fine grained, mild HCl reaction, weak to medium strong (R2 to R3), voids 1/16" over 5-7% of core surface.	- - -
70_ -29.1			1 NR	open 67.8' - Fracture, 10 deg, rough, highly undulating to stepped, tight		unevenly distributed, few cavities generally 3/8" or less in diameter, thin black discontinuous	R6: 4 minutes
-	71.0		3	68.1' - Fracture, horizontal, rough, undulating, open 68.5, 68.75, 69.35' - Fractures (3), 10 deg, very rough, undulating, open	Ė	carbonaceous laminae common, fossil molds/casts rare to absent No Recovery 64.5-66.0' Limestone	Core was stuck in core
-			1	71.5' - Fracture, 0-45 deg, rough, planar, open 71.8' - Fractures (2), 45 deg, smooth, undulating, open		66.0-67.7' - pale yellowish brown grading to dark yellowish brown, (10YR 6/2 to 10YR 4/2), fine to medium grained, mild HCl reaction,	barrel, required all rods to be removed
- - - 75 -34.1	R7-HQ 5 ft 34%	18	NR	71.9-72.2' - Fracture zone, irregular angles 72.2' - Fracture, horizontal, smooth, planar, open		 weak to medium strong (R2 to R3), voids up to 1/16" over 15-20% of surface, some cavities (generally 3/16" or less in diameter), fossil molds/casts rare 67.7-67.8' - Same as 66.0-67.7' except dark yellowish brown, (10YR 4/2), medium grained, extremely 	
- - -	76.0		3	- 76.4' - Fracture, horizontal, smooth, planar, open - 76.5' - Fracture, horizontal, rough, undulating		weak (R0) 67.8-68.1' - grayish orange mottled with pale yellowish brown, (10YR 7/4 and 10YR 6/2), fine to medium grained, mild HCl reaction, extremely weak (R0), voids/cavities/fossils	- - -
- - -	R8-HQ 5 ft 98%	83	2	open 76.7' - Fracture, 0-20 deg, rough, stepped, open 78.0' - Fracture or mechanical break, horizontal, rough, undulating, tight 78.9' - Fracture, 30 deg, rough, planar		absent, possible intraclasts of very weak (R1) rock 68.1-69.45' - pale yellowish brown, (10YR 6/2), fine grained, mild to moderate HCI reaction, weak to	-
- 80_ -39.1 -	81.0		1	- 1 racture, 30 deg, rough, planal		medium strong (R2 to R3), voids 1/16" over 10-15% of rock surface, few cavities (<3/8" in diameter), trace fossil casts/molds	SC-1 collected at 79.7- 80.8' R8: 10 minutes
	01.0						

APPENDIX 2BB-769 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-01 SHEET 6 OF 13

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723795.0 N, 457523.7 E (NAD83)

ELEVATION: 40.9 ft (NAVD88)

DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

CORING	IVIETHOD AI	ND EC	אורוע	IENT: CME 550X S/N 340253, mud rotary, HQ tools, HV	v Casii	<u>ıy</u>	ORIENTATION: Vertical
WATER	LEVELS: 3.2	2 ft bg	s on 5	/30/07 START : 5/30/2007 END : 6/	3/200	LOGGER : B. Ellis	
>	(9)			DISCONTINUITIES	ا ن	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES.	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	CIZE AND DEDTH OF CACINO
불병	RUF F. F. VER	Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	1	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
PTF/	NG CO	ΩC	AC R F	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
吕Տ급	SHR	R	FE	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	DROFS, TEST RESULTS, ETC.
			(NR)	80.85' - Fracture, 40 deg, rough, planar, tight,	Ш	Limestone	
-			1	<1/16"-sized black "peppering" of amorphous mineral over 8-10% of fracture plane surface	ш	- 69.45-69.65' - grayish orange, (10YR 7/4), fine grained, mild HCl reaction,	1 1
-				81.5' - Fracture, horizontal, rough, undulating,	Ħ	very weak to weak (R1 to R2), fossils	1
-			1	open	ш	absent, voids <1/16" over <1%,	1
-	DO LIO		_	82.5' - Fracture, 75 deg, rough, undulating, fracture plane extends from 82.2-82.8'	ш	cavities absent, some very thin dark gray laminations	-
-	R9-HQ 5 ft	46	2	83.1' - Fractures, 0-40 deg, rough, stepped,	ш	No Recovery 69.65-71.0'	-
_	68%			open	Н	Limestone	_
			0	83.3' - Fracture, 0-90 deg, rough, stepped, open	Ш	71.0-72.7' - light olive gray to moderate yellowish brown, (5Y 5/2 to	
85				open -	Щ	10YR 5/4), fine grained, mild to	1
-44.1			NR	_	Ш	moderate HCl reaction, strong (R4),	R9: 6 minutes
-					H	voids 1/16" over 10-15% of surface, some cavities generally 3/8" in	-
-	86.0				H	diameter or less, sparsely	Start drill at 07:30 on
-			1		Н	fossiliferous casts/molds	6/3/07
-				86.85' - Fracture, 45-60 deg, rough,	Ш	No Recovery 72.7-76.0'	
			3	undulating, several intersecting fracture	Н	76.0-78.5' - mottled yellowish gray to	Driller's Remark: Lost circulation at 87.0'
				planes, open	Ħ	light olive gray, (5Y 7/2 to 5Y 5/2),	
-	R10-HQ			87.1' - Fracture, 50 deg, rough, planar, conical	Н	fine to medium grained, mild to moderate HCl reaction, medium	1
-	5 ft 86%	80	1	87.45' - Fracture, horizontal, rough,	Ш	strong to strong (R3 to R4), voids	1
-	00 /0			undulating, tight	+	typically 1/16" or less over 5-10% of	-
-			0	87.85, 88.6' - Fractures (2), horizontal, smooth, planar	Ш	rock surface, some cavities generally 3/8" in diameter or less but up to	-
90 <u> </u>			0	——————————————————————————————————————	Н	1-3/16" in diameter (filled with silty to	D40: 7 minutes
-49.1					ш	sandy carbonate grains), fossils rare	R10: 7 minutes
	91.0		NR		Н	as molds/casts, <1% of surface having a patina of white very fine	
				91.3' - Mechanical break	Ħ	grained carbonate staining/film	
			1	91.7' - Fracture, horizontal, smooth, planar,	Ш	78.5-79.5' - grayish orange, (10YR	1
-				tight	Ш	7/4), fine grained, none to mild HCl reaction, extremely weak (R0), very	Cavity filled with organic
-			0		ш	friable, voids <1/16" over <1%,	material at 92.1'
-	R11-HQ				H	- cavities absent, non-fossiliferous,	1
-	5 ft	83	2		ш	rare intraclasts (<1/4") of grayish very weak to weak(R1 to R2)	-
-	96%			93.6' - Fracture, 20 deg, rough, planar, coarse gravel sized fragments at interface,	Ш	- limestone	
_			2	open	Ш	Silt (ML)	Coulting at 04 4 04 01 ===
95				93.95, 94.25' - Fractures (2), horizontal,	\square	79.5-79.7' - grayish orange, (10YR	Cavities at 94.4-94.6' and 94.6-94.8'
-54.1			1	rough, undulating, open 94.95' - Fracture, horizontal, rough, planar,		7/4), mild HCl reaction, carbonate derived	R11: 6 minutes
-	96.0			open	FA	Limestone	7 1
-	30.0		NR.	95.25' - Fracture, horizontal, rough,	Ш	79.7-80.9' - grayish orange to very	1
-			7	undulating to stepped, open	Н	pale orange, (10YR 7/4 to 10YR 8/2), very fine grained, moderate HCl	-
-				96.4' - Fracture, horizontal, rough, undulating, open	Ш	reaction, medium strong to weak (R3	-
_			>10	96.45' - Fracture, vertical, smooth, planar,	\square	to R2), voids 1/16" or less over 1-3%	_
				open	Ш	of rock surface, cavities rare, trace	
	R12-HQ			96.5' - Fracture, <5 deg, smooth, undulating, open	Ш	fossil casts/molds No Recovery 80.9-81.0'	1
	5 ft 88%	18	>10	96.6' - Fracture, 60 deg, smooth, slightly	Ш	Limestone	1
-	0070			undulating, tight	H	81.0-81.5' - Same as 79.7-80.9'	SC-2 collected at 99.0-
			>10	96.7' - Fracture, horizontal, rough, planar to stepped, open	世	-	99.9'
100 <u> </u>				96.8' - Fracture, horizontal, rough, planar, —	Ш	<u> </u>	R12: 6 minutes
-58.1			2	open	Ш	_	13. O Hilliutes
	101.0		NR				
					Ш		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-01	SHEET	7	OF	13	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723795.0 N, 457523.7 E (NAD83)

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

			<u> </u>	TENT . CIVIE 550X 5/N 540255, Hud Totally, Fig tools, Fiv		5		ORIENTATION : Vertical
WATER	LEVELS: 3.2	ft bgs	s on 5	/30/07 START : 5/30/2007 END : 6/	3/200	7	LOGGER : B. Ellis	
	_			DISCONTINUITIES	(1)		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	Г	DOCK TYPE COLOR	
H N N N N N	N. A. Y.		FRACTURES PER FOOT	DECOMM HON	으		ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
ATION	문트	(%) _Q		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	፬		WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AN
무유의	S S S S S S S S S S S S S S S S S S S	Ø	A P	PLANARITY, INFILLING MATERIAL AND	₩.		AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
필요리	898	ď	E H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Š		CHARACTERISTICS	BROFO, TEOT REGOETO, ETO.
				96.9' - Fracture, vertical, smooth, planar,		П	81.5-83.5' - moderate yellowish	08:30 rig stops for water
-			10	open	Ш		brown with yellowish gray limestone	refill
				97.0' - Fracture, horizontal, rough, stepped,	Н		interbeds, (10YR 5/4 with 5Y 7/2),	SC-3 collected at 101.75-
				open	Ш		fine to medium grained, mild to	102.8'
1 -			>10	97.0-98.0' - Fracture zone, rough, undulating		H	moderate HCl reaction, weak to	
-	D 40 110			to stepped, vertical to subvertical, open	₩	H	medium strong (R2 to R3), HCI	
	R13-HQ		>10	98.23' - Fracture, horizontal, smooth, undulating to planar, open	Н		reaction strong where patina of very fine grained limestone coats core	
1 7	5 ft 100%	53	> 10	98.5' - Mechanical break	111		surface, abundant fractures,	
-	100 /0			98.6-99.0' - Fracture zone, 0-90 deg, rough,	ш	H	breccia-like features (with possible	
_			10	stepped to undulating, open	Н	LТ	intraclasts) common from 82.7-83.5',	
105				99.9-100.05' - Fracture zone, rough, planar,	Н		voids up to 1/16" over 15-20% of	
-64.1				various fracture orientations, gravel sized	тп		surface, cavities common (up to	R13: No time recorded
-			5	rock fragments, open	口	H	2-3/8"-2-3/4" in length, 1-9/16"-2"	
	106.0			100.2' - Fracture, horizontal, smooth, planar,	₽₩	LΙ	wide and extending 3/4"-1-3/16" into	
				open	H	П	core), fossiliferous (casts/molds) 83.5-84.4' - yellowish gray, (5Y 7/2),	09:30 begin drill, add 1 bag
-			4	100.5' - Fracture, horizontal, rough, planar to stepped, open			fine grained, moderate to strong HCl	mud
-			<u> </u>	101.4' - Fracture, 0-45 deg, smooth, planar,	Ш	ŀΙ	reaction, weak to medium strong (R2	Drillorla Romaria Drill
			4	open	\mathbb{H}	Ll	to R3), voids (1/16" or less) unevenly	Driller's Remark: Drill chatter throughout run
1 7			4	101.6-101.75' - Fracture zone, 0-50 deg,	т	ГΙ	distributed over 15% of rock surface,	Chatter throughout run
-	R14-HQ			rough, undulating, open	ш	Ηl	cavities (<3/16"), fossil molds/casts	
-	5 ft	53	>10	102.8' - Fracture or mechanical break,	\vdash	LΙ	rare to absent	
	92%			horizontal, smooth, planar	Н		No Recovery 84.4-86.0'	
				102.8-103.1' - Fracture zone, gravel-sized	Ш		Limestone	
-			4	rock fragments, multiple fracture orientations 103.13, 103.2, 103.3, 103.45' - Bedding plane	Ш	ΗI	86.0-87.4' - dusky yellow with yellowish gray interbeds, (5Y 6/4 with	
110_				(4), horizontal, rough, planar to stepped,	Н	Н	5Y 7/2), fine to very fine grained,	
-69.1			0	discontinuous, open	Н	Ш	weak to medium strong (R2 to R3),	R14: 4 minutes
1 7	111.0		NR	103.5' - Fracture, 45 deg, smooth, planar,			voids 1/16" or less over 25-30% of	SC-4 collected at 110.15- 111.0'
-	111.0		INIX	tight	₩	Ηl	rock surface, some cavities up to	111.0
_			>10	103.8, 103.9' - Fractures (2), horizontal,	Н	LΙ	1-3/16"-1-9/16" x 3/4"-1-3/16", very	
			'	rough, planar			fine grained limestone from	
				104.1, 104.2' - Fractures (2), horizontal,	ш		86.7-86.8', very fine grained	
-			>10	rough, stepped, open 104.7' - Fracture, rough, cone-shaped	Н	\vdash \mid	intraclast from 87.0-87.4' (subangular, up to 1/2"-3/4"), some	
				104.7 - Fracture, rough, cone-shaped 104.7-104.75' - Fracture zone, gravels sized	Н	LΙ	fossil molds/casts	
	R15-HQ			fragments of irregular chang and fracture	Ш	Ш	87.4-88.6' - very light gray, (N8), fine	
-	5 ft	15	>10	orientation	H	Ηl	grained, strong HCl reaction, very	
-	76%			104.83' - Fracture, horizontal, smooth, planar	╀╫	ŀΙ	weak (R1), voids (1/16" or less) over	
			>10	105.2, 105.45, 105.57, 105.7, 105.9' -	Ш	Ll	3-5% of rock surface, cavities rare	
115			<u>.</u> _	Bedding plane (5), horizontal, rough, planar	\Box		(typically 3/8"x3/16"), trace fossil	
-74.1				to stepped, open —	╫	H	molds and trace echinoderms	R15: 5 minutes
"-			NR	106.3' - Fracture, horizontal, smooth, planar	H	ĻΙ	88.6-90.3' - variegated pale yellowish brown to moderate yellowish brown,	
	116.0			106.4-106.5' - Fracture zone, horizontal, planar, multiple fragments		Ll	(10YR 6/2 to 10YR 5/4), fine to	
1				106.55' - Fracture, horizontal, smooth, planar	Ш	ΓΙ	medium grained, moderate HCl	
-			4	106.6' - Fracture, horizontal, smooth, planar	╂┼┤	\vdash	reaction, very weak to weak (R1 to	
			L	106.9' - Mechanical break, horizontal,	\Box	μl	R2), voids up to 1/16" over 5-8%,	
				smooth, planar	Ш	П	cavities (typically 3/8"x3/16"),	
			4	107.4' - Fracture, horizontal, rough, planar	\square		fossiliferous (molds/casts),	
-	D46 LIO			107.5' - Fracture, horizontal, rough,	╂╫	Ηl	echinoderms, becomes coarse	
	R16-HQ 5 ft	55	0	undulating	Ш	μl	grained with depth from 90.2-90.3'	
	96%	00		107.8' - Fracture or mechanical break, horizontal, smooth, undulating	\square		and extremely weak rock (R0) with some black carbonaceous material	
				107.9' - Fracture or mechanical break,	1		No Recovery 90.3-91.0'	
-			4	horizontal, smooth, undulating	\Box	ŀΙ		
120_				108.0-108.3' - Fracture zone, horizontal,	口	Ш		
-79.1				smooth, planar, bedding plane separations at	Ш	П		R16: 4 minutes
	404.0		6	108.0, 108.1, 108.2, 108.25, 108.3'	H			
<u> </u>	121.0				ဓ	Н		+
1			ı		1			1

APPENDIX 2BB-771 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-01 SHEET 8 OF 13

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723795.0 N, 457523.7 E (NAD83)

ELEVATION: 40.9 ft (NAVD88)

DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

CORING	NETHOD A	ND E	JUIPIN	MENT: CME 550X S/N 340253, mud rotary, HQ tools, HV	v casii	ig	ORIENTATION : Vertical
WATER	LEVELS: 3.2	ft bg	s on 5	/30/07 START : 5/30/2007 END : 6/	3/2007	LOGGER : B. Ellis	
	_			DISCONTINUITIES	(J	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
HH H		(9)	FRACTURES PER FOOT		윽	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
EXE FXF	RES	(%) 🛭	[DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOI	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
PR-R	R N N N	Ø	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ООШ	Olk	22	шп		S		
			>10	108.5-109.0' - Fracture zone, horizontal,	Н	Limestone	
_			1-10	smooth, planar, open 109.05' - Bedding plane, horizontal, rough,	Ш	91.0-92.0' - very light gray, (N8), fine grained, strong HCl reaction, weak to	1
-				planar to stepped, open	Н	medium strong (R2 to R3), voids	-
-			>10	109.5, 109.85, 109.98' - Bedding plane (3),	Н	- 1/16" or less over 10-15% of rock	-
_				horizontal, rough, undulating, open	Ш	surface, several cavities typically	_
	R17-HQ			111.0-112.55' - Bedding plane, horizontal,	Н	3/8"x3/16", trace fossil molds/casts	
_	5 ft 40%	0		rough, planar to undulating, open, 0.1' thick or less throughout interval, multiple breaks	111	with occasional echinoderm fossils 92.0-93.5' - Same as 88.6-90.3'	-
-	40 /6			112.3-113.7' - Fracture zone, smooth to	ш	except trace black	-
_			NR	rough, planar to undulating, coarse gravel to	+	- carbonaceous/organic discontinuous	_
125_				cobble size fragments, various fracture plane	Н	laminae/cavity infilling, intraclasts (up	
-84.1				orientations, open	ш	to 1-9/16"-2", subrounded) common	R17: 4 minutes
_	1000			114.4-114.8' - Fracture zone, smooth to rough, planar to undulating, coarse gravel to	+	93.2-93.5' 93.5-95.45' - yellowish gray to very	1
-	126.0		0	cobble size fragments, various fracture plane		light gray, (5Y 8/1 to N8), fine to	Driller's Remark: Large
_			<u> </u>	orientations, open	₽₩	medium grained, strong HCl	rock fragment jammed in
_				116.15' - Fracture, horizontal, rough,	Н	reaction, very weak (R1) rock from	tip of core barrel. 10:30
				stepped, open 116.27' - Fracture, 10 deg, rough, undulating,		93.5-94.3', becoming weak rock (R2) from 94.3-95.2' and returning to very	drilling suspended to fix
_				open	14	weak rock (R1) from 95.2-95.45',	wireline spool – One rock fragment 2.4"
-	l R18-HQ			116.57' - Fracture, horizontal, rough, planar,	ш	voids (1/16" or less) over 3-5% of	long was all that was
_	5 ft	0	NR.	open	H	rock surface and unevenly	recovered during coring.
	4%		INIX	116.68' - Fracture, horizontal, rough, planar	Н	distributed, some cavities up to	No void reported.
				to undulating, open 117.02' - Fracture, horizontal, rough,	Ш	1-3/16"-1-9/16"x3/8" over 2-3% of rock surface, chalk-like texture when	Driller's Remark: Strong
120	1			stepped, open	Н	scraped with pocket knife, fossil	chatter -
130 <u> </u>				117.07' - Fracture, vertical, rough, stepped,	$\pm \pm$	molds/casts rare to absent	R18: 3 minutes
-				open	ш	Peat	- Trio. 5 minutes
_	131.0			117.1' - Fracture, 20 deg, rough, stepped,	Н	95.45-95.7' - black to grayish black,	
			_	conical, open 117.32' - Fracture, horizontal, rough,		(N1 to N2), no HCl reaction, firm to stiff, interlaminated with some very	
-			8	undulating, open	ш	weak limestone	
-				117.9' - Mechanical break	Ш	Limestone	-
-			5	118.5' - Mechanical break		- 95.7-95.8' - Same as 93.5-95.45'	_
_				119.3' - Fracture, horizontal, rough, undulating, open	Н	except very weak (R1), friable	
	R19-HQ			119.4' - Fracture, horizontal, rough, stepped,	ш	No Recovery 95.8-96.0'	Driller's Remark: Strong
_	5 ft	22	>10	open	1—1	 Limestone 96.0-100.4' - yellowish gray, (5Y 8/1), 	chatter from 133.0-136.0' -
-	92%		<u> </u>	119.72' - Fracture, horizontal, rough,	╂╨┨	strong HCl reaction, weak to medium	Many fractures resulted
_			6	stepped, open	Ш	strong (R2 to R3), voids 1/16" or less	from breakage along weak -
135_			Ĺ	119.8' - Fracture, horizontal, rough, planar, open —	┟┼┤	over 5-10% of rock surface, cavities	bedding planes when
-94.1			>10	120.05, 120.12, 125.25, 120.45, 120.65' -		typically 3/8" in diameter over 3-4%, trace fossil molds/casts	removing sample from core
-	126.0		NR	Fractures (5), horizontal, rough, planar to	Ш	No Recovery 100.4-101.0'	barrel – R19: 5 minutes
-	136.0		1417	undulating, open	\Box	Limestone	1713. 3 Hilliutes
-			10	120.75' - Fracture, 0-60 deg, rough, stepped,	口	_ 101.0-106.0' - very pale orange to	_
_			Ľ.	open 121.0' - Fracture zone. unconsolidated. 1/2"-	H	yellowish gray, (10YR 8/2 to 5Y 7/2),	
_				4" fragments		fine to medium grained, strong HCl reaction, weak (R2), chalky texture	
-			10	131.1, 131.3, 131.35, 131.4, 131.45, 131.55,	\Box	when scraped with pocket knife,	1
-	R20-HQ			131.7, 131.8' - Fractures (8), horizontal,	╀┦	voids up to 1/16" over 10% or less of	-
_	5 ft	0	7	rough, planar to undulating, open 132.25, 132.3, 132.38, 132.8, 132.9' -	Ш	rock surface, some cavities up to	_
	66%	-		Fractures (5), horizontal, rough, planar to	H	3/8" in diameter, some echinoid	
_			0	undulating, open	Ш	 fossils in addition to sparse occurrences of molds/casts 	
440				133.1, 133.25, 133.4, 133.5, 133.6, 133.7,	Ш	106.0-110.6' - Same as 101.0-106.0'	1
140 -99.1			NR.	133.8, 133.85' - Fractures (8), horizontal,	╂┯┨	 except echinoderm fossils common 	R20: 4 minutes
			'*''	rough, planar to undulating, open 133.85-134.15' - Fracture zone, 0-90 deg,		_ from 106.0-107.4'	1\20. 4 Hilliutes
	141.0		<u> </u>	rough, undulating to stepped, open	Ш	No Recovery 110.6-111.0'	
				On The State of th			
					_		•

APPENDIX 2BB-772 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-01 SHEET 9 OF 13

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723795.0 N, 457523.7 E (NAD83)

ELEVATION: 40.9 ft (NAVD88)

DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

CORING	IVIL IT IOD AI	ND EC	ZUIFIV	MENT: CIME 550X S/N 340253, mud rotary, HQ tools, HV	v casii	<u>ıg</u>	ORIENTATION : Vertical
WATER	LEVELS: 3.2	ft bgs	s on 5	/30/07 START : 5/30/2007 END : 6/	3/2007	LOGGER : B. Ellis	
	(DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE OOLOD	
H H H H H H H H H H H H H H H H H H H	N. A. Y.	(9	FRACTURES PER FOOT	BECOMI HOW	힐	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
ATI	E E E	Q D (%)	E S	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	l g	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
[면유년	N N N N N N N N N N N N N N N N N N N	Ø	A R	PLANARITY, INFILLING MATERIAL AND	\(\bar{\bar{2}} \)	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
ESD	225	ď	H H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	, , , , , , , , , , , , , , , , , , , ,
				134.15, 134.25, 134.4, 134.5, 134.6, 134.8,	Ш	Limestone	
-			1	135.85' - Fractures (7), horizontal, rough,	+	- 111.0-113.7' - Same as 101.0-106.0'	1
-				planar to stepped, open 135.07' - Fracture, horizontal, rough, planar,		except echinoid fossils rare to absent 113.7-114.45' - yellowish gray, (5Y	-
I _			4	open	₽₩	- 8/1), very fine grained, strong HCl	
			_	135.07-135.7' - Fracture zone, multiple	Н	reaction, extremely weak (R0),	
-	R21-HQ			coarse gravel to cobble-sized fragments,		voids/cavities absent, fossils absent	1
-	5 ft	62	4	various fracture plane orientations	╫	- 114.45-114.8' - Same as	1
_	88%			135.7' - Fracture, horizontal, rough, stepped,	H	111.0-113.7'	
			2	open 135.85' - Fracture, horizontal, rough, planar,		No Recovery 114.8-116.0' Limestone	
145			2	open	Ш	116.0-119.7' - yellowish gray, (5Y	SC-5 collected at 144.5-
-104.1			0	136.1, 136.2, 136.3' - Fractures (3),	╂┼┦	7/2), fine grained, strong HCl	145.4'
_			-	horizontal, rough, planar, open	┌┤	reaction, very weak to weak (R1 to	R21: 5 minutes
	146.0		NR	136.4-136.6' - Fracture zone, bounded by	Щ	R2), chalky texture when scraped]
]				planar to undulating, rough, open bedding	H	with knife, voids (<1/16" over 1-2%	1
-			>10	planes 136.8, 136.9' - Fractures (2), horizontal,		of surface, few cavities (generally 3/8" in diameter or less), fossils rare	1
-				rough, undulating, open	╁┼┤	to absent (trace echinoderms)	-
			2	137.05, 137.2, 137.35, 137.6, 137.75, 137.8,	╁┼┦	119.7-120.8' - yellowish gray, (5Y	_
			_	137.85, 138.0, 138.1, 138.2, 138.25, 138.35,	口	7/2), medium to coarse grained,	
	R22-HQ			138.5, 138.55' - Fractures (14), horizontal,	14	strong HCl reaction, very weak (R1),	1
-	5 ft	68	2	rough to smooth, planar to undulating, open	╂┼┼	voids <10%, some cavities (typically	-
l -	88%			138.5' - Mechanical break 138.85' - Fracture, horizontal, rough, planar		<3/8" in diameter), fossiliferous (molds/casts), pelecypods,	1
			2	141.4' - Fracture or mechanical break,	ш	_ gastropods, some echinoderms	
150				horizontal, rough, planar	Н	(fossil hash)	
-109.1			0	142.0' - Fracture, horizontal, rough, planar —		No Recovery 120.8-121.0'	R22: 7 minutes
-				142.12' - Fracture, horizontal, rough, planar,	₽₽	_ 121.0-123.0' - yellowish gray, (5Y	-
_	151.0		NR	open 142.0-142.12' - Fracture zone	Ш	7/2), fine grained, strong HCl reaction, extremely weak (R0), very	
				142.33, 142.40' - Fracture or mechanical	Н	friable, 40-50% fine to medium	Start drill at 12:15
-			2	break (2), horizontal, rough, planar	╀┤	sand-sized grains grading to	Add 1/2 bag mud - SC-6 collected at 151.3-
-				142.9' - Fracture or mechanical break,	⊞	gravel-sized carbonate	152.35'
_			3	horizontal, rough, planar	+	No Recovery 123.0-126.0'	-
			_	143.0' - Fracture, horizontal, rough, undulating, coarse gravel-sized rock	Н	Limestone - 126.0-126.2' - yellowish gray, (5Y	
	R23-HQ			fragments on bottom face	Ш	7/2), medium to coarse grained,	Driller's Remark: Drilling in
-	5 ft	80	0	143.3' - Fracture, vertical, rough, stepped,	╂┼┼	strong HCl reaction, very weak to	fourth gear, consistent -
-	96%			tight	╀┤┤	- weak (R1 to R2), fossiliferous	chatter throughout run
_			0	143.4' - Fracture, horizontal, rough, stepped,	Ш	(echinoderms, fossil hash)]
155				open	H	No Recovery 126.2-131.0'	[, ,, ,, ,, ,, ,, ,, ,, , , , , , , , ,
-114.1				143.7' - Fracture, 80 deg, rough, planar, tight — 144.1' - Fracture, 80 deg, rough, stepped,	1++	— Limestone 131.0-135.6' - Same as 111.0-113.7'	Large cast/void at 154.85', —
-			0	(intersects fracture at 143.7')	団	No Recovery 135.6-136.0'	155.2', 155.8' R23: No time recorded
-	156.0		NR	144.50' - Fracture or mechanical break,	╂┼┦	- Limestone	
			1	horizontal, rough, undulating	H	136.0-137.9' - Same as 131.0-136.0'	Lost 2.0' due to having to break 2.9' long piece to box
1 7			'	146.4' - Fracture, horizontal, rough,	Ш	137.9-138.2' - olive gray, (5Y 3/2),	break 2.9 long piece to box
-				undulating, organic staining on bottom face 146.4-146.6' - Fracture zone, smooth, planar,	╁┼┤	fine to medium grained, strong HCl reaction, very weak (R1), thinly	1
-			1	coarse gravel to cobble-sized fragments	╂╫	laminated	-
				146.6' - Fracture, horizontal, rough,	Д	138.2-138.5' - Same as 136.0-137.9']
	R24-HQ		.]	undulating, tight	H	138.5-138.7' - yellowish gray, (5Y	00.7 1141 1450.0
-	5 ft	55	1	146.8' - Fracture, vertical, rough, planar,	╂┴╂	7/2), fine grained, moderate HCl	SC-7 collected at 158.3-
-	80%			tight, fracture plane extends from	口	reaction, weak (R2), laminated, voids	159.1'
_			2	146.6-147.0'	\coprod	(<1/16") 5-8% irregularly distributed over core surface, few cavities]
160			_	147.0' - Fracture or mechanical break, horizontal, smooth, planar, open	Н	<1/16" in diameter, fossils	
-119.1				147.0-147.2' - Fracture zone, rough, planar to	Ш	(casts/molds) rare to absent	R24: 4 minutes
-			NR	stepped, multiple fractures, open, angular	╂┼╂	138.7-139.3' - Same as 121.0-123.0'	-
_	161.0			gravel size fragments	Ħ	No Recovery 139.3-141.0'	ļI

APPENDIX 2BB-773 Rev. 7



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-01	SHEET	10	OF	13

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723795.0 N, 457523.7 E (NAD83)

ELEVATION: 40.9 ft (NAVD88)

DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

CORING	NETHOD A	ND EC	JUIPIV	MENT: CME 550X S/N 340253, mud rotary, HQ tools, HV	v casir	ig	ORIENTATION : Vertical
WATER	LEVELS: 3.2	ft bgs	s on 5	/30/07 START: 5/30/2007 END: 6/	3/2007	LOGGER : B. Ellis	
	_			DISCONTINUITIES	(2)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표원한	N.Y.	(%	FRACTURES PER FOOT		음	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
FAC		Q D (%)	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
- R.R.		ō	RA(PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
Δош	078	₩.	шФ		S		
			2	147.7' - Fracture or mechanical break,	Н	Limestone	1
-			3	horizontal, smooth, planar, tight 148.4' - Fracture or mechanical break, 0-50	$1 \pi l$	 141.0-141.35' - yellowish gray to pale yellowish brown, (5Y 7/2 to 10YR 	1 1
-				deg, smooth, planar, tight		6/2), medium to coarse grained,	1 1
-			3	148.9' - Fracture, 70 deg, smooth, undulating,	₽₩	strong HCl reaction, very weak (R1),	1 -
				tight, fracture plane extends from	Ш	voids (1/16") over 5-7% of surface,	1
	R25-HQ			148.5-149.5'	П	some cavities up to 3/8" in diameter,	1 1
-	5 ft	75	1	149.3' - Fracture, horizontal, very rough,	₩	- fossiliferous (echinoderm parts),	1 1
-	96%			undulating, tight 149.55' - Fracture, vertical, rough, undulating	┦┼┼	molds/casts sparse 141.35-142.0' - pale yellowish brown,	1 -
I _			2	to stepped, tight	Ш	- (10YR 6/2), fine to medium grained,]
165			_	149.8' - Fracture, 0-90 deg, rough, stepped,	Н	strong HCl reaction, weak to medium	1
-124.1				tight	ш	strong (R2 to R3), voids up to 1/16"	R25: 4 minutes
-			3	151.2' - Fracture, 10 deg, rough, stepped,	╂┯╂	over 10% of surface, few cavities	-
-	166.0		NR	tight 151.3' - Fracture, 10 deg, smooth, undulating,	₽₩	generally 3/8" or less in diameter, fossiliferous (echinoids), thinly	-
			8	tight	Ш	laminated with wispy, discontinuous,]
]			٥	152.6' - Fracture, horizontal, smooth,	$\vdash\vdash$	black (N1) carbonaceous/organic	1
-				undulating, tight	ᡛ᠊ᡰ	material naterial	Loud drill chatter
-			6	152.9' - Fracture, horizontal, smooth,	╓	142.0-143.05' - yellowish gray, (5Y	throughout, especially at
I -				undulating, open 152.97' - Fracture, horizontal, rough,	H	7/2), medium grained, strong HCI reaction, weak (R2), chalk-like	167.0'
	R26-HQ		9	undulating .		texture when scraped with knife,	Large cavity >3/4" at
	5 ft 68%	18	9	156.35' - Fracture, 10 deg, rough, undulating,	ш	irregular to undulating core surface,	168.0', 169.2'
-	00,0		2	open	╁┼	voids (<1/16" or less) over 1-2%,	1 1
-				157.9' - Fracture, horizontal, smooth,		_ cavities rare, fossils (molds/casts)	1 -
170				undulating, open 158.0' - Fracture, 10 deg, smooth, planar —	Щ	difficult to discern — 143.05-145.4' - yellowish gray, (5Y	
-129.1			NR	158.3' - Mechanical break	Н	7/2), very fine grained, moderate to	R26: 4 minutes
-	171.0			159.4, 159.7' - Fractures (2), horizontal,		strong HCl reaction, medium strong	1 1
-	17 1.0			rough, planar, open	╂┴╂	to strong (R3 to R4), voids (1/16" or	1 -
l -			2	161.35' - Fracture, horizontal, rough,		less) over 3% or less of rock surface,	1 -
I _				undulating, tight 161.6' - Fracture or mechanical break,	Ш	cavities common up to a few inches in length (possibly bioturbated),]
			_	horizontal, smooth, planar, open	Н	fossiliferous (mostly casts), some	1
_			5	161.95' - Fracture or mechanical break,	ш	pelecypod molds/casts	1 1
-	R27-HQ			horizontal, rough, planar, open	╆┼	No Recovery 145.4-146.0'	1
l -	5 ft	57	10	162.2' - Fracture, horizontal, rough,	╀╫	Limestone	1 -
	96%			undulating, open 162.45, 162.55' - Fracture or mechanical	川	146.0-146.4' - Same as - 143.05-145.4'	
				break (2), horizontal, rough, planar, open	H	146.4-148.1' - yellowish gray to pale	1
475			>10	163.5' - Mechanical break		yellowish brown, (5Y 7/2 to 10YR] 1
175 <u> </u>				163.65' - Fracture or mechanical break, —	Ш	— 6/2), fine grained, moderate HCI	R27: 4 minutes
'54.1			10	horizontal, smooth, planar, open	╀	reaction, weak to medium strong (R2	TV27. 4 HIIIIUUGS
	176.0		NR	164.0' - Fracture or mechanical break, horizontal, smooth, planar, open	世	to R3), thin black wispy organic/carbonaceous laminations,	
]			-	164.0-164.1' - Fracture zone	Ш	voids (<1/16") over 1-3% of surface	1
-			3	164.1' - Fracture, 10 deg, rough, planar	╂┯╂	non-uniformly distributed, few	-
-				165.15, 165.2, 165.25' - Fractures (3),		 cavities, fossil molds/casts rare to 	-
_				horizontal, smooth, planar, open	Ш	absent]
				166.10, 166.4, 166.42, 166.45, 166.55, 166.6, 166.7, 166.8' - Bedding plane (8), horizontal,	H	148.1-149.0' - yellowish gray, (5Y 7/2), very fine grained, moderate to]
-	R28-HQ			rough, planar, open	口	strong HCl reaction, medium strong	Drill chatter at 178.0'
-	5 ft	0		167.15, 167.2, 167.25, 167.3, 167.35, 167.95'	╁┼┼	to strong (R3 to R4), voids (<1/16")	-
-	16%		NR	 Bedding plane (6), horizontal, smooth, 	Ш	over <1% of surface, cavities	-
				planar to stepped		(<3/16") rare to absent, fossils	
180				168.0' - Fracture, 10 deg, rough, undulating,	H	- absent	1
-139.1				open 168.2, 168.25, 168.3, 168.35, 168.4, 168.5,	⇈		R28: 4 minutes
-				168.6, 168.9' - Mechanical break (8),	$\{ \dots \}$	-	
	181.0			horizontal, smooth, planar	H		

APPENDIX 2BB-774 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-01 SHEET 11 OF 13

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723795.0 N, 457523.7 E (NAD83)

ELEVATION: 40.9 ft (NAVD88)

DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS: 3.2	2 ft bgs	s on 5	/30/07 START: 5/30/2007 END: 6/	3/20	007	LOGGER : B. Ellis	
≥ ∩ ⊙	6)			DISCONTINUITIES	ي		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLICLOG	O I MIDOLIO EO	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- 185 -144.1 	R29-HQ 5 ft 26%		2 2 NR	168.5-168.6' - Fracture zone 169.0, 169.1' - Fracture or mechanical break (2), horizontal, smooth, planar, along bedding planes 171.35' - Fracture, 80 deg, smooth, planar, tight 171.8' - Fracture or mechanical break, horizontal, rough, undulating to stepped, tight 172.0' - Fracture or mechanical break, horizontal, smooth, planar (possible continuation of 171.8' fracture) 172.62' - Fracture or mechanical break, horizontal, smooth, planar 172.80' - Fractures (2), 70 deg, rough, planar, tight, parallel 172.92' - Fracture, 30-60 deg, rough, stepped, tight 173.45' - Fracture, horizontal, rough, planar, open 174.3' - Fracture, horizontal, rough, planar, open 174.5-174.8' - Fracture zone, 0-60 deg, rough, undulating, open 174.5-174.8' - Fracture zone, various fracture plane orientations producing angular gravel-sized limestone rock fragments 174.85' - Fracture, horizontal, rough, planar, open 175.75-175.8' - Fracture zone, 0-90 deg, rough, undulating, open 175.75-175.8' - Fracture zone, multiple irregular sized, very angular cobble-sized fragments 176.35, 176.5' - Fractures or mechanical break (2), horizontal, rough, planar, open 181.25, 181.7' - Fractures or mechanical break (2), horizontal, smooth, planar 182.05' - Fracture or mechanical break, horizontal, smooth, planar			149.0-150.0' - yellowish gray mottled with pale yellowish brown (<1% of rock surface), (5Y 7/2 mottled with 10YR 6/2), coarse grained, strong HCI reaction, weak to medium strong (R2 to R3), voids and cavities absent, abundant rip up/lithoclasts (subrounded to rounded), fossil casts/molds rare, echinoids rare 150.0-150.4' - yellowish gray, (5Y 7/2), medium grained, strong HCI reaction, weak (R2), although rock has "grainy" appearance, the interval is generally absent of voids, cavities absent, fossil (casts/molds) rare to absent No Recovery 150.4-151.0' Limestone 151.0-153.0' - Same as 150.0-150.4' except with some intraclasts between 151.5' and 151.9' 153.0-155.8' - yellowish gray, (5Y 7/2), fine grained, moderate HCI reaction, medium strong to strong (R3 to R4), voids up to 1/16" over 3-5% becoming more common (up to 10% below 154.5'), some cavities up to 3/4"-1-3/16" in diameter/length over 1-2% becoming more common below 154.5', some dark yellowish orange banding from 154.9-155.8', fossil (molds/casts), echinoderms rare No Recovery 155.8-156.0' Limestone 156.0-156.3' - variegated yellowish gray to pale brown, (5Y 7/2 to 5YR 5/2), fine grained, moderate HCI reaction, voids (1/16" or less) over 1-2% surface, cavities 3/8"-3/4"x3/16" at base of interval (elongated), very thinly laminated (argillaceous laminae), fossils rare to absent 156.3-159.1' - Same as 153.0-155.8' except lacking dark yellowish orange banding 159.1-159.25' - dark yellowish orange banding 159.1-159.25' - dark yellowish orange banding 159.25-160.0' - very pale orange, (10YR 6/6), medium to coarse grained, strong HCI reaction, weak (R2), hummocky/irregular surface with 4% voids, cavities absent, fossil hash, contact sharp with undulating limestone 159.25-160.0' - very pale orange, (10YR 8/2), medium grained, strong HCI reaction, weak (R2), voids over <1%, cavities (<3/16") rare, some rip up/intraclast-like grain, fossil casts and molds rare No Recovery 160.0-161.0'	Extensive drill chatter throughout run - R29: 7 minutes - Driller's Remark: Total of 37 flights used for total depth -



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-01	SHEET	12	OF	13	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723795.0 N, 457523.7 E (NAD83)

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

WATER	ATER LEVELS: 3.2 ft bgs on 5/30/07 START: 5/30/2007						END : 6/3/2007 LOGGER : B. Ellis					
≥ □₽	(%			DISCONTINUITIES		g	L	LITHOLOGY	COMMENTS			
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUG PLANARITY, INFILLING MATERIAL THICKNESS, SURFACE STAINING, AND	AND	SYMBOLIC LOG		ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.			
								Limestone 161.0-161.6' - Same as 169.25-160.0' 161.6-162.5' - very pale orange, (10YR 8/2), coarse grained, strong HCI reaction, weak to medium strong (R2 to R3), fossil hash, voids (<1/16" or less) over 3-5% of rock surface, cavities rare, fossils common (echinoids, pelecypods, casts/molds), rip up/intraclasts common in base of interval 162.5-164.1' - yellowish gray mottled with moderate yellowish brown, (5Y 7/2 mottled with 10YR 5/4), medium grained, strong HCI reaction, weak to medium strong (R2 to R3), becoming finer grained with depth, voids (1/16" or less) over 3-5% of rock surface (irregularly distributed), brown mothling is wavy and discontinuous, some echinoids and fossil molds/casts 164.1-165.8' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCI reaction, weak (R2), voids (1/16") over 1% or less of rock, cavities rare (1/8"-3/16" over <1%), echinoids rare, fossil molds/casts rare to absent No Recovery 165.8-166.0' Limestone 166.0-166.6' - Same as 159.25-160.0' 166.6-169.4' - yellowish gray, (5Y 7/2), fine grained, moderate HCI reaction, medium strong (R3), voids (1/16" or less) over 3-5% of rock surface, few cavities (typically 3/16" or less in diameter), voids and cavities becoming more common below 168.5' up to 20-25% voids, fossils (casts/molds) and echinoids rare to absent to 168.5', some fossil molds/casts and few echinoids below 168.5-169.4' No Recovery 169.4-171.0' Limestone 171.0-175.8' - yellowish gray, (5Y 7/2), fine to medium grained, mild to moderate HCI reaction, weak to medium strong (R2 to R3), voids (1/16" or less) over 5-10% of rock surface, fossil (casts/molds) rare, medium to coarse grained from 174.5-175.3' No Recovery 175.8-176.0'				
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-01	SHEET	13	OF	13

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723795.0 N, 457523.7 E (NAD83)

ELEVATION: 40.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

WATER	/ATER LEVELS : 3.2 ft bgs on 5/30/07 START : 5/30/2007 EN					END : 6/3/2007 LOGGER : B. Ellis				
≥0≎	(%)			DISCONTINUITIES		9	LITHOLOGY	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION		SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,		
H BE ATIC	E RU SITH, OVEF	R Q D (%)	T.O.	DEPTH, TYPE, ORIENTATION, ROUG	HNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD		
LEV.	ORE	οD	RAC ER F	PLANARITY, INFILLING MATERIAL THICKNESS, SURFACE STAINING, AND	. AND	YME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.		
ООШ	075	Ψ.	шФ	11110144200, 0014 7102 017414140,7442	110111111200	S	Limestone			
-					-		- 176.0-176.35' - yellowish gray, (5Y	_		
-					-		7/2), fine to very fine grained, mild to moderate HCl reaction, medium	_		
1 -					-		strong (R3), voids (1/16" or less)	_		
					-		over 3-5% of rock surface (irregularly distributed), cavities along bedding	_		
					-		planes (elongate 3/8"-3/4"), fossils	_		
					_		(casts/molds) rare to absent	_		
					_		176.35-176.8' - dark yellowish - orange, (10YR 6/6), fine grained,	_		
							mild to moderate HCl reaction, weak	_		
					_		to medium strong (R2 to R3), voids (typically <1/16") over 10% of	_		
					_		surface, cavities common (up to 3/8"x3/16") irregularly distributed,	_		
					_		fossil molds/casts rare	_		
					_		No Recovery 176.8-181.0'	_		
					_		_ 181.0-182.3' - dark yellowish orange,	_		
					_		(10YR 6/6), very fine grained, mild HCl reaction, weak to medium strong	_		
					_		(R2 to R3), voids (typically 1/16" or	_		
					_		less) over 3-5% of rock surface, some cavities, arcuate to ovate (up	_		
					_		to 3/4"x3/16"), fossil (casts/molds)			
1 4					_		rare 	_		
1 4					_		Bottom of Boring at 186.0 ft bgs on	_		
1 4					_		6/3/2007	_		
1 4					_		<u>-</u>	_		
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-02	SHEET	1	OF	11

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1724255.5 N, 457486.3 E (NAD83)

ELEVATION: 39.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" and 6" tri-cone bits ORIENTATION: Vertical WATER LEVELS: 1.5 ft bgs on 5/18/07 START: 5/18/2007 END: 5/21/2007 LOGGER: P. De Sa'rego, R. Bitely SOIL DESCRIPTION COMMENTS STANDARD DEPTH BELOW SURFACE AND ELEVATION (ft) PENETRATION TEST RESULTS SAMPLE INTERVAL (ft) SYMBOLIC SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND CONSISTENCY, SOIL STRUCTURE, MINERALOGY INSTRUMENTATION #TYPE 6"-6"-6" (N) 39.8 Water level: 1.5-5.0' 0.0 0.0-0.3' - grayish brown to brownish black, (5YR 3/2 to 1-3-6 SS-1 1.0 5YR 2/1), wood debris and organics (9)Poorly Graded Sand (SP) 1.5 0.3-1.0' - grayish orange, (10YR 7/4), moist, loose, nonplastic, very fine to fine grained silica sand, trace nonplastic fines, trace fine organics and roots 5.0 34.8 Wood Debris And Silty Sand (SM) 5.0-5.95' - light olive gray to yellowish gray, (5Y 5/2 to 5-6-5 0.9 SS-2 5Y 7/2), wet, medium dense, 30% nonplastic fines, (11)very fine to fine grained silica sand 6.5 10 10.3 29.8 0.3 SS-3 50/3.5 Silty Sand (SM) 7.14 10.0-10.3' - dark yellowish brown, (10YR 6/6), moist, very dense, fine to coarse grained, mild to moderate (50/3.5")HCl reaction, carbonate, 48% nonplastic fines, rapid dilatancy, bottom 1" contains fine gravel-sized limestone fragments 15.0 24.8 Limestone Driller's Remark: 100% fluid loss, no 15.0-15.2' - dark yellowish orange, (10YR 6/6), mild HCl reaction, carbonate materials circulation 4-4-5 SS-4 0.8 (9)Silt With Sand (ML) 16.5 15.2-15.85' - dark yellowish orange, (10YR 6/1), wet, stiff, nonplastic, rapid dilatancy, mild to moderate HCI reaction, carbonate materials, 20-25% fine-grained silica sand 20



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-02	SHEET	2	OF	11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724255.5 N, 457486.3 E (NAD83)

ELEVATION: 39.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" and 6" tri-cone bits ORIENTATION: Vertical

WATER	LEVELS	: 1.5 ft bo	gs on 5/18	3/07	START : 5/18/2007 END : 5/21/2007 LOGGER : P. De Sa'rego, R. Bitely
>				STANDARD	SOIL DESCRIPTION O COMMENTS
AND (f)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	
H BE ACE		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY
19.8				()	Install 15' HW casing to seal off flow zone
-	21.0				after collecting SS-5: 20.0-21.5' SPT
		0.9	SS-5	20-50/5	Sandy Silt (ML) 21.0-21.9' - grayish yellow to grayish orange, (5Y 8/4
-	21.9			(70/11")	to 10YR 7/4), moist, hard, nonplastic, moderate HCl 05/19/07 07:30 Drilling from 20.0', advance
-					reaction, 38% fine to coarse grained gravel-sized, hw casing to 20.0', using 3-7/8" tricone roller and AWJ rod beyond 30.0' inside HW
-	-				casing
-	-				- Driller's Remark: Smooth, moderate to rapid
-	-				drilling rate, intermittent light chatter
25	25.0				
14.8	25.4	0.3	SS-6	50/5	Silty Sand (SM)
				(50/5")	25.0-25.3' - grayish orange, (10YR 7/4), wet, very dense, very fine to coarse grained, mild to moderate
					HCI reaction, 30% nonplastic fines, trace iron cemented sands, carbonate materials
-					
-	-				
-	-				
-					
-	-				
30	30.0				
9.8	30.3	0.1	SS-7	50/4	Silty Sand (SM)
]			(50/4")	\ \ 30.0-30.1' - Same as 25.0-25.3' except grayish orange, (10YR 7/4), no iron cemented sands, coarse \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
					grained silica sand, limestone fragments
-]
-	-				
-	-				
-	-				
-	-				
35	35.0				
4.8	00.0				Sandy Silt (ML)
]	1.3	SS-8	29-26-50/6 (76/12)	35.0-36.3' - moderate yellowish brown, (10YR 5/4), moist to wet, mild to moderate HCl reaction, low
-	36.5			(* • * * =)	plastic, 33% very fine to medium grained sand-sized, trace fine gravel-sized limestone, carbonate materials /
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-02	SHEET	3	OF	11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724255.5 N, 457486.3 E (NAD83)

ELEVATION: 39.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" and 6" tri-cone bits

ORIENTATION : Vertical

WATER	VATER LEVELS : 1.5 ft bgs on 5/18/07											
>				STANDARD	SOIL DESCRIPTION		_{(D}	COMMENTS				
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLO)R	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,				
TH BE		RECOVE	- ' '		MOISTURE CONTENT, RELATIVE DENSITY CONSISTENCY, SOIL STRUCTURE, MINERAL	OR	IBOLI	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION				
DEP SUR ELE			#TYPE	6"-6"-6" (N)	CONSISTENCT, SOIL STRUCTURE, MINERAL	.001	SYN	INSTRUMENTATION				
-0.2	40.6	0.2	SS-9	50/4 \ (50/4") /	Limestone 40.0-40.2' - moderate yellowish brown, (10YR 5	5/4). [-	Г	_				
-					mild HCl reaction, coarse sand-sized and fine gravel-sized	/ -	-	-				
-					g.avo. 0, <u>20</u> 0		┨	-				
-						-	1	-				
						_]					
-						-	-	_				
-						-	┨	-				
45	45.0					-	1	-				
-5.2	45.4	0.4	SS-10	50/5 (50/5")	Sandy Silt (ML)	5/4). /-	Ш					
-				(00/0)	wet, low plasticity, mild HCI reaction, 44% very medium sand-sized, carbonate materials	fine to /_	-	_				
-					inediam sand-sized, carbonate materials		┨	-				
-						-	1	-				
						-]]				
-						-	-	_				
-						-	┨	-				
50	50.0					-	1	-				
-10.2	50.3	0.3	SS-11	50/4 (50/4") /	Limestone	mild /-	⊭	Advance HW casing from 20.0-50.0' below ground surface to prevent circulation blow -				
-				(00/4)	_\HCl reaction, fine gravel-sized			out around pit neck				
-					Begin Rock Coring at 51.0 ft bgs See the next sheet for the rock core log	-	┨	Begin rock coring with NQ wireline tooling from 51' below ground surface				
-						-	1	(Irom 51 below ground surface				
						-]]				
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-02

SHEET 4 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724255.5 N, 457486.3 E (NAD83)

ELEVATION: 39.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

CORING	NIL ITIOD A	ND L	ZOIFIV	/IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	Casiii	9	ORIENTATION : Vertical
WATER	LEVELS: 1.5	ft bgs	s on 5	/18/07 START : 5/18/2007 END : 5/	21/20	D7 LOGGER: P. De Sa'rego, R. Bite	ely
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		Ś	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	1
표원은	P. A. A.	(%	A P		일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
±ĕĕ.	# # 5 S	Q D (%)	CTI FO	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	IBO	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	RESO	S S	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	51.0			51.05, 51.2, 51.4, 52.85, 53.3' - Fractures (5),	1	Limestone	Begin rock coring at 16:00
-			3	<10 deg, rough, undulating, no staining or		- 51.0-55.8' - moderate yellowish	with NQ wireline tooling -
l -				infill, open <1/4"-<1/2"	₽	brown, (10YR 5/4), very fine to	from 51.0' using water only
l _			1		厂	medium grained, 51.0-53.5' extremely weak to weak rock (R0 to	SC-1 collected at 51.85- 52.85' -
			'		\vdash	R2) weakest at 51.0-51.5' and	32.03
I -	R1-NQ					53.3-53.5', voids <1/16" over 50-60%	1 7
-	5 ft	69	10	53.5-53.55' - Soil Seam	╨	 of surface, highly fossiliferous with many fossil molds/casts <1/2" 	1 1
-	96%			53.7, 53.8, 54.05, 54.15, 54.6, 55.15' -	世	diameter, few cavities <1/2" diameter	1 -
-			3	Fractures (6), <10 deg, rough, undulating,	╀	 53.5-54.5' extremely weak to very 	-
55				open <1/4"- <3/4" —		weak (R0 to R1) with depth, voids	
-15.2			1		\vdash	<1/16" over <20% of surface, no fossils	R1: 4 minutes
I -	56.0					54.5-55.8' weak to medium strong	1
-	55.5		NR_	56.15, 56.3, 56.43, 56.55, 56.7, 56.9' -	\Box	rock (R2 to R3) , voids <1/16" over	1
-			10	Fractures (6), <10 deg, rough, undulating,		 40-50% of surface, secondary recrystallized infill over 50% of core 	-
-				open <1/2"	$+\Box$	zone] -
-			>5	57.40-57.55' - Fracture zone, rough,	世	53.5-54.5' - extremely weak to very] -
l _				undulating	H	weak (R0 to R1), weaker with depth,]
	R2-NQ			58.2, 58.45, 59.65' - Mechanical break (3),		voids <1/16" over <20% of surface, no fossils	1
_	5 ft 90%	50	2	<10 deg, rough, undulating, tight to open	Ш	54.5-55.8' weak to medium strong	1 1
-				<1/2"	╁	rock (R2 to R3) , voids <1/16" over	1 1
			1	-	\Box	40-50% of surface, secondary recrystallized infill over 50% of core	1 -
-20.2			40	_	╀	zone	R2: 3 minutes
-20.2			>10	60.3-60.45' - Fracture zone, rough,	\Box	54.5-55.8' - weak to medium strong	NZ. 3 minutes
l -	61.0		NR	undulating, gravel sized fragments <3/4"	廾	(R2 to R3), voids <1/16" over 40-50% of surface, secondary	
			>10	diameter 61.0-61.1' - Fracture zone, rough, undulating,		recrystallized infill over 50% of core	1
			/10	gravel sized fragments <1" diameter		zone	1
-					Ш	No Recovery 55.8-56.0' Limestone	1 1
-			0	•		56.0-60.5' - pale yellowish brown to	-
-	R3-NQ			-	╁	 moderate yellowish brown, (10YR 6/2 	SC-2 collected at 62.65- 63.65'
-	5 ft	58	0	-		to 10YR 5/4), strong HCl reaction, extremely weak to medium strong	-
l -	78%				oxdot	R0 to R3), fine to medium grained,	
l _			4	64.05, 64.3, 64.5, 64.7' - Fractures (4), 40	Ш	silts increasing with depth, voids	
65			т .	deg, rough, undulating, tight, open <1/2"		1/16" over 40% of surface,	1
-25.2				_		moderately fossiliferous with fossil casts/molds <3/4" diameter, many	R3: 5 minutes
I -	660		NR		Щ	cavities <1" diameter, 20% of] 1
-	66.0				世	- cavities with secondary recrystallized	-
-			1	66.2, 63.25, 65.1, 65.15, 65.55' - Fractures	+	infill No Recovery 60.5-61.0'] -
-				(5), <10 deg, undulating, smooth to rough, open <1/4"		_ Limestone	
I _			0	···	oxdot	61.0-64.9' - dark yellowish brown to]
						yellowish gray, (10YR 4/2 to 5Y 7/2), very fine to medium grained,]
-	R4-NQ				\Box	moderate to strong HCl reaction,	1
1 -	5 ft 95%	85	1		\vdash	strong (R4) 61.1-64'. At 61.0-61.1'] 1
-	90/0				屽	and 64.0-64.9' extremely weak to very weak (R0 to R1), voids <1/16"	-
-			0		世	over 30% of surface, trace fossil] -
70 -30.2				_	\vdash	molds/casts <1/2, cavities with	R4: 3 minutes —
-30.2			2	_		secondary recrystallized in fill up to 2" diameter; trace organics	R4. 3 Minutes
	71.0				\vdash	No Recovery 64.9-66.0'	
						· -	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-02

SHEET 5 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724255.5 N, 457486.3 E (NAD83)

ELEVATION: 39.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

CORING	NIETHOD A	ND EC	אורוע	MENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	Casiii	3	ORIENTATION : Vertical
WATER	LEVELS: 1.5	ft bgs	s on 5	/18/07 START : 5/18/2007 END : 5/	21/20	D7 LOGGER: P. De Sa'rego, R. Bite	ely
				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE COLOR	
BEL ON	L. A. C.	(9)	FRACTURES PER FOOT	BECOME HOW	흑	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
A HE A	HTE SVE	Q D (%)	l E E	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30L	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
	S S S S S S S S S S S S S S S S S S S	g	ER X	PLANARITY, INFILLING MATERIAL AND	₹	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
口饭皿	078	œ		THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	
			NR/	71.05, 71.2, 71.65, 71.7' - Fractures (4), <10	\Box	Limestone	
-			10	deg, rough, undulating, open <1/4"-1/2", few	т	- 66.0-70.75' - moderate yellowish	1
-				intersecting fractures, 71.65-71.7'		brown, (10YR 5/4), very fine to fine grained, moderate to strong HCl	NQ wireline lowered in
-			1	72.4, 73.05, 73.25, 73.65' - Fractures (4), <10	⊬	- reaction, weak rock (R2) with	boring at 76.0',
				deg, rough, undulating, open <1/4"		extremely weak rock (R0) lenses	backhammer
-	R5-NQ					<0.1' thick rock at 66.2', 67.0', 67.45',	1
-	5 ft	48	>10		╁	- 67.65', voids <1/16" over 30% of	5/19/07 17:15 76.0'
-	90%			73.8-73.9' - Fracture zone, rough, undulating,	┢	surface, few cavities <1" diameter, poorly fossiliferous	Water level at surface
l _			5	gravel-sized fragments, <1" diameter		- No Recovery 70.75-71.0'	
75				74.3, 74.4, 74.55, 74.7, 74.8, 75.15' -	\vdash	Limestone]
-35.2			1	Fractures (6), <10 deg, rough, undulating, — except 74.7-70.0' deg intersecting, tight, open		71.0-75.5' - moderate yellowish	R5: 3 minutes
-				<pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre><</pre>	\Box	brown, (10YR 5/4), very fine to] -
I -	76.0		NR	75.3' - Clay seam	\vdash	medium grained, moderate to strong	
			\10	•		HCl reaction, interbedded extremely weak to very weak rock (R0 to R1),	05/20/07 08:00 Continue
1 -			>10	76.4, 76.9' - Fracture (2), <10 deg,	\Box	with weak to medium strong rock (R2	advancing HW casing from - 50.0 to 65.0'
-				undulating, smooth to rough, tight, open <1/2" . 76.9-77.15' - Fracture zone, rough,	╫	to R3), voids <1/16" over 0-30% of	30.0 to 03.0
-			10	undulating, gravel-sized fragments, <1-1/2"	口	_ surface, variable, trace fossil molds,	10:30 NQ tooling freed at -
I _				diameter		few cavities <1/2" diameter, trace	76.0' with HW casing at
	R6-NQ				\vdash	secondary recrystallized infill No Recovery 75.5-76.0'	65.0', continue rock coring
-	5 ft 78%	63	4	78.45-78.5' - Fractures (3+), rough,	\Box	Limestone	from 76.0' – SC-3 collected at 77.15-
-	/0%			undulating, intersecting	1-	76.0-79.9' - moderate yellowish	78.3'
-			3	78.9, 79.35, 79.45' - Fractures (3), <10 deg,	\vdash	brown to medium light gray, (10YR	
80				rough, undulating, tight, open <1/4"		5/4 to N6), very fine to medium	
-40.2				_	\vdash	grained, 76.0-78.3' medium strong to strong rock (R3-R4), void <1/16"	R6: 4 minutes
-	04.0		NR			over <10-20% of surface increasing	1 - 1
-	81.0				屽	with depth, poorly fossiliferous, no	1 -
1 -			10	81.3-81.45' - Fracture zone (5+ intersecting),		_ cavities, 78.3-78.45' Fat Clay (OH),]
			.0	rough, undulating		dark gray (N3), high plasticity, high	
-				82.0-82.1' - Fracture zone (3+ intersecting),	\perp	 organic content, no HCl reaction, 78.45-79.9' weak to medium strong 	1
-			3	rough, undulating		rock (R2-R3), fine to medium	1
-				82.9' - Fracture, 20 deg and 50 deg, rough,		- grained, voids <1/16" over <10-40%	-
	R7-NQ	65	4	undulating, tight	Ш	of surface, poorly fossiliferous,	
_	5 ft 96%	UO	4	83.4, 83.5, 83.6, 83.65, 83.85' - Fractures,	\vdash	secondary recrystallized infill of	1
-	00,0			<10 deg, undulating, organic staining, smooth		- cavities over 40% of surface, strong	1 1
1 -			>10	to rough, <1/2" organic clay infill, tight, open	╀	HCl reaction No Recovery 79.9-81.0'] -
85				<1/2" 84.4.84.7' Fracture zone, rough, undulating —		— Limestone	l
-45.2			3	84.4-84.7' - Fracture zone, rough, undulating, — gravel-sized fragments <1" diameter		81.0-85.8' - pale yellowish brown,	R7: 5 minutes
1 -	00.0				╨	(10YR 6/2), very fine to medium	1 1
-	86.0		NR	85.7-85.8' - Fractures (3+), rough, undulating,	+	grained, weak to medium strong rock	1
-			6	open <1/2" 86.3, 86.45, 86.55, 86.6' - Fractures, 40 deg		(R2 to R3) except 83.4-83.85', grayish black, (N2), extremely weak]
				and 60 deg, rough, undulating, open <1/2"	\vdash	grayish black, (N2), extremely weak to very weak rock (R0 to R1) with	1
1 -				86.8, 86.85, 87.0, 87.2, 87.4, 87.65' -		interbedded organic fat clay seams	1
-			6	Fractures, <10 deg, rough, undulating, open	匚	and laminations, 81.0-83.4 and	1 -
-	DO NO			<1/2" 97.9 97.05' Eraptures (2) 40 deg and 60	₩	_ 83.85-85.8' voids <1/16" over	-
I -	R8-NQ 5 ft	6	>10	87.8, 87.95' - Fractures (2), 40 deg and 60 deg, rough, undulating, open <1/4"		30-50% of surface, few cavities with	l J
	72%		10	88.25-88.65' - Fracture zone, rough,		secondary recrystallized infill, 2" diameter at 81.9 to 82.0', poorly to]
1 -			2	undulating, gravel-sized fragments, <1"	1—	moderately fossiliferous with molds	1 1
-				diameter		<1/2" diameter, trace organics,] -
90				88.85, 89.1, 89.4' - Fractures, 10 deg and 40	\Box	strong to moderate HCl reaction	I —
-50.2			NR	deg, rough, undulating, open <1/4"	\vdash	No Recovery 85.8-86.0'	R8: 4 minutes
-	91.0				\Box		1
_	31.0						
					1		

APPENDIX 2BB-782

Rev. 7



PROJECT NUMBER:

33884.FL

BORING NUMBER:

E-02

SHEET 6 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724255.5 N, 457486.3 E (NAD83)

ELEVATION: 39.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

CORING	INICITIODA	ND L	ZUIFIV	IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	Casiii	9	ORIENTATION : Vertical
WATER	LEVELS: 1.5	ft bg	s on 5	/18/07 START : 5/18/2007 END : 5/	21/20	07 LOGGER: P. De Sa'rego, R. Bite	ely
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		m	DESCRIPTION	- PO	DOOK TYPE OOLOD	
	N. 4 K		FRACTURES PER FOOT	BEOOK!! HOW	$\overline{\circ}$	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
H H H		(%) Q	L 로	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
		g	ER Z	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ĮΣ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
Оνш	07.5	<u>~</u>	ш а.		S		
			>10	91.0-91.4' - Fracture zone, <10 deg, rough,	Н	Limestone	
-			> 10	undulating, gravel-sized fragments, no stain or infill, <1" diameter		 86.0-89.6' - yellowish gray, (5Y 7/2), very fine to coarse grained, 	<u> </u>
-				91.65' - Fracture, <10 deg, rough, undulating,	ऻ	extremely weak to weak (R0 to R2),	-
-			5	tight	╀	 voids 1/16" over 20% of surface, 	-
l -				92.2' - Fracture, 40 deg, rough, undulating,		poorly fossiliferous	_
	R9-NQ			tight, open <1/4"	<u> </u>	87.8-89.6' - medium gray (N5) to	
1 -	5 ft 90%	59	0	92.6, 92.85, 92.95' - Fractures (3), <10 deg, rough, undulating, silt and/or clay sized	ш	olive gray (5Y 4/1), medium strong to strong rock (R3 to R4), very	<u> </u>
-	3070			infilling, trace of silt infill at 92.6', open <1"	Ш	fine-grained, voids 1/16" over	-
-			2	93.4-93.65' - elastic silt (MH) seam	ш	30-40% of surface, moderately to	-
95				94.55, 95.1' - Fractures (2), horizontal, rough,		highly fossiliferous with many fossil	
-55.2			4	undulating, 80 deg intervals, open <1/2"	ш	molds <1/2" diameter, few cavities <1" diameter, moderate to strong HCI	R9: 7 minutes
	96.0		NR			reaction	
1 -					Ь.	No Recovery 89.6-91.0'	<u> </u>
-			3	96.4, 96.5, 96.95, 97.35, 97.6, 97.7, 98.05,	╁	L Limestone 91.0-93.4' - pale yellowish brown to	-
-				98.2, 98.4, 98.55, 98.65, 98.7, 98.8, 100.4,	厂	yellowish gray, (10YR 6/2 to 5Y 7/2),	-
_			3	100.7, 100.9, 101.05, 101.1, 101.15' - Fractures (19), <10 deg, rough, undulating,	┢	very fine to fine grained, medium	l -
				tight, open <1/4"		strong to strong (R3 to R4), 91-93.4'	
	R10-NQ			3 9 4	\vdash	and 93.65-94.5' voids <1/16" over 30% of surface, 91-92.5',92.65-93.4',	
-	5 ft 100%	52	8	-		93.65-94.5' no voids, few cavities	-
-	100 /0			-	╁	<1/2" diameter, poorly fossiliferous	SC-4 collected at 98.85-
-			0	-	╀	- Elastic Silt (MH)	100.0'
100_				_	ш	93.4-93.65' - olive gray, (5Y 4/1),	
-60.2			6		Н	medium plasticity, strong HCl reaction	R10: 4 minutes
	101.0		"			Limestone	
-				101 0 101 05 101 0 101 05 101 1 101 7	₩	94.5-95.5' - yellowish gray, (5Y 7/2),	<u> </u>
-			>10	101.2, 101.25, 101.3, 101.35, 101.4, 101.7, 101.95, 102.45, 102.5, 102.55, 102.6, 102.65,	口	- strong HCl reaction, extremely weak	-
-				102.7, 102.75, 103.25, 103.35, 103.4, 103.5,	Н	to weak (R0 to R2), voids <1/16" over <20% of surface, moderately	-
-			10	103.65, 103.7, 103.9, 103.95, 104.0, 104.15,		fossiliferous with molds/casts <1/2"	-
l _				104.2, 104.3, 104.35, 104.4, 104.45, 104.5' - Bedding plane (30), <10 deg, undulating,	₽	diameter	_
	R11-NQ		40	smooth to rough, tight, open <1/2"		No Recovery 95.5-96.0' Limestone	
-	5 ft 99%	16	10		Ъ	96.0-101.0' - yellowish gray, (5Y 7/2),	_
-	00,0				Ľ	very fine to fine grained, strong HCl	-
-			>10		╨	reaction, weak to very weak rock (R1	-
105_ -65.2				104.9, 105.0, 105.2, 105.25, 105.3, 105.35,	╁┰	to R2), silt zone from 96.5-96.95', voids <1/16" over <20-30% of	
-05.2			10	105.7, 105.8' - Bedding plane (11), <10 deg,	F	surface, moderately fossiliferous,	R11: 4 minutes
	106.0			undulating	H	with fossil molds/casts <1" diameter,	
1			NR/	106.1, 106.8, 109.1, 109.25, 109.3, 109.55,	Ш	no cavities	l -
-			2	109.7, 109.8, 109.85, 110.3, 110.5, 110.6,	╁	Limestone 101.0-105.95' - yellowish gray, (5Y	
-			\vdash	110.65, 110.85, 110.95' - Bedding plane (15),	广	7/2), very fine to fine grained,	SC-5 collected at 106.85-
-			0	<10 deg, undulating, smooth to rough, tight, open <1/4"	╀	_ extremely weak to weak rock (R0 to	107.9'
1 -					\Box	R2), voids <1/16" over <20% of surface, poorly fossiliferous,	
	R12-NQ		_10	108.1-108.45' - Fracture zone, rough,	-	laminated, strong HCl reaction	
1 -	5 ft 100%	62	>10	undulating, gravel-sized fragments, <2"	Ľ	No Recovery 105.95-106.0'	l -
1 -	.55,0			diameter .	ш	-	l -
I			10		t	-	-
110_ -70.2			<u> </u>	_	\Box	_	D42. 5 minutes
-70.2			10		╨	_	R12: 5 minutes
L_	111.0		L		\Box		
					L		<u> </u>
_	_	_			_		



PROJECT NUMBER:

33884.FL BORING NUMBER:

E-02 SHEET 7 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724255.5 N, 457486.3 E (NAD83)

ELEVATION: 39.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 1.5	ft bgs	s on 5	18/07 START : 5/18/2007 END : 5	5/21/20	07 LOGGER : P. De Sa'rego, R. Bite	ely
≥∩≘	_ @			DISCONTINUITIES	၂ ဖွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - - - 115 -75.2	8 H W R13-NQ 5 ft 79%	<u>«</u>	>10 >10 >10 >10 NR	THICKNESS, SURFACE STAINING, AND TIGHTNESS 111.1-111.2' - Fracture zone, undulating, gravel-sized fragments <1" diameter, smooth to rough 111.65-112.15' - Bedding plane, <10 deg, rough, undulating, tight 112.25, 112.5, 112.65, 112.7, 112.8' - Bedding plane (5), <10 deg, undulating, smooth to rough, tight 112.85-114.2' - Fracture zone, and bedding plane, gravel-sized fragments <1-1/2" diameter 114.8' - Bedding plane, <10 deg, smooth, undulating, open <1/2"		CHARACTERISTICS Limestone 106.0-111.0' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCI reaction, very weak to weak (R1 to R2), voids <1/16" over <20% of surface, moderately fossiliferous with molds <1" diameter, laminated Limestone 111.0-114.95' - yellowish gray, (5Y 7/2), very fine to fine grained, strong HCI reaction, extremely weak to weak (R0 to R2), laminated, voids 1/16" over <10% of surface, no fossils No Recovery 114.95-116.0'	- R13: 4 minutes
- - - - - 120 -80.2	R14-NQ 5 ft 100%	97	1 0 2 0	116.15, 118.5, 118.95, 120.65' - Fractures (4), <10 deg, rough, undulating, tight		Limestone 116.0-121.0' - yellowish gray, (5Y 7/2), very fine to medium grained, very weak to weak rock (R1 to R2), voids <1/16" over <10-15% increasing at 118.5', highly fossiliferous, few cavities <1-1/2" diameter, strong HCl reaction	
- - - - - 125 -85.2	R15-NQ 5 ft 81%	70	2 0 0	121.35, 121.5, 122.5, 122.8, 130.0' - Bedding plane (5), <10 deg, rough, undulating, tight		Limestone 121.0-125.05' - pale yellowish brown to yellowish gray, (10YR 6/2 to 5Y 7/2), very fine to medium grained, very weak to weak rock (R1 to R2), voids <1/16" over <20% of surface, highly fossiliferous at 122.5-124.1', strong HCl reaction	
- - - - - - 130	126.0 R16-NQ 5 ft 97%	93	1 NR 2 1 0 0	126.0-126.1' - Fracture zone, rough, undulating, gravel-sized fragments, tight 126.8' - Fracture, <10 deg, rough, undulating, open <1/2" 127.9, 130.3' - Fractures (2), <10 deg, rough, undulating, tight, open <1/4"		No Recovery 125.05-126.0' Limestone 126.0-131.0' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very fine to medium grained, strong HCl reaction, very weak to weak (R1 to R2), moderately to highly fossiliferous molds <1" diameter, voids <1/16" over 30% of surface, trace laminated bedding	R15: 4 minutes
-90.2	131.0		1			-	R16: 3 minutes

APPENDIX 2BB-784 Rev. 7



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-02	SHEET	8	OF	11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724255.5 N, 457486.3 E (NAD83)

ELEVATION: 39.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

				IENT . Dietrich D-30 3/N 232, mad rotary, NQ tools, HV			ORIENTATION: Vertical
WATER	LEVELS : 1.5	ft bgs	s on 5		21/20		
≥ ∩ ≎	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	CIZE AND DEDTH OF CACING
ᆱ끯은	RUI H, /	(%) _Q	공진	DEDTIL TYPE ODIENTATION DOLLOUNESS	1 월	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
T A A	ZE I	0	Z F	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	I ₩	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SUF	COF	S S	FR/	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
			NR/	424 4 424 4 424 5 424 05 422 2 422 4	+	Limestone	
-			6	131.1, 131.4, 131.5, 131.85, 132.3, 132.4, 132.55, 132.6, 132.75, 132.85, 133.25,	\Box	- 131.0-135.6' - yellowish gray, (5Y	
l _				133.55, 133.75, 133.9, 134.0, 134.3, 134.35,	Н	_ 7/2), very fine to medium grained,	
				134.45, 134.5, 134.7, 134.85, 134.9, 140.15,		strong HCl reaction, extremely weak	
1 7			6	140.45' - Bedding plane (24), 40 deg,	ЪН	 to weak (R0 to R2), voids <1/16" over <20% of surface, poorly to 	1
-	R17-NQ			undulating, smooth to rough, tight, open <1/2"		moderately fossiliferous with fossil	-
-	5 ft	22	5		Ш	 molds, <1" diameter, few cavities 	
-	92%				H	with secondary infill <2" diameter, trace laminated bedding	-
l _			7			trace laminated bedding	
135			'		Н		
-95.2			2	_	Ш		R17: 4 minutes
-	400.0		NR		╂┼┤	No Recovery 135.6-136.0'	-
-	136.0		INK	400 4 400 4 400 0 407 0 407 0 407 0	世	Limestone	-
-			4	136.1, 136.4, 136.6, 137.0, 137.05, 138.5, 139.65, 139.75, 139.8, 139.85, 139.95, 140.2'	H	- 136.0-140.75' - yellowish gray to light	-
_				- Bedding plane (12), <10 deg, rough,		olive gray, (5Y 7/2 to 5Y 5/2), very	
				undulating, tight, open <1/4"		fine to medium grained, strong HCI	
-			2	127.7. 129.25! Erecture (2), 20 deg. rough	╁	 reaction, very weak to weak (R1 to R2), 140.0-140.75' medium strong to 	1
-	R18-NQ			137.7, 138.25' - Fracture (2), 30 deg, rough, undulating, tight, open <1/4"	Ш	strong rock (R3 to R4), voids <1/16"	1
-	5 ft	60	2	arradiating, agint, open in t	╂┼┤	 over <10% of surface, poorly to 	-
-	95%					moderately fossiliferous, laminated	_
			5		Н	bedding 136.1-136.6', trace - secondary infill, 140.2-140.75'	
140			J			cavities over 30% of surface (50% of	
-100.2			1	_	1	which have secondary recrystallized	R18: 5 minutes
-	444.0				ш	infill) <1-1/2" diameter	-
-	141.0		NR		╁┼	No Recovery 140.75-141.0'	-
-			0		\blacksquare	Limestone 141.0-145.75' - yellowish gray to light	-
I _						_ olive gray, (5Y 7/2 to 5Y 5/2), very	_
					\vdash	fine to medium grained, strong HCI	
			2	142.65, 142.95, 143.3, 143.5, 143.9, 145.45' -	Ш	reaction, medium strong to strong	1
-	R19-NQ			Fractures (6), <10 deg, rough, undulating,	╁┼	_ (R3 to R4), very weak rock (R1) 145.55-145.75', voids <1/16" over	1
-	5 ft	70	3	open <1/4" to 1/2"	口	<20-40% of surface, many cavities	-
-	95%				╂┼┤	_ <1" diameter, highly fossiliferous,	-
			10	144.15-144.25' - Fracture zone, rough,	Ш	trace laminated bedding, <30% cavities with secondary recrystallized]
145				undulating, gravel-sized fragments <1/2" diameter —	┟┼┤	infill	
-105.2			2				R19: 6 minutes
	146.0			145.55' - Fracture, <10 deg, rough,	14]
-	1+0.0		NR	undulating, open <1"	丗	No Recovery 145.75-146.0' Limestone	-
-			2	146.1, 146.2, 147.35, 149.25' - Bedding plane	+	146.0-150.4' - yellowish gray, (5Y	-
_				(4), <10 deg, rough, undulating, tight, open		_ 7/2), fine to medium grained, strong	_
			1	·	Щ	HCl reaction, weak (R2), moderately	SC 7 collected at 147.25
			'		H	fossiliferous with molds <1/2" diameter, sandy silt (ML) lenses	SC-7 collected at 147.35- 148.55'
-	R20-NQ					146.0-146.1' and 1/2" at 150.25'	-
-	5 ft	80	0		╂┴┤	_	-
-	88%				口	_	-
			1		H	_	_
150			Ľ.				
-110.2			>10		Щ		R20: 5 minutes
	151.0		NR		Ш	No Recovery 150.4-151.0'	1
-	131.0				+		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-02

SHEET 9 OF 11

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724255.5 N, 457486.3 E (NAD83)

ELEVATION: 39.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

WATER	LEVELS : 1.5	ft bgs	s on 5	/18/07 START: 5/18/2007 END: 5/2	21/20	07 LOGGER : P. De Sa'rego, R. Bite	ely
≥ ∩ ⊋	. (%			DISCONTINUITIES	၂ ပွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - 155 -115.2	R21-NQ 5 ft 86%		1 1 5 >10 NR	150.25-150.35' - Fracture zone, rough, undulating, gravel-sized fragments <1" diameter 151.3, 152.4, 153.2, 153.3, 153.35, 153.85' - Bedding plane (7), <10 deg, undulating, rough to smooth, tight, open to <1/4" 154.0-155.3' - Bedding plane, rough, undulating, intersecting vertical fractures, tight, open <1/2"		Limestone 151.0-155.3' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), very fine to medium grained, very weak to medium strong (R1 to R3), rock strength weakening with depth, 151.0-153.5' voids <1/16" over <10% of surface, few cavities with secondary recrystallized infill, poorly to moderately fossiliferous with fossil molds <1/2" diameter, very fine to fine grained, 153.5-154.0' laminated with organics, recrystallized fine to medium grained	- - - - - - R21: 7 minutes
- - - - - - 160	R22-NQ 5 ft 100%	70	1 2 9	156.1, 157.75, 158.0, 158.05, 158.1, 158.15, 158.2, 158.6, 158.7, 158.75, 158.95, 159.05, 159.2, 159.35, 159.7, 159.8' - Bedding plane (16), <10 deg, undulating, rough to smooth, tight, open <1/4"		texture, 154.0-155.3' fine to medium grained, <10% voids, no cavities, very weak rock (R1), 151.0-153.0' mild HCl reaction, 153.5-155.3' strong HCl reaction No Recovery 155.3-156.0' Limestone 156.0-161.0' - very pale brown to yellowish gray, (10YR 6/2 to 5Y 7/2), fine to medium grained, extremely weak to weak rock (R0 to R2) weakening with depth, 156.0-158.0' fine to medium-grained, voids <1/16"	- - - - - -
-120.2 - - - - -	161.0 R23-NQ		2 >10 >10	160.6' - Fractures (2), 20 deg and 50 deg, rough, undulating, intersecting, open <1/4" 161.0-164.7' - Bedding plane, <10 to 90 deg, undulating, intersecting vertical fractures, rough to smooth		over <10% of surface, poorly to moderately fossiliferous, molds <1/2" diameter, trace secondary infill of very fine-grained material, 158.0-161.0' fine grained, trace voids, poorly to moderately fossiliferous with fossil molds <1/4" diameter, trace secondary infill, strong HCI reaction Limestone	R22: 5 minutes
- 165 -125.2 -	5 ft 98%	0	>10 >10 10	164.95, 165.2, 165.55, 165.7, 165.75, 165.35, 165.9' - Bedding plane (7), undulating, rough to smooth, tight, open <1/4"		161.0-165.9' - yellowish gray to yellowish gray, (5Y 7/2 to 5Y 8/1), fine to medium grained, extremely weak to weak (R0 to R2), trace voids, no cavities, trace laminate at 165.4-165.5', poorly fossiliferous with fossil molds <1/2" diameter, strong HCI reaction, hardness strengthens with depth, trace medium strong	SC-8 collected at 163.15- 164.05' - R23: 5 minutes -
 170 -130.2	R24-NQ 5 ft 89%	53	>10 >10 1 >10 5 NR	166.6, 166.65, 167.3, 167.35, 167.5, 168.15, 169.05, 169.2, 170.05, 170.15, 170.5, 170.35,		will depin; trace medium strong lenses <1/2" thick No Recovery 165.9-166.0' -	- - - - - - - - - - - - - - -
	171.0		INK		Ħ		

Rev. 7



PROJECT NUMBER:

33884.FL BORING NUMBER:

E-02 SHEET 10 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724255.5 N, 457486.3 E (NAD83)

ELEVATION: 39.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

			<u> </u>	IENT . DIELIICH D-30 3/N 232, Mud Tolary, NQ 10018, HW	000	.9		ORIENTATION : Vertical
WATER	LEVELS: 1.5	ft bgs	s on 5	/18/07 START : 5/18/2007 END : 5/	21/20	07	LOGGER : P. De Sa'rego, R. Bite	ly
	_			DISCONTINUITIES	(D	1	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	г	DOCK TYPE COLOR	
H H H	N. A. Y.		FRACTURES PER FOOT	DECOMM NOW	으	ı	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
A H E		(%) Q	ΪŽ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ	ı	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
F F F F	N.S. S.	g	SAC ER I	PLANARITY, INFILLING MATERIAL AND	Ĭ₩	ı	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
E S E		ď	FH	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	ı	CHARACTERISTICS	Briol of Teol Meddero, Ero.
				474 0 474 01 - 10 1		Т	Limestone	
-			0	171.2-171.3' - silt lens	╁	╂	166.0-170.45' - dark yellowish brown	-
I -					╀	╁	to pale yellowish brown, (10YR 4/2 to	-
				172.1, 172.35, 172.6, 173.15, 173.35, 173.4,	П	1	10YR 6/2), very fine to fine grained,	
-			4	173.6, 174.1' - Bedding plane (8), <10 deg,	1	1	grains becoming more coarse with	1
-	R25-NQ			rough, undulating, tight, open <1/2"	╀	╂	depth 166.0-169.4' very fine to fine-grained,	-
I _	5 ft	47	10	172.75, 174.5' - Fractures (2), 50 deg and 40	┢	L	becoming more coarse with depth,	
	86%	47	10	deg, rough, undulating, tight, open <1/4" 173.6-173.65, 173.8-173.85, 174.0-174.1' -		1	weak to strong rock (R2 to R4)	
-				silt/sand silt (ML) lenses	╨	╁	interbedded, <1/2" thick silt/sand	1
-			10	Silvadia Silt (IVIL) letises	╀	╁	(carbonate) at 166.65', <10% voids,	-
175				_		L	few cavities/recrystallized cavities	
-135.2			$\left[\circ \right]$		П	Τ	<1" diameter, gradational contact to	R25: 11 minutes
-			NR		╀	╂	extremely weak rock (R0) at	1
l -	176.0				╀	╊	169.3-169.4' laminated, 169.3-169.7' extremely weak rock	-
			40	176.2, 176.25, 176.4, 176.9, 176.98, 177.1,		1	(R0) to poorly competent silts/sand	
			10	177.3, 178.55, 178.9, 179.25, 179.4, 179.5,	1_	1	(carbonate), laminated, friable,	1
-				179.6, 179.8' - Bedding plane, <10 deg,	₩	╂	169.7-170.45' very fine to	1
I -			10	rough, undulating, tight, open <1/2"	╁┼	1	fine-grained, medium strong to stong	
				176.7-176.8', 177.6-177.9' - silt seams		1	rock (R3 to R4), trace voids, no	
-	R26-NQ			·	╙	╀	cavities, trace fossils, moderate HCl	1
-	5 ft	16	10	178.25-178.35, 179.6-179.7' - Fracture zone	╁╌	╊	reaction	-
I _	84%			(2), rough, undulating, gravel-sized fragments <1" diameter		1	No Recovery 170.45-171.0' Limestone	
					ш	1	171.0-175.3' - pale yellowish brown,	
180			>10	179.35' - Fractures (2+), vertical, smooth,	Н	╁	(10YR 6/2), very fine to fine grained,	1
-140.2			0	undulating, vertical, tight 179.95' - Fractures (2+), <10 deg and 40 deg,	╀╧	┺	171.0-173.6' weak to strong rock (R2	R26:9 minutes
140.2				rough, undulating, intersecting, open <1/2"	\perp	Į.	to R4), 1" silt (ML) lens at	1/20.9 minutes
	181.0		NR	rough, unduluting, intorocoung, opon 1/12	Н	1	171.2-171.3' - voids <1/16' over	
-					1-	t	<20% of surface, variable, poorly	SC-9 collected at 181.0-
-			2		仜	1	fossiliferous, moderate odor, laminated organics in silt lens,	181.8' -
I _				181.8, 181.95, 182.1, 182.25, 182.5, 182.8,	╀	╁	moderate HCl reaction, 173.6-174.1'	_
				182.9, 183.1, 183.25, 183.4, 183.8, 184.0,	Н	1	- interbedded silt (ML) lenses,	
-			>10	184.3, 184.4, 184.45' - Bedding plane (15),	ш	T	extremely weak rock (R0), strong	1
-	R27-NQ			<10 deg, rough, undulating, tight, <1/2"	╁	╂	odor, strong HCl reaction,	1
I _	5 ft	16	>10	182.05, 182.2, 182.4, 182.7, 182.85' -	╀	╁	174.1-175.35' - medium strong to	_
	84%			Fractures (5), rough, undulating, open <1/2"		1	strong rock (R3 to R4), <10% voids	
I -				184.1-185.0' - Fracture zone, rough,	1—	1	<1/16", few cavities with secondary recrystallized infill <1" diameter,	1
-			>10	undulating, gravel-sized fragments <1"	╀┴	╂	moderate odor, moderate to strong	-
185				diameter	仜	┺	- HCI reaction	l
-145.2			_1_	185.05' - Fractures, 40 deg, rough,		1	No Recovery 175.3-176.0'	R27: 8 minutes
]	186.0		NR	undulating, open <1/4"	╨	Ł	Limestone	1
-	186.0				+-	ħ	176.0-180.2' - light olive gray, (5Y	
-					4		5/2), very fine to fine grained,	
					1		medium strong to strong except soil seams (R4 to R5), voids <1/16" over	
					1		0-15% of surface, variable, poorly	1
-					1	\mathbb{H}	fossiliferous, few cavities <1/2"	-
-					1	H	diameter, moderate to strong HCl	
					1		reaction, moderate odor,	
]					1		176.7-176.8', 177.6-177.9' - sandy	1
-					1	\mathbb{H}	silt (ML), extremely weak rock (R0)	-
_					1	μl	interbedded, laminated with organics, strong odor, moderate HCl reaction]
					1		No Recovery 180.2-181.0'	
				_	1	П		
-					1	H		-
					1	L		
					1	1		
					\bot	L		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-02	SHEET	11	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724255.5 N, 457486.3 E (NAD83)

ELEVATION: 39.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER LEVELS 1.5 ft bigs on drildo? DISCORPTION DISCO					HENT . Dietrich D-50 S/N 232, Mud rotary, N	19 10010, 1111	Jaoni	9		ORIENTATION: Vertical
DESCRIPTION Part P	WATER	LEVELS: 1.5	ft bgs	on 5/	/18/07 START : 5/18/2007	END : 5/2	1/20	07	LOGGER : P. De Sa'rego, R. Bit	ely
Limestone - 181.0-185.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very fine to medium grained, grains becoming more coarse with depth, weak to strong rock (R2 to R4), voids <1/16" over 0-30%, poorly - tossiliferous 181.0-183.5', 183.5-185.2' - moderately to highly fossiliferous with molds <1/2" - diameter, 182.95-183.4' - laminated, few cavities with secondary recrystallized infill, 183.0-185.2', mild to moderate HCI reaction increasing with depth No Recovery 185.2-186.0' - Bottom of Boring at 186.0 ft bgs on		_			DISCONTINUITIES		(D	1	LITHOLOGY	COMMENTS
Limestone - 181.0-185.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very fine to medium grained, grains becoming more coarse with depth, weak to strong rock (R2 to R4), voids <1/16" over 0-30%, poorly - tossiliferous 181.0-183.5', 183.5-185.2' - moderately to highly fossiliferous with molds <1/2" - diameter, 182.95-183.4' - laminated, few cavities with secondary recrystallized infill, 183.0-185.2', mild to moderate HCI reaction increasing with depth No Recovery 185.2-186.0' - Bottom of Boring at 186.0 ft bgs on	SQ E	9%		S	DESCRIPTION		ŏ	Г	DOCK TYPE OOLOD	
Limestone - 181.0-185.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very fine to medium grained, grains becoming more coarse with depth, weak to strong rock (R2 to R4), voids <1/16" over 0-30%, poorly - fossiliferous 181.0-183.5', 183.5-185.2' - moderately to highly fossiliferous with molds <1/2" - diameter, 182.95-183.4' - laminated, few cavities with secondary recrystallized infill, 183.0-185.2', mild to moderate HCI reaction increasing with depth No Recovery 185.2-186.0' - Bottom of Boring at 186.0 ft bgs on	SEL ON	N. A.Y.		黑는	DESCRIPTION		<u></u>	l		
Limestone - 181.0-185.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very fine to medium grained, grains becoming more coarse with depth, weak to strong rock (R2 to R4), voids <1/16" over 0-30%, poorly - fossiliferous 181.0-183.5', 183.5-185.2' - moderately to highly fossiliferous with molds <1/2" - diameter, 182.95-183.4' - laminated, few cavities with secondary recrystallized infill, 183.0-185.2', mild to moderate HCI reaction increasing with depth No Recovery 185.2-186.0' - Bottom of Boring at 186.0 ft bgs on	AHE	E E	%)	ΪŠΕ	DEPTH, TYPE, ORIENTATION, ROUG	HNESS,	30L	l	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
Limestone - 181.0-185.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very fine to medium grained, grains becoming more coarse with depth, weak to strong rock (R2 to R4), voids <1/16" over 0-30%, poorly - fossiliferous 181.0-183.5', 183.5-185.2' - moderately to highly fossiliferous with molds <1/2" - diameter, 182.95-183.4' - laminated, few cavities with secondary recrystallized infill, 183.0-185.2', mild to moderate HCI reaction increasing with depth No Recovery 185.2-186.0' - Bottom of Boring at 186.0 ft bgs on	무류	SING	٥٦	ZAC ER I	PLANARITY, INFILLING MATERIAL	AND	ME	l		DROPS, TEST RESULTS, ETC.
- 181.0-185.2' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very fine to medium grained, grains becoming more coarse with depth, weak to strong rock (R2 to R4), voids <1/16" over 0-30%, poorly fossiliferous 181.0-183.5', 183.5-185.2' - moderately to highly fossiliferous with molds <1/2" diameter, 182.95-183.4' - laminated, few cavities with secondary recrystallized infill, 183.0-185.2', mild to moderate HCI reaction increasing with depth No Recovery 185.2-186.0' Bottom of Boring at 186.0 ft bgs on		225	22	E E	THICKNESS, SURFACE STAINING, AND	IIGHTNESS	S	l	CHARACTERISTICS	
olive gray, (5Y 7/2 to 5Y 5/2), very fine to medium grained, grains becoming more coarse with depth, weak to strong rock (R2 to R4), voids <1/16" over 0-30%, poorly fossiliferous 181.0-183.5', 183.5-185.2' - moderately to highly fossiliferous with molds <1/2" diameter, 182.95-183.4' - laminated, few cavities with secondary recrystallized infill, 183.0-185.2', mild to moderate HCI reaction increasing with depth No Recovery 185.2-186.0' Bottom of Boring at 186.0 ft bgs on										
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becoming more coarse with depth, weak to strong rock (R2 to R4), voids <1/16" over 0-30%, poorly fossiliferous 181.0-183.5', 183.5-185.2' - moderately to highly fossiliferous with molds <1/2" diameter, 182.95-183.4' - laminated, few cavities with secondary recrystallized infill, 183.0-185.2', mild to moderate HCI reaction increasing with depth No Recovery 185.2-186.0' Bottom of Boring at 186.0 ft bgs on	1 -					-		H	olive gray, (5Y 7/2 to 5Y 5/2), very	-
weak to strong rock (R2 to R4), voids <- 1/16" over 0-30%, poorly fossiliferous 181.0-183.5', 183.5-185.2' - moderately to highly fossiliferous with molds <1/2" diameter, 182.95-183.4' - laminated, few cavities with secondary recrystallized infill, 183.0-185.2', mild to moderate HCI reaction increasing with depth No Recovery 185.2-186.0' Bottom of Boring at 186.0 ft bgs on						_		LI		_
 <									weak to strong rock (R2 to R4), voids	
- 183.5-185.2' - moderately to highly fossiliferous with molds <1/2" - diameter, 182.95-183.4' - laminated, few cavities with secondary recrystallized infill, 183.0-185.2', mild - to moderate HCl reaction increasing with depth - No Recovery 185.2-186.0' - Bottom of Boring at 186.0 ft bgs on	1 7					_			<1/16" over 0-30%, poorly	1
fossiliferous with molds <1/2" diameter, 182.95-183.4' - laminated, few cavities with secondary recrystallized infill, 183.0-185.2', mild to moderate HCl reaction increasing with depth No Recovery 185.2-186.0' Bottom of Boring at 186.0 ft bgs on	-					-		⊦∣	fossiliferous 181.0-183.5',	-
diameter, 182.95-183.4' - laminated, few cavities with secondary recrystallized infill, 183.0-185.2', mild to moderate HCI reaction increasing with depth No Recovery 185.2-186.0' Bottom of Boring at 186.0 ft bgs on	-					_		L	183.5-185.2' - moderately to highly	_
few cavities with secondary recrystallized infill, 183.0-185.2', mild to moderate HCI reaction increasing with depth No Recovery 185.2-186.0' Bottom of Boring at 186.0 ft bgs on -								L		
recrystallized infill, 183.0-185.2', mild to moderate HCl reaction increasing with depth No Recovery 185.2-186.0' Bottom of Boring at 186.0 ft bgs on								Γ	few cavities with secondary	
with depth No Recovery 185.2-186.0' Bottom of Boring at 186.0 ft bgs on	-							厂	recrystallized infill, 183.0-185.2', mild	
No Recovery 185.2-186.0' - Bottom of Boring at 186.0 ft bgs on	-					-		F		-
- Bottom of Boring at 186.0 ft bgs on						_		L		
	1 1					_		Γ]
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	F-03	SHEET	1	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724208.2 N, 457932.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

						ary, cathead, AWJ rods, 3-7			ORIENTATION: Vertical		
WATER	LEVELS	: 2.9 ft b	gs on 5/0	7/07	START : 5/7/2007	END : 5/8/2007	LOGG	<u>ER : I</u>	N. Jarzyniecki		
≥ ∩ ∵:				STANDARD PENETRATION	SOIL DESCRIPTION			۷ ا	COMMENTS		
ANI (#	SAMPLE	INTERVA	AL (ft)	TEST RESULTS	SOIL NAMI	COLOR	= = = = = = = = = = = = = = = = = = = =	DEPTH OF CASING, DRILLING RATE,			
ASE TIC		RECOVE	ERY (ft)		MOISTURE	E, USCS GROUP SYMBOL CONTENT, RELATIVE DE	NSITY OR	2	DRILLING FLUID LOSS, TESTS, AND		
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	CONSISTEN	CY, SOIL STRUCTURE, MI	NERALOGY		INSTRUMENTATION		
<u> </u>	0.0			(N)	│ Topsoil			/ i)		
	0.0			1-2-3	0.0-0.1		/	/ - :	-		
_		1.0	SS-1	(5)	Silty Sand (SM	1)		4			
_	1.5				0.1-1.0' - dusky	y yellowish brown to dark 2/2, 10YR 4/2), moist, loo	yellowish se fine	/ 📗	Begin E-03 at 11:27 05/07/2007; HW surface casing used in boring		
_						% non plastic fines, silica			_		
_								1			
								J			
								1			
								1			
5	5.0							1	1		
37.0	0.0				Clayey Sand (S						
-		0.5	SS-2	1-2-2	5.0-5.5' - green	nish gray, (5G 6/1), moist, limestone fragments bet	very loose,	ſĽ	-		
-	6.5			(4)		ICI reaction, no HCI react		/ 🕇			
-	0.5				\			1	-		
-								+	-		
-								+	-		
-								+	-		
-								4	-		
-								+	-		
_								4	_		
10	10.0				Cilt Mitte Come	/B#1 \		4	_		
32.0				5-18-30	Silt With Sand 10.0-10.95' - pa	· (ML) ale yellowish orange, (10\	/R 8/6).	Ш	_		
_		1.0	SS-3	(48)	moist, hard, no	nplastic, rapid dilatancy, i	mild HCl	\prod	<u>_</u>		
_	11.5				reaction, 20% v	very fine to medium sand,	carbonate	/]	_		
					materiale		/	1	_		
								J			
								1			
								1	1		
_								1	1		
15	15.0							1	1		
27.0	15.3	0.1	SS-4	50/3		gments		\forall	=		
_				(50/3")	15.0-15.1' - gra	ayish orange, (10YR 7/4), reaction, fragments to 1/2	mild to	/ 🕇	-		
_					(moderate noi)	reaction, tragments to 1/2	/	+	-		
-								+	-		
-								+	-		
-								+	-		
-								+	-		
-								4	-		
_								4	-		
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20								\perp			



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-03	SHEET	2	OF	10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724208.2 N, 457932.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

WATER	LEVELS	: 2.9 ft bo	gs on 5/07	7/07	START : 5/7/2007 END : 5/8/2007 LOGGE	R : I	N. Jarzyniecki
				STANDARD	SOIL DESCRIPTION	,	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME LISCS GROUP SYMPOL COLOR		DEDTILOF CACING DESILORGE
ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	2	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
EPTI URF.			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		INSTRUMENTATION
22.0	20.0	0.0	SS-5	50/3	No Recovery 20.0-20.3'	Ť	
-				(50/3")		1	1
- - - - 25_ 17.0	25.0 25.5	0.4	SS-6	50/5.5 (50/5.5")	Sandy Silt (ML) 25.0-25.4' - pale yellowish orange, (10YR 8/6), wet, hard, low plasticity, rapid dilatancy, mild HCl reaction, 49% fine to medium grained sand	- - - - - - - - - - - - - - - - - - -	
- 30_ 12.0 - - -	30.0	0.3	SS-7	50/5.5 (50/5.5")	Sandy Silt (ML) 30.0-30.25' - Same as 25.0-25.4'	- - - - - -	- - - - - - - - -
35_ 7.0 - - - - - - - - - 40	35.0 35.8	0.2	SS-8	26-50/3 (76/9")	Limestone Fragments 35.0-35.15' - moderate yellowish brown, (10YR 5/4), mild HCl reaction, sand with limestone fragments	- - - - - - - - -	- - - - - - - - - - - - -



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-03	SHEET	3	OF	10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724208.2 N, 457932.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

						END 5/2/222			ONIENTATION : Vertical		
WATER	LEVELS	: 2.9 ft bo	gs on 5/0	//0/	START : 5/7/2007	END : 5/8/2007	LOGGEF	(: N.	Jarzyniecki		
30=				STANDARD PENETRATION	SOIL DESCRIPTION			ဗ္ဂ	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)			TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,			
A S E L		RECOVERY (ft)				E CONTENT, RELATIVE DEN		Ω	DRILLING FLUID LOSS, TESTS, AND		
PTT JRF,			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY				INSTRUMENTATION		
ESE ESE			00 -	(N)	0 1 000 000			Ś			
2.0	40.4	0.4	SS-9	50/5 (50/5")	Sandy Silt (M	L) oderate olive brown, (5Y 4/4	L) wet hard /=	Ш			
				((30/3))	\ low plasticity, i	rapid dilatancy, mild HCl rea	action, 49% /				
					fine to coarse	grained sand, carbonate ma	aterial				
							_		_		
-							-	1	-		
-							-	1	-		
-							-		-		
-							-		-		
_							_		_		
_							_				
45	45.0							<u> </u>			
-3.0		0.6	SS-10	42-50/3	Sandy Silt (M		100/ fine	$\ \ $			
]	45.8			(92/9")		ame as 40.0-40.4' except 5- mestone fragments	10% tine /=	1]		
-					914701 01200 111		/ -	1	-		
-							-	1	-		
-							-		-		
-							-		-		
_							-		_		
_							_		_		
_							_		_		
							_				
50	50.0										
-8.0	50.3	0.0	SS-11	50/3	No Recovery	50.0-50.3'			Driller's Remark: Drill chatter		
-				(50/3")			_	1	_		
-							_		-		
-							-		-		
-							-		-		
-							_		_		
-							-		_		
-							_		_		
_							_				
55	55.0						_		1		
-13.0	55.3	0.0	SS-13	50/2	Limestone Fra	agments	,,, <u>,,,,,,</u> [Г			
-				(50/2")	\55.0-55.05' - n	moderate olive brown, (5Y 4) ments to 1/4"	/4), mild HCl / −	1			
-					poaction, nagn			1	-		
-							-		-		
-							-		-		
-							-		_		
-	60.0 60.1	0.1	00.10	FC/0	Na Decesion	CO O CO 4!			_		
_	υυ. I	0.1	SS-12	50/3 (50/3")	No Recovery	60.0-60.1' stone fragment	/_		_		
_				(==,0)	(======================================		/		<u> </u>		
									Water level at 2.9' below ground surface at 17:31		
60							_		- 17.51		
					Begin Rock C	oring at 60.0 ft bgs sheet for the rock core log					
					See the next s	sheet for the rock core log					



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-03 SHEET 4 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724208.2 N, 457932.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS : 2.9	ft bgs	s on 5	/07/07 START : 5/7/2007 END : 5/8	3/200	7 LOGGER : N. Jarzyniecki				
≥0 00	(9)			DISCONTINUITIES	Ğ	LITHOLOGY	COMMENTS			
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	D (%)	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,			
H BE ATIC	TH.		TUR -00-	DEPTH, TYPE, ORIENTATION, ROUGHNESS,		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND			
FRA	ORE ECC	ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ΥME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.			
-18.0		ď	Η Ф	THIORNEGO, GON AGE GTAINING, AND TIGHTNEGO	S	Limestone				
-10.0	60.0 R1-NQ 1 ft	100	1	60.45' - Bedding plane, 15 deg, rough,		- 60.0-60.7' - light olive gray, mottled	Begin rock coring at 07:47 05/08/2007; water level at			
-	61.0 100%			undulating -	Н	moderate olive brown, (5Y 5/2,	3.9' below ground surface _			
_			1	61.2, 63.95' - Mechanical break	\square	mottled 5Y 4/4), very fine to fine grained, weak to medium strong (R2	R1: 2 minutes			
-				61.7, 62.2' - Fracture, 75 deg, rough,	Ш	to R3), poorly fossiliferous, voids	_			
l -			2	undulating -	Н	<1/16", 15-25% coverage 60.7-61.0' - Same as 60.0-60.7'	_			
l _				62.8' - Bedding plane, <5 deg, rough,	H	except highly fossiliferous with casts	_			
l _	R2-NQ 5 ft	25	3	undulating		and molds up to 1/2" 61.0-65.3' - light olive gray and				
l _	86%	25	3	63.0' - Bedding plane, 35 deg, rough, undulating, open up to 1/4"	Н	moderate olive brown, (5Y 5/2, 5Y				
			3	63.15' - Bedding plane, <5 deg, smooth,	Н	4/4), fine to medium grained,moderate to strong HCl reaction,				
65			J	planar 63.25' - Bedding plane, <5 deg, rough, —	Щ	weak to medium strong (R2 to R3),	1			
-23.0			0	undulating	\Box	voids <1/16" with 10% coverage on surface, extremely weak (R0) rock at	R2: 3 minutes			
-	66.0		NR	64.25' - Bedding plane, <5 deg, rough, undulating, open up to 1/4"	\Box	61.2' and 63.95', medium strong (R3)	1			
-				64.65' - Bedding plane, <5 deg, rough,	H	at 61.8' No Recovery 65.3-66.0	SC-1 collected at 66.0-			
-			1	undulating, open up to 1/4" 64.8' - Fracture, 80 deg, rough, undulating,	Ш	Limestone	66.9'			
_				open	╙	66.0-67.8' - light olive gray, (5Y 5/2), very fine to fine grained, moderate	1			
-			>10	66.9' - Bedding plane, <5 deg, rough, undulating, open up to 1/4"	Ш	HCl reaction, medium strong to	1			
-	R3-NQ			67.3-67.5' - Fracture zone, up to 1-1/2"	\Box	strong (R3 to R4), voids <1/16" with	1			
-	5 ft 84%	34	>10	fragments, intersecting fractures	Н	_ 15% coverage of surface 67.8-69.2' - grayish yellow to dusky	1			
-	0470			67.95' - Bedding plane, 30 deg, rough, undulating, open up to 1/2"	Ħ	yellow, (5Y 8/4, 5Y 6/4), medium	1			
70 -			3	68.5' - Bedding plane, <5 deg, smooth to		grained, mild HCl reaction, medium strong (R3), porous voids <1/16" with	1			
70 -28.0			1	rough, undulating, open up to 1/4" 68.6' - Bedding plane, <5 deg, smooth to	╫	45 to 55% coverage, trace 1/4"	R3: 5 minutes			
-			NR	rough, undulating	囯	cavities, moderately fossiliferous (casts/molds)	-			
-	71.0			68.85-69.15' - Fracture zone, fragments to 2", intersecting fractures	団	- 69.2-70.2' - Śame as 66.0-67.8'	-			
-			3	69.35, 69.7, 69.95' - Fracture, vertical, rough, -	Н	except extremely weak to medium strong (R0 to R3)	-			
-				undulating 70.1' - Bedding plane, <5 deg, smooth to	\Box	- No Recovery 70.2-71.0'	-			
-			5	rough, undulating, open up to 1/4" -	Ħ	Limestone 70.2-71.8' - Same as 66.0-67.8'	-			
-	R4-NQ			71.1 - Fracture, 60 deg, rough, stepped to undulating, open up to 1/8"	Ш	 except trace organics 	-			
-	5 ft	7	>10	71.3, 71.6' - Bedding plane, 25 deg, rough, -	Н	71.8-72.15' - dusky yellow, (5Y 8/4), fine to medium grained, moderate to	-			
-	80%		>10	\square	$\vdash\vdash\vdash$	<u> </u>	undulating, open to 1/8", 1/2" at 71.6' 72.1, 72.35, 72.7' - Bedding plane, <5 deg,	囯	 strong HCl reaction, extremely weak 	-
-				rough to smooth, planar, along abrupt -	団	to weak (R0 to R2), poorly to moderately competent, trace voids	-			
75 -33.0				lithology change, open up to 1/8" at 72.1', no gap at 72.7	Н	— <1/16" on surface	R4: 10 minutes			
-			NR	72.15-72.4' - Fracture zone, 70-80 deg, -	F	72.15-74.15' - Same as 66.0-67.8' 74.15-75.0' - Same as 67.8-69.2'	-			
-	76.0			multiple hairline fractures, branch-like appearance	H	No Recovery 75.0-76.0'	-			
-			2	72.8' - Bedding plane, 60 deg, rough to	世	Limestone 76.0-80.0' - dusky yellow and	-			
-				smooth, undulating 73.1-73.3' - Fracture zone, fragments to 2",	Н	yellowish gray, (5Y 6/4 and 5Y 7/2),	-			
-			1	intersecting fractures	П	mild to moderate HCl reaction, medium strong (R3), voids <1/16"	-			
-	D=			73.5' - Bedding plane, 60 deg, rough to smooth, undulating	\blacksquare	covering 45-55% of surface, trace	-			
-	R5-NQ 5 ft	53	1	73.7-74.2, 74.35, 74.6' - Fracture zone,	H	cavities to 1/4", moderately fossiliferous (casts and molds), trace	_			
-	80%			fragments to 2", intersecting fractures, open up to 1/4" at 74.35' and 74.6'	H	organics]			
-			5	- ap to 174 at 74.00 and 74.0	H	 -				
80					\vdash					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-03	SHEET	5	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724208.2 N, 457932.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

	LEVELS: 2.9	ft bgs	on 5/	/07/07 START : 5/7/2007 END : 5/8	3/2007	7 LOGGER : N. Jarzyniecki	
				DISCONTINUITIES	O	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEDTH OF CASING
불하는	P.H.A.	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	딩	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
FREVE	NG CO	οD	AC ER F	PLANARITÝ, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	8.58	ď	H H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	, , ,
-38.0			NR	74.8-74.9' - Bedding plane, 60 deg, rough to smooth, undulating, intersects high angle	Н	No Recovery 80.0-81.0'	R5: 3 minutes
	81.0		1411	fracture, fragments to 2", predominantly 1/4"	Ш]
			2	76.4, 76.6' - Bedding plane, 20 deg, open up to 1/2" at 76.4'; up to 1/8" gap at 76.6'	ш	Limestone - 81.0-85.7' - Same as 76.0-80.0'	
			_	77.1' - Bedding plane, 30 deg, open up to	\vdash	except yellowish gray to dusky	1
1 7			_	1/2" 78.6' - Bedding plane, 20 deg, tight	H	yellow, (5Y 7/2 to 5Y 6/4), trace - cavities to 1"	1
			1	79.1, 79.3' - Bedding plane, 20 deg, tight	Ш	- cavilles to 1	1
1 7	R6-NQ		. 40	to 1/2" at 79.1'	Н		1
	5 ft 94%	63	>10	79.6, 79.7' - Bedding plane, 20 deg, open up - to 1/2"	Ш	_	1 1
				79.9' - Fracture, 85 deg, rough, undulating	ш	_	1 1
85			>10	81.2' - Bedding plane or mechanical break, - 40 deg, rough, undulating	Н	_	SC 2 collected at 94.7
-43.0			0	81.9' - Bedding plane or mechanical break,			SC-2 collected at 84.7- 85.7'
	00.0			<5 deg, rough to smooth, undulating to planar - 82.8' - Fracture, 75 deg, rough, undulating		- N. B. 05 7 00 01	R6: 3 minutes
+	86.0		NR	83.8-84.1' - Fracture zone, fragments to 1"	Н	No Recovery 85.7-86.0' Limestone	1
-			>10	84.75' - Fracture, 75 deg, rough, undulating, - open up to 1/4"	囯	- 86.0-88.1' - very light gray, (N8), very	1
-				86.4' - Bedding plane, <5 deg, smooth to	団	fine to fine grained, mild HCl reaction, medium strong (R3), voids	1 -
-			>10	rough, planar, open to <1/8" gap, organic	HH	- <1/16" with <2% coverage on	1 -
-	R7-NQ			stain 86.6, 87.5, 88.5, 88.6' - Mechanical break ⁻		_ surface	1 -
-	5 ft	58	1	86.9-87.2' - Fracture zone, fragments to 3		88.1-90.9' - dusky yellow, (5Y 6/4, N8), fine grained, mild to moderate	1 -
-	98%			1/2" 88.4' - Fracture, 80 deg, rough, undulating,	Н	 HCl reaction, medium strong (R3), 	-
-			1	open 1/8"	Ш	mottled very light gray (N8) from 88.1-88.6', voids up to 1/16" covering	1 -
90 <u> </u>				89.1' - Bedding plane, 30 deg, rough, undulating —	ш	30-40% of surface, cavities up to 1/4"	D7. 0 minutes
-40.0			1	90.2' - Bedding plane, 40 deg, rough,	Н	covering up to 3% of surface, trace organics	R7: 6 minutes
↓	91.0		NR	undulating -	H	No Recovery 90.9-91.0'	1
			1	<u>-</u>		Limestone	_
				91.7' - Fracture, 75 deg, associated with	Ш	91.0-96.0' - yellowish gray, (5Y 8/1), fine to medium grained, strong HCl	_
			0	dissolution features or very extensive breaks in softer area, open up to 2"	Н	reaction, weak to medium strong (R2]
				in solici died, open up to 2	Ш	to R3), laminated bedding 91.0-92.5', trace voids <1/6" and cavities to 1/4",	
	R8-NQ 5 ft	80	>10	93.1-93.35' - Fracture zone, intersecting	Ш	trace fossil casts]
	100%	55	10	fractures, fragments to 2"	\mathbb{H}	_	
 			3	94.0' - Fractures (2), 65 deg, rough, undulating, open up to 1/2", organic features -	口	_	
95			J	on fracture surface	川	<u> </u>	
-53.0			1	94.6, 95.7' - Bedding plane, <5 deg, smooth to rough, undulating, open up to 1/2", organic	Н		R8: 10 minutes
]	96.0		1	features on fracture surface; no organics at	Щ		1
			2	95.7'	Ш	96.0-100.6' - light olive gray to	1
1			3	96.2' - Fracture, 80 deg, rough, undulating, - open	Н	 yellowish gray, (5Y 5/2 to 5Y 7/2), fine grained, strong HCl reaction, 	1
				96.7' - Bedding plane (2), 10 deg and 60 deg,	Ħ	weak to medium strong (R2 to R3),	1
			1	rough to smooth, undulating 97.5' - Bedding plane, <5 deg, rough to	H	 mottled from 96.6-97.5', trace voids from <1/16" to 1/8", organic layers 	1
	R9-NQ			smooth, undulating	Н	from 97.6-97.7' (black), trace fossil	1
	5 ft 92%	57	1	97.6-97.7' - Fracture (3), 0-10 deg, open to - 1/4", 1/4" organic infill	Щ	- casts	1
	52 /0			98.5' - Bedding plane (2), 10 deg and 60 deg,	団	_	SC-3 collected at 99.1-
100			0	rough to smooth, undulating - 99.3, 97.6, 99.85' - Mechanical break	Ш	_	99.85'
100				Total, or to, octob modification block	\Box		-
					Ш		

APPENDIX 2BB-793 Rev. 7



PROJECT NUMBER:

33884.FL BORING NUMBER:

E-03 SHEET 6 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724208.2 N, 457932.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

WATER	LEVELS : 2.9	ft bgs	s on 5/	07/07 START : 5/7/2007 END : 5/	8/200	7 LOGGER : N. Jarzyniecki	
≥∩≘	_ (9			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	E.H.	(%) O	TE S	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30Li	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
LEV.	ENGE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-58.0	Olk	α.		THORACOC, COTA NOL CIVILATION, NAVO HOLLINGO	S	CHARACTERIOTICS	R9: 7 minutes
-50.0			0	-	Ħ		Na. 7 minutes
-	101.0		NR		世	No Recovery 100.6-101.0' Limestone	1 -
-			8	101.1' - Bedding plane, 10 deg, rough, undulating, open up to 1/8"	₽	 101.0-104.4' - yellowish gray to 	1 -
_				101.3, 101.35, 101.4, 101.5' - Bedding plane,	П	dusky yellow, (5Y 7/2, 5Y 6/4), fine to medium grained, strong HCl	1 -
_			4	5-10 deg, rough, undulating, open up to 1/8" 101.6' - Bedding plane, 35 deg, rough,	世	reaction, very weak (R1), 1/16" voids	1 -
_	D40 NO			undulating	\vdash	with 10% coverage, trace cavities to 1/4", trace planar bedding of variable	1 -
_	R10-NQ 5 ft	19	4	101.8' - Fracture, 65 deg, rough, undulating 101.9' - Bedding plane, 10 deg, rough,	\vdash	 thickness, poorly to moderately 	1 -
_	68%			undulating, open up to 1/4"	F	fossiliferous, zone of circular discoloration from 103.8-104.2'	1 -
_			0	102.2' - Fracture (2), 60 deg and <5 deg, rough, undulating, open up to 1/8"	片	(possible leaching)	1 -
105_ -63.0			ND	102.9' - Fracture (2), 60 deg and 80 deg,	世	No Recovery 104.4-106.0'	P10: 4 minutes
-03.0			NR	rough, undulating, open up to 1/8" 103.1' - Bedding plane, 10 deg, rough,	仠	-	R10: 4 minutes
-	106.0			undulating, open up to 1/8"	口	Limestone	1 -
-			1	103.25, 103.5' - Bedding plane, 35 deg, rough, undulating	世	- 106.0-109.9' - yellowish gray, (5Y	1 -
_				103.7' - Fracture, 80 deg and vertical, rough, undulating, open up to 1/8"	╁	8/1), fine grained, strong HCl reaction, very weak (R1), trace voids	1 -
_			1	103.9' - Bedding plane, <5 deg, rough,	F	- <1/16" on surface, laminated bedding	1 -
_	D44 NO			stepped 106.6' - Bedding plane, 30 deg, rough,	Ħ	-	1 -
_	R11-NQ 5 ft	43	>10	undulating	世	-	1 -
-	78%			107.8' - Bedding plane, 25 deg, rough, undulating	₽	_	1 -
-			>10	108.2-109.8' - Fracture zone, intersecting	Н	_	1 -
110 <u></u> -68.0				fractures, fragments to 2"	扛	No Recovery 109.9-111.0	R11: 3 minutes
-00.0			NR		士	-	KTT. 5 minutes
-	111.0			-	╀	_ Limestone	1 -
-			1	111.3' - Bedding plane, 30 deg, rough,	H	- 111.0-116.0' - mottled yellowish gray	1 -
-				undulating, open to 1/2"	Ħ	and yellowish gray, (5Y 7/2 and 5Y 8/1), fine to coarse grained, strong	1 -
-			0	-	世	 HCl reaction, very weak to weak (R1 	1
-	R12-NQ			112.7, 113.5' - Mechanical break	₽	to R2), voids <1/16" with 10-20% coverage, cavities to 1/4" with 5-10%	1
-	5 ft	88	1		₽	 coverage decreasing with depth, 1" 	-
-	100%			113.9, 114' - Bedding plane, <5 deg, rough to	厂	laminated bedding at 114.0', moderately fossiliferous	-
-			1	smooth, undulating, open up to 1/4"	世	F	-
-73.0				_	\Box	L	R12: 2 minutes
-			0		+	-	-
-	116.0			116.1. 116.25! Dodding plans of dog		Limestone	-
-			4	116.1, 116.25' - Bedding plane, <5 deg, rough to smooth, undulating to planar, open	片	 116.0-121.0' - yellowish gray, (5Y 	-
-				to <1/8"	\vdash	8/1), fine to coarse grained, strong HCl reaction, weak to medium strong	-
-			0	116.45' - Bedding plane, 35 deg, rough, undulating	F	- (R2 to R3), laminated bedding at	-
-	R13-NQ			116.7' - Bedding plane, <5 deg, rough, undulating to planar, open up to 1/4"	匚	116.0-116.35', voids <1/16" with 40% coverage, trace cavities to	-
-	5 ft	60	1	117.1, 118.4, 118.8, 119.7, 120.9' -	士	- 1/2"-1-1/2" cavity at 117.6',	-
-	100%			Mechanical break 118.2' - Bedding plane, 10-15 deg, rough,	\vdash	moderately fossiliferous (casts and molds)	-
-			3	undulating to planar, open up to <1/4"	F	-	-
120					H		-
$\overline{}$			$\overline{}$				



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-03 SHEET 7 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724208.2 N, 457932.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

				MENT . Dietiich D-30 3/N 232, mud rotary, NQ tools, HV		3	ORIENTATION : Vertical
WATER	LEVELS: 2.9	ft bgs	s on 5	/07/07 START : 5/7/2007 END : 5	/8/200	7 LOGGER : N. Jarzyniecki	
				DISCONTINUITIES	Т.	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)			 	SYMBOLIC LOG		
Π₹Z	z¥≿		FRACTURES PER FOOT	DESCRIPTION		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
표일은	S ř. ř.	(%) Q	158	DEDTH TYPE OPIENTATION POLICINESS	٦ž	MINERALOGY, TEXTURE,	FLUID LOSS, CORING RATE AND
Ĕ₽₹	# <u>P</u>	٥	D.Y.	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	Ιĕ	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
		S. O.	RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	ΙŞ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	0716	I.C.	шп		0)	0.11.11.0.12.110.1100	
-78.0				119.0-119.1' - Bedding plane, <5 deg, rough	\vdash		SC-4 collected at 119.7-
-			1	to smooth, undulating to planar, open to <1/8"	1	-	120.55' -
-	121.0			119.05' - Fracture, 85 deg, fracture between	₽	-	R13: 2 minutes
				two bedding fractures, open up to 1/8"		Limestone	
-			3	120.55' - Bedding plane, <5 deg, rough to		- 121.0-125.95' - Same as	1 1
-			_	smooth, undulating to planar, open to <1/8" 121.3' - Fracture, 85 deg, rough, undulating,	₩	116.0-121.0' except transitions from	1 -
			2	open to <1/8"	Н	coarse to fine grained with depth, percentage of voids and fossils	
1 7			4	121.85, 121.9, 122.0' - Bedding plane, <5	1	decrease with depth, laminated	1 7
-	D44 NO			deg, smooth to rough, undulating, open up to	\pm	bedding from 122.6-125.1'	-
	R14-NQ 5 ft	40	1	1/4"	厂	L Dedding from 122.0-125.1	
]	99%	40	'	122.2' - Bedding plane, <5 deg, smooth to	\perp		1
-	3373		-	rough, undulating, open to <1/8"	+-	 	-
_			>10]
125			ا ا	75 deg and <5 deg, rough, undulating, high			
-83.0				angle fracture intersected by bedding (partial	1	<u> </u>	R14: 2 minutes
			>10	fracture), open up to 1/8"	\bot	_	
	126.0		'	123.9, 124.5' - Bedding plane, <5 deg,	\vdash		
1 7			NR/	smooth to rough, undulating, open up to 1/4"	1	No Recovery 125.95-126.0'	1
-			0	124.6' - Fracture, 50 deg, rough, undulating,		_ Limestone	1 -
				open to <1/4"		126.0-130.85' - yellowish gray, (5Y	
				124.65' - Bedding plane, <5 deg, smooth to	11	8/1), fine to medium grained, strong	1
-			1	rough, undulating, open up to 1/4"	+	 HCl reaction, very weak to weak (R1 	1 -
				124.9-125.8' - Fracture zone, intersecting	\bot	to R2), voids <1/16" with 10%	
	R15-NQ			fractures, fragments to 1-1/2"		coverage, trace voids to 1/4" and	
-	5 ft	63	2	127.3' - Bedding plane, 30 deg, rough,	1_	voids <1/16" with 30% coverage from	1
I _	97%			undulating, open up to 1/2"	╨	127.2-128.6' and 130.0-130.85', zone	
				128.4, 128.65' - Mechanical break 128.85, 128.9, 129.1, 129.3' - Bedding plane,	\vdash	of slightly undular laminated bedding from 128.7-129.2'	
			4	<5 deg, rough to smooth, undulating, open up	+-	_ 110111 120.7-129.2	1 1
130				to 1/4"; may have associated dissolution		_	I
-88.0			1	cavities at 128.9', 129.1', and 129.3'	—		R15: 3 minutes
-	404.0		'	129.5, 129.55' - Bedding plane, <5 deg,	1	=	1 1
-	131.0		NR	smooth, planar to undulating, open to <1/8"	+	No Recovery 130.85-131.0'	1 -
			>10	130.25' - Bedding plane, 20 deg, rough to		Limestone	
			-10	smooth, undulating, open to <1/8"	\perp	131.0-132.8' - yellowish gray, (5Y	
-				131.1' - Bedding plane, <5 deg, rough to	╁	 8/1), fine to medium grained, strong 	1 -
_			>10	smooth, organic stain, open up to 1/4"		HCl reaction, very weak (R1),]
			``	131.2-131.4' - Fracture zone, intersecting		undular bedding planes (variable	
-	R16-NQ			fractures, fragments to 1-1/2"		- thickness 1/2" to 1-1/2"), trace voids	1 1
-	5 ft	0	3	131.7' - Fracture, 70 deg, rough, undulating,	+	to 1/16"	-
	78%			open, piece of fracture missing, organic staining	\vdash	132.8-134.9' - yellowish gray and	
1 7				132.0-132.7' - Fracture zone or bedding	1	 light olive gray, (5Y 8/1 and 5Y 5/2), fine to medium grained, very weak to 	1 1
-			>10	plane, <5 deg, rough, undulating, open up to	-	weak (R1 to R2), up to 1/16" voids	-
135_			<u> </u>	1/8" -		— cover 5-10%, wavy laminated	
-93.0			ا ـ ا	132.7-132.85' - Fracture zone, fragments to	\vdash	bedding transitioning to planar with	R16: 2 minutes
-			NR	1/2"	+-	depth, trace fossils (casts)	-
_	136.0			133.4, 133.9, 133.95, 134.0, 134.2, 134.6,		No Recovery 134.9-136.0']
				134.65' - Fracture zone or bedding plane, <5		Limestone	
-			>10	deg, rough, undulating, open up to 1/8"	1	136.0-139.6' - yellowish gray, (5Y	1 1
-			<u> </u>	134.5-134.6' - Fracture zone, fragments to	+	7/2, 5Y 8/1), very fine to fine grained,	-
				1/2"	\vdash	strong HCl reaction, trace fossil	
1 7			3	136.0-136.4' - Fracture zone, intersecting	1	casts/molds, elongated voids to 1/2"	1
-	D47.10		<u> </u>	fractures, fragments to 1-1/2"	$-\Box$	with 5-10% coverage from	-
	R17-NQ	13	>10	136.5, 136.8, 136.9, 137.1' - Bedding plane,		136.0-137.5', voids <1/16" with 10%	
1 7	5 ft 72%	13	1 10	o dog, rough, and alating, open up to 1/2,	\vdash	coverage	1
-	12/0		<u> </u>	associated with dissolution	+-	 	1
1 _			2	137.4' - Fracture, 65 deg, rough, undulating, open up to 1"; fossils and voids]
140				open up to 1 , lossils and volus		No Recovery 139.6-141.0'	
140					1	• • • • • • • • • • • • • • • • • • • •	
1			ı				

APPENDIX 2BB-795 Rev. 7



PROJECT NUMBER:

33884.FL

BORING NUMBER:

E-03 SHEET 8 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724208.2 N, 457932.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

	LEVELS : 2.9	ft bgs		•	8/200	7 LOGGER : N. Jarzyniecki	
>00	(6			DISCONTINUITIES	ŋ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-98.0			NR	137.8' - Bedding plane, <5 deg, rough,	Ħ		R17: 5 minutes
-	141.0			undulating, open up to 3/4" 138.1-138.5' - Fracture zone, fragments to	Ш	-	1
	·		>10	1-1/2" 138.8, 139.1' - Bedding plane, <5 deg, rough,	Ш	Limestone - 141.0-143.5' - yellowish gray, (5Y]
			-10	undulating, open up to 1/2", associated with	Ш	8/1), fine to medium grained, strong	
١.			>10	dissolution 139.5' - Fracture, 60 deg, rough to smooth,	Н	HCI reaction, very weak (R1), voids - <1/16" with 30% coverage, wavy	
-	D40 NO			undulating, open to <1/8" 141.2-141.7' - Fracture zone or bedding	Н	bedding planes to 1/2"	-
-	R18-NQ 5 ft	15	2	plane, <10 deg, rough, undulating, open to	H	_ 143.5-144.7' - yellowish gray, (5Y	-
-	74%			<1/2" (most <1/8") 141.75-142.2' - Fracture zone, intersecting	H	 8/1), very fine grained, moderate HCl 	-
145			1	fractures, fragments to 1/2" 142.25, 142.3' - Bedding plane, <5 deg,	Ħ	reaction, medium strong to strong (R3 to R4), voids <1/16" with 10-20%	
145_ -103.0			NR	rough, planar	Ħ	 coverage, 1/4" zone at 143.75' of weak to medium strong rock (R2 to 	R18: 3 minutes —
-	146.0		INIX	142.4-143.0' - Fracture zone, fragments to 1-1/2"	Ħ	R3) with voids <1/16" covering	1
-			_	143.1, 143.3' - Bedding plane, open to 1/4" 143.5' - Mechanical break	Ħ	 30-40% of the surface and slightly darker color 	1
			1	144.1' - Fracture, 75-80 deg, rough,		No Recovery 144.7-146.0' Limestone	
_			1	undulating, organic stain or mineralization, open	H	146.0-147.0' - grayish yellow to	
-	546.110		·	144.3' - Mechanical break 146.85' - Fracture, 70 deg, rough, undulating	H	yellowish gray, (5Y 8/4 to 5Y 7/2), very fine to fine grained, strong HCl	
-	R19-NQ 5 ft	58	3	147.75' - Bedding plane, <5 deg, rough,	H	reaction, strong to weak (R4 to R2), trace organics and voids <1/16"	-
-	98%			undulating 148.0, 148.6, 148.65, 150.8, 150.9' - Bedding	Н	 147.0-147.9' - yellowish gray, light olive gray, and grayish yellow, (5Y 	-
150			0	plane, <5 deg, rough, undulating, 1/4" open 148.1, 148.5, 149.95' - Mechanical break	Ш	7/2, 5Y 5/2 and 5Y 8/4), fine grained,	-
150_ -108.0				_	Ш	strong HCl reaction, very weak to weak (R1 to R2), voids <1/16" with	SC-5 collected at 148.95-
-	151.0		2	-	Ш	10% coverage, frace organics, wavy laminated bedding, possible cross	150.80' – R19: 4 minutes
			<u>NR</u> >10	151.0-151.35' - Fracture zone, intersecting fractures, fragments to 1-1/4", some organic	Н	bedding]
_			-10	staining	Н	147.9-150.9' - grayish yellow, (5Y 8/1), fine to medium grained, strong	
_			2	151.6' - Bedding plane, 15-40 deg, open up to 1"	H	HCl reaction, weak to medium strong (R2 to R3), voids <1/16" with 10%	
-	DOO NO			152.15, 152.45' - Bedding plane, <5 deg, rough, undulating, open to <1/8"	P	coverage, trace cavities to 1/4"	-
-	R20-NQ 5 ft	37	3	153.15' - Fracture, 40-45 deg, rough,	H	No Recovery 150.9-151.0' Limestone	-
-	97%			undulating, open <1/8" to 1/2" 153.3, 153.9, 154.9' - Bedding plane, <5 deg,	囯	_ 151.0-152.15' - yellowish gray, (5Y 7/2), fine grained, strong HCl	-
155			3	rough, planar, open to 1/4" at 154.9' 154.6' - Fracture (2), 65 deg and <5 deg,	囯	 reaction, weak to medium strong (R2 to R3), trace voids <1/16", poorly 	-
-113.0			1	intersected with bedding fracture, open up to	囯	fossiliferous	R20: 2 minutes
-	156.0			1/8"	囯	 152.15-155.85' - Same as 151.0-152.15' except yellowish gray 	1
			<u>NR</u> 2	155.8' - Bedding plane, <5 deg, rough, undulating, open to <1/8"	Щ	to dusky yellow, (5Ý 7/2 to 5Y 6/4), - weak (R2)]
_				156.15' - Bedding plane, <5 deg, smooth to rough, planar to undulating, trace organics,	H	No Recovery 155.85-156.0]
-			>10	open to <1/4" 156.7' - Bedding plane, 10 deg, rough,	Ш	Limestone - 156.0-160.4' - yellowish gray to	4
-	R21-NQ			undulating, open up to 1"	H	mottled yellowish gray, and dusky yellow, (5Y 7/2 to mottled 5Y 6/4 and	-
-	5 ft	23	>10	157.1' - Bedding plane, <5-35 deg, rough, undulating, open up to 1"	団	 5Y 6/2), fine to medium grained, 	-
-	88%			157.2' - Bedding plane, 35 deg, rough, undulating, open up to 1/8"	団	strong HCl reaction, medium strong (R3), trace voids, trace fossils (casts)	-
160			4	and dating, open up to 170	\boxminus		-
100					П		



PROJECT NUMBER:

33884.FL

BORING NUMBER:

E-03

SHEET 9 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724208.2 N, 457932.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

WATER	LEVELS : 2.9	ft bgs	s on 5	07/07 START : 5/7/2007 END : 5/	8/200	7 LOGGER : N. Jarzyniecki	
≥∩≘	(%			DISCONTINUITIES	၂ ဗ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	: RU :TH, :VEF	(%) _Q	TUR OO-	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
LEV.	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-118.0	075	Ω.	>10	157.35' - Bedding plane, <5 deg, rough,	S	OT ALVAOTE NOTICO	Driller's Remark: 100%
-110.0				undulating, open up to 1/8"	Ħ	No Recovery 160.4-161.0'	loss of circulation at 159.5'
_	161.0		NR	157.45-157.7' - Fracture zone, intersecting	╨	_	R21: 3 minutes
_			4	fractures, fragments to 1" 157.8, 157.9, 158.5' - Bedding plane, <5 deg,	尸	Limestone - 161.0-162.6' - yellowish gray, (5Y	-
				rough, undulating, open up to 1/8"		7/2), fine grained, moderate to strong	_
_			3	158.6-158.8' - Fracture zone, intersecting fractures, fragments to 1-1/2"		HCI reaction, medium strong (R3), - <1/16" voids with 5-10% coverage,]
				158.9, 159.05, 159.15, 159.3' - Bedding	\vdash	trace cavities to 1/4", poorly]
	R22-NQ 5 ft	28	8	plane, <5 deg, rough, undulating, open 1/8-1/4"		fossiliferous - 162.6-165.25' - alternating dusky]
	85%	20		159.6' - Bedding plane, 10-30 deg, rough,		yellow to light olive gray, (5Y 6/4 to]
			5	undulating, open up to 1/8" 160.05' - Bedding plane, 35 deg, rough,	oxdot	5Y 5/2), medium to very fine grained, strong to moderate HCl reaction,	
165			3	undulating, open up to 1/8"	厂	15-20% coverage of voids <1/16"	
-123.0			>10	160.1-160.2' - Fracture zone 161.05, 161.5, 161.6' - Bedding plane, <5	Ш	and fossiliferous in dusky yellow zones; trace voids <1/16" and no	R22: 3 minutes
7	166.0		NR	deg, rough, undulating, open up to 1/4"	\vdash	visible fossils in light olive gray zones	1
	·		_	161.75' - Bedding plane, <5 deg, rough, undulating, open up to 1"	Ħ	No Recovery 165.25-166.0' Limestone	1
			1	162.6' - Bedding plane, <5 deg, rough,	世	166.0-170.6' - light olive gray and	1
				undulating, open to <1/8" 162.8, 162.9' - Bedding plane, <5 deg, rough,	╨	dusky yellow, (5Y 5/2 and 5Y 6/4), fine to medium grained, moderate	SC-6 collected at 166.0- 166.85'
-			2	planar, open up to 1/4"	\Box	HCl reaction, medium strong to	1
	R23-NQ		4.0	163.1' - Fracture, 60 deg, rough, undulating, open to 1/8"		strong (R3 to R4), voids to 1/16" with 30-40% coverage and cavities up to	1
-	5 ft 92%	29	>10	163.3, 163.4' - Bedding plane, <5 deg, rough,	\vdash	1/4"x1/2", color transitions to	1
-				undulating, open up to 1/4" 163.45' - Fracture, 85 deg, rough to smooth,	H	moderate yellowish brown (10YR 5/4) at 169.7' with interbeds of light	1
170			4	planar to undulating, intersects bedding plane	Ħ	olive gray material up to 2"	1
-128.0			1	fracture — 163.55, 163.6, 163.65' - Bedding plane, <5	Ш		R23: 3 minutes
-	171.0		NR	deg, rough, undulating, open up to 1/4"	╙	No Recovery 170.6-171.0'	1
-	17 1.0			163.9' - Bedding plane, horizontal and 35 deg. open	口	Limestone	1
-			4	164.3, 164.4, 164.6, 164.75, 164.8' - Bedding	世	 171.0-174.3' - Same as 166.0-170.6' except light olive gray to dusky 	1
-				plane, <5 deg, rough, undulating, open up to 1/4"	\vdash	yellow, (5Y 5/2 to 5Y 6/4)	
-			>10	165.0-165.2' - Fracture zone, fragments to 1",	F		-
-	R24-NQ			most to 1/4", intersecting fractures 166.85, 167.4, 167.5' - Bedding plane, <15	岸	-	-
-	5 ft 66%	33	>10	deg, rough, undulating, open to 1/8"		-	-
-	00%		1	168.0' - Fracture, 75 deg, rough, undulating, open up to 1/8"	oxdot	-	-
175				168.25, 168.35, 168.5' - Bedding plane, <15	口	- No Recovery 174.3-176.0'	-
175_ -133.0			NR	deg, rough, undulating, open up to 1/8" — 168.7, 168.85' - Bedding plane, <5 deg,	世	_	R24: 4 minutes —
-	470.0			rough, undulating, open to 1/8"	\vdash	-	-
-	176.0			169.1, 169.7, 169.75' - Bedding plane, <5 deg, smooth to rough, planar, open to 1/8"	F	Limestone	-
-			3	169.85, 170.35' - Fracture, 55-60 deg, rough,	廿	 176.0-177.3' - yellowish gray, (5Y 	-
-				undulating, open to 1/2"	世	8/1), very fine to medium grained, moderate to strong HCl reaction,	-
-			3	171.2, 171.45, 171.55, 171.95' - Bedding plane, <5 deg, rough to smooth, planar, open	仠	medium strong to strong (R3 to R4),	-
-	R25-NQ			up to 1/4", open to 1/2" at 171.95	口	moderately fossiliferous (casts, trace molds), voids <1/16" with 10%	-
-	5 ft	18	3	172.8-178.4' - Fracture zone, intersecting fractures, fragments to 1-1/2"	\vdash	coverage, cavities to 1/4" with 5%	-
-	95%			173.5, 174.05' - Bedding plane, <5 deg,	F	coverage	-
-			6	rough to smooth, planar, open up to 1/4", gray staining at 173.5'		-	-
180					\vdash		_



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-03 SHEET 10 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724208.2 N, 457932.6 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHO	DANDL	QUIFI	/IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	Casiii	9	ORIENTATION : Vertical
WATER LEVELS	: 2.9 ft bo	s on 5	/07/07 START : 5/7/2007 END : 5/	8/200	7 LOGGER : N. Jarzyniecki	
			DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#) CORE RUN, LENGTH, AND LENGTH, AND	RQD(%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-138.0			176.35, 176.5, 176.8, 177.3' - Bedding plane,	ш	177.3-178.3' - yellowish gray to	R25: 4 minutes
-138.0 	i-NQ ft 20	5 NR 4 >10 4 1 NR	176.35, 176.5, 176.8, 177.3' - Bedding plane, <10 deg, rough, undulating, open to <1/8", organic stains or thin laminae at 177.3' 177.5' - Bedding plane, <5 deg, rough, planar to undulating, open to <1/8" 177.7' - Bedding plane, 35 deg, rough, undulating, open to <1/2" 178.15, 178.5' - Mechanical break 178.65, 178.75, 178.9, 179.0, 179.15, 179.3, 179.5' - Bedding plane, <5 deg, rough, planar to undulating, open to <1/8" 179.75' - Bedding plane, <5 deg, rough, planar to undulating, open to 1/8" 179.8, 180.2, 180.3' - Bedding plane, <5 deg, rough, planar to undulating, open to <1/8" 180.1' - Fracture, 60 deg, rough, undulating 180.4' - Fracture, 60 deg, rough, undulating 180.65' - Bedding plane, <5 deg, rough, undulating 180.65' - Bedding plane, <5 deg, rough, stepped, open up to 1/4" 181.2, 181.5, 181.7, 181.9' - Bedding plane, <10 deg, stain on some fracture planes, open up to 1/8" 182.8' - Bedding plane, <10 deg, open to 1/8" 182.8' - Bedding plane, <10 deg, open to 1/8" 182.8' - Bedding plane, <10 deg, open to 1/8" 183.4' - Bedding plane, 15 deg, organic stain, open to <1/8" 183.4' - Bedding plane, 15 deg, organic stain, open to <1/8" 183.6' - Fracture zone, fragments to 1", intersecting fractures 183.6, 183.9, 184.2, 184.8, 184.4, 185.0, 185.2' - Bedding plane, <10 deg, open to 1/8" 183.6', 184.25' - Fracture, 55-60 deg, rough, undulating, open to <1/8" 183.6', 184.25' - Fracture, 55-60 deg, rough, undulating, open to <1/8"		CHARACTERISTICS 177.3-178.3' - yellowish gray to dusky yellow, (5Y 8/4 to 5Y 6/4), fine to medium grained, moderate HCI reaction, medium strong to weak (R3 to R2), voids to 1/8" with 10-20% coverage increasing with depth 178.3-180.75' - Same as 176.0-177.3' except poorly fossiliferous and trace voids <1/16", laminated bedding No Recovery 180.75-181.0' Limestone 181.0-182.5' - Same as 177.3-178.3' except mild to moderate HCI reaction 182.5-185.25' - alternating yellowish gray, (alternating 5Y 8/1 and 5Y 7/2), very fine to medium grained, strong to moderate HCI reaction, strong to moderate HCI reaction, strong to medium strong (R4 to R3), alternating beds, trace voids <1/16" and cavities to 1", voids <1/16" with 10% coverage, cavities to 1/4" with 10% coverage, 1/16" laminated bedding only visible in finer grained beds No Recovery 185.25-186.0' Bottom of Boring at 186.0 ft bgs on 5/8/2007	
1		1				



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-04	SHEET	1	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723843.2 N, 457904.3 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

WATER LEVELS: 5.5 ft bgs on 5/03/07 START: 5/2/2007 END: 5/3/2007 LOGGER: M. Faurote, N. Jarzyniecki									
WATER	LEVELS	. σ.σ. π	us on 5/03		51AK1:5/2/2007	SOIL DESCRIPTION	LUGGI	<u> </u>	Faurote, N. Jarzyniecki COMMENTS
≥Q€	044:5:	INTERVA	1 (0)	STANDARD PENETRATION		SUIL DESURIF HUN		8	COIVIIVIENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE		. ,	TEST RESULTS	SOIL NAM	ME, USCS GROUP SYMBOL,	COLOR.	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H B		RECOVE	ERY (ft)		MOISTURI	E CONTENT, RELATIVE DEN	ISITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND
			#TYPE	6"-6"-6" (N)	CONSISTEN	NCY, SOIL STRUCTURE, MIN	IERALOGY	N/S	INSTRUMENTATION
43.1	0.0			(11)	Topsoil			7/ 1/2	
-		1.4	SS-1	1-2-2	0.0-0.3'		/	\mathcal{T}	No water level - start hole
-		1.4	33-1	(4)	Poorly Grade	ed Sand With Organics (SP lium light gray grading to me) adium arav	-	Cathead operator: Paul Buchler
- ا	1.5				and greenish l	black, (N6 to N5 and 5GY 2	2/1), moist,	Æ	
-					very loose, find	ne grained, 20-25% organic ith depth, sand is silica	fines,	' -	
-					decircasing with	ar deptri, saria is sinca		+	
-								-	
-								4	
-								-	
-								4	
5 38.1	5.0				Clayey Sand ((80)		1111	-
- 30.1			00.	1-2-2	√ 5.0-5.35' - ligh	nt greenish gray, (5GY 8/1),	wet, very	/ - 	
-		1.0	SS-2	(4)	loose, very fine	ie to fine grained, 35% low t s, sand is silica	o medium	, 111	
-	6.5				Silty Sand (SI			/-	
-					5.35-6.0' - gra	yish orange, (10YR 7/4), we	et, very	-	
-					sand is silica	ne to fine grained, 25% nonp	plastic fines,	4	
-								4	
-								1	
-								1	
l -								1	
10	10.0							_	_
33.1				22-40-50/5	Silt With Sand	d (ML) ark yellowish orange, (10YR	9.6/6) moiet		
l _		1.2	SS-3	(90/11")	hard, nonplast	tic, rapid dilatancy, mild HC		4	
l _	11.4				16% of sand-s	sized, carbonate material		┨Ш	1
l _									
l _								J	
								1	
I -								1	
-								1	
15	15.0							1	
28.1		0.7	SS-4	40-50/4	Silt With Sand	d (ML)			1
-	15.8	0.7	00-4	(90/10")	15.0-15.7' - gr nonplastic. rar	rayish orange, (10YR 7/4), w pid dilatancy, mild to moder	vet, hard, ate HCl	▞▋╨	1
-					\reaction, 15%	fine to medium sand-sized,	, carbonate	1	
-					∖material			1	
-								1	
1 -								1	
I -								1	
-								1	
-								1	
20								1	
							-	+	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-04	SHEET	2	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723843.2 N, 457904.3 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit

ORIENTATION : Vertical

						ary, carriedu, AVVJ 1005, 3-77			ORIENTATION: Vertical
WATER	LEVELS	. σ.σ. π	gs on 5/03		START : 5/2/2007	END: 5/3/2007 SOIL DESCRIPTION	LUGGEF	k i IVI.	Faurote, N. Jarzyniecki COMMENTS
ŞQ₽			1 (0)	STANDARD PENETRATION		SOIL DESCRIPTION		8	COIVIIVIENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		TEST RESULTS	SOII NAM	IE, USCS GROUP SYMBOL	COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H B ATIC		RECOVE	ERY (ft)		MOISTURE	E CONTENT, RELATIVE DE	NSITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND
무유의			#TYPE	6"-6"-6" (N)	CONSISTEN	ICY, SOIL STRUCTURE, MII	NERALOGY	Σ	INSTRUMENTATION
23.1	20.0	0.1	SS-5 /	50/2	☐ Limestone Fra	agments	Г	0)	
-	20.2			(50/2")	\ 20.0-20.1' - gra	ayish orange, (10YR 7/4),	mild HCl /-	-	-
-					reaction, coars	se sand-sized fragments, v	ery poor	1	-
-					liecovery				-
_							-	1	_
I -							-		_
							_		_
I _							_		
							-	1	
25	25.0						-	1	_
18.1					Silty Sand (SN	M)		Ш	
-		1.0	SS-6	13-20-25	25.0-26.0' - gra	ayish orange, (10YR 7/4), grained, mild HCl reaction	wet, dense,	1111	-
-	26.5			(45)	nonplastic fines	s, 13% gravel-sized limes	tone /		-
-	20.5				∖fragments with ∖material	many fossil molds/casts,	all carbonate / -	1	-
-					Inaterial			ł	-
-							-	ł	-
-							-	ł	-
-							-	-	-
-							-	ł	-
-							-		-
30	30.0				0 1 031 (84)			.	
13.1				5-17-14	Sandy Silt (ML 30.0-31.1' - dus	∟) sky yellow, (5Y 6/4), wet, l	nard, fine to	Ш	_
_		1.1	SS-7	(31)	coarse grained	d, fine% gravel, nonplastic	, rapid	Ш	_
I -	31.5				dilatancy, mild	HCl reaction, 30% fine to 1% fine gravel-sized limest	coarse		_
I _					fragments, carl	bonate material			_
									_
1 -							-	1	
-							-	1	
-							-	1	-
35	35.0						-	1	-
8.1	35.3	0.3	SS-8	50/4	Limestone Fra	agments		ш	
-				(50/4")	\ 35.0-35.3' - mo	oderate yellowish brown, (ate HCl reaction, coarse sa	10YR $5/4$),	1	-
-						agments, poor recovery		1	-
-								1	-
-							-	1	-
-							-	1	-
-							-	1	-
-							-	1	-
-							-	ł	-
-							-	-	-
40								\vdash	
		L			l				



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-04	SHEET	3	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723843.2 N, 457904.3 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232. mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit

ORIENTATION · Vertical

DRILLIN	G METH	OD AND	EQUIPM	ENT : Dietrich D-5	50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit		ORIENTATION : Vertical
WATER	LEVELS	: 5.5 ft bo	gs on 5/0:	3/07	START : 5/2/2007 END : 5/3/2007 LOGGE	ER : N	1. Faurote, N. Jarzyniecki
	· · ·		· · ·	STANDARD	SOIL DESCRIPTION	(r	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		SYMBOLICLOG	
BEL OF /		RECOVE	ERY (ft)	TEGT REGUETO	SOIL NAME, USCS GROUP SYMBOL, COLOR,		DEPTH OF CASING, DRILLING RATE,
YFA'			#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	MBG	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
SUI				(N)		S	
3.1	40.8	0.1	SS-9	50/4 (50/4") /	Limestone Fragments 40.0-41.0' - pale olive, (10Y 6/2), mild HCl reaction,	7	Very hard rock, a lot of bit chatter - if continues will start coring at 45.0'
_					poor recovery	1	
l _						1	
l _						1	
-						1	_
-						1	_
_						1	_
_						1	_
-						1	1
45	45.0				City Cond With Lineartons (OM)	-	
-1.9	45.8	0.6	SS-10	30-50/4 (80/10")	Silty Sand With Limestone (SM) 45.0-45.6' - light olive, (10Y 5/4), wet, very dense, fine		Continue drilling soils based on drillers log of nearby boring GSC-6 where they went
-	45.0			(55.15)	to coarse grained, mild HCl reaction, 40% low plastic /fines, 15% fine gravel-sized, carbonate material	/ -	through a tough rock layer, then about 5.0' of sand from about 48.0-53.0', the driller wants
-					lines, 15% line graver-sized, carbonate material	4	to make sure they case deep enough at the
-						4	start of the hole
-						4	-
-						-	-
-						+	-
-						+	-
-						+	-
50 <u> </u>	50.0	0.3	SS-11	50/5	Silty Gravel With Sand (GM)	-	┩ —
-	50.4	0.3	33-11	(50/5")	50.0-50.3' - moderate olive brown, (5Y 4/4), wet, very	/ -	┧ -
-					dense, fine to coarse grained, mild HCl reaction, 22% low plastic fines, 38% fine to coarse sand, carbonate	4	-
-					material	+	-
-						+	-
-						+	-
-						+	1
-						+	1
-						+	1
						1	1
55 <u> </u>	55.0				Silty Sand With Limestone (SM)	+	,
-		1.4	SS-12	22-35-35	55.0-56.4' - moderate olive brown, (5Y 4/4), wet, very	-	-
-	50.5	1.7	00-12	(70)	dense, fine to coarse grained, mild HCl reaction, 20-25% low plastic fines, 20% fine to coarse		∤]
-	56.5				gravel-sized, carbonate materials	4"	-
-						+	
-						+	-
-						+	1
-						1	1
-						1	
60						1	
00						+	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-04	SHEET	4	OF	12

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723843.2 N, 457904.3 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 5.5 ft bg	gs on 5/03	3/07	START : 5/2/2007 END : 5/3/2007 LOGGER	R : M.	Faurote, N. Jarzyniecki
					SOIL DESCRIPTION		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	STANDARD PENETRATION TEST RESULTS		SYMBOLIC LOG	
HE HE		RECOVE	ERY (ft)	TEOTINEOUETO	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	SLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTH			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	MB(INSTRUMENTATION
				(N)		Ś	
-16.9	60.0			33-42-50/5	Silty Sand With Gravel (SM) 60.0-61.3' - moderate olive brown, (5Y 4/4), moist, -		_
_		1.3	SS-13	(92/11")	very dense, fine to coarse grained, rapid dilatancy.		_
l .	61.4				mild to moderate HCl reaction, 40% nonplastic fines, 17% gravel-sized limestone fragments	1111	:
_					Begin Rock Coring at 61.5 ft bgs See the next sheet for the rock core log		
_					See the next sheet for the rock core log		
-						1	
-					_	1	_
65						1	
-21.9							_
-					-	1	<u> </u>
-					-	1	
-					-	1	-
-	1				-	1	-
-	1				-	1	-
-					-	1	-
-	1				-	1	-
-					-	1	-
70					-	1	-
-26.9	1				_	1	_
-	1				-	1	-
-					-	1	-
-	1				-	1	-
-	1				-	1	-
-					-	1	-
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75 <u> </u>	1					1	-
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PROJECT NUMBER:

33884.FL

BORING NUMBER:

E-04

SHEET 5 OF 12

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723843.2 N, 457904.3 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

WATER	LEVELS: 5.5	ft bgs	s on 5/	03/07 START: 5/2/2007 END: 5/	/3/200	7 LOGGER : M. Faurote, N. Jarzyn	iecki
≥O≎	(%			DISCONTINUITIES] g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPT SURF ELEV.		RQD	FRAC PER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-	61.5		3	61.6' - Fracture, rough, undulating 61.95' - Mechanical break 62.3' - Mechanical break	片	Limestone - 61.5-65.5' - moderate yellowish brown, (10YR 5/4), fine to medium	16:05 Began inserting new bit and reamer to 61.5' – Driller's Remark: Reamed
-	R1-NQ		2	62.5' - Fracture, rough, undulating, along solution cavity 62.85' - Bedding plane, possible separation		grained, mild HCl reaction, weak (R2), 30% void space typically related to fossil casts, trace stringers	the borehole to 61.5' below ground surface – 5/2/07 at 16:23,
-	4.5 ft 89%	63	1	63.9' - Mechanical break		and lenses of black organic material from 61.5', moderate HCl reaction where pulverized, solution cavities to	Commence coring First core run is 4.5' long to – get even run at 66.0'
65_ -21.9			3	64.85' - Mechanical break 65.1' - Mechanical break or fracture, along		1-1/2"x3/8", organic lenses, partings — and blebs disseminated through the run	R1: 2 minutes
-	66.0		NR	solution cavity	ightharpoons	No Recovery 65.5-66.0'	_
-	00.0		1	65.25' - Mechanical break or fracture, along solution cavity 66.5' - Mechanical break	H	Limestone - 66.0-67.8' - Same as 61.5-65.5'	-
-			1	67.25' - Mechanical break		-	
-	R2-NQ 5 ft 98%	90	0	67.95' - Fracture, smooth, planar, at contact with finer grained segment		 67.8-68.0' - yellowish gray, (5Y 7/2), very fine grained, moderate HCI reaction, weak to medium strong (R2 	-
70	3070		1	69.55' - Fracture, 65 deg, rough, irregular	#	 to R3), limestone is composed of silt sized particles with trace organic pieces 	-
70_ -26.9				70.0' - Mechanical break	Ħ	— 68.0-69.6' - light olive gray, (5Y 5/2), fine to medium grained, mild to	R2: 4 minutes
-	71.0		1	70.6' - Mechanical break or fracture, very	F	moderate HCl reaction, weak to medium strong (R2 to R3), 40% open	-
			(<u>NR</u>) 2	rough, irregular	F	voids that are fossil casts of forams	
_				71.5' - Fracture, smooth, undulating, some fines buildup from drilling	F	and some possible pelecypods, thin stringers of carbon or organic black	_
_			1	71.95' - Mechanical break	F	material between 68.0' and 68.3' 69.6-70.45' - Same as 67.8-68.0'	_
-	R3-NQ			73.0' - Fracture, smooth, undulating, soft thin	井	except laminar bedding	-
-	5 ft 98%	78	1	gouge zone and gently undulant surface near contact	士	70.45-70.9' - Same as 68.0-69.6' No Recovery 70.9-71.0'	-
-	3070			73.5' - Fracture, appears shattered, angular	E	Limestone 71.0-72.9' - moderate olive brown,	
75			2	faces 74.3' - Mechanical break	F	(5Y 4/4), fine grained, mild HCl reaction, very weak to weak (R1 to	1
-31.9			4	74.95' - Fracture, appears shattered at lithology change, angular	井	R2), except 72.3-72.9' zone medium strong to strong (R3 to R4), voids to	R3: 4 minutes
_	76.0		· (NR)	75.3' - Fracture, 30 deg, smooth, planar	厈	_ 1/16" covering 20% of surface,]
-			1	75.6' - Fracture, 3-5 deg, smooth 75.75' - Mechanical break	井	fossiliferous (casts) 72.9-73.5' - light brown, (5Y 6/4), fine	_
-				75.85' - Mechanical break 76.65' - Mechanical break, 60 deg, probably	井	to medium grained, mild HCI reaction, very weak (R1), bedding	-
-			4	part of cleavage 77.6-78.0' - Fracture zone, cannot describe	#	 planes irregular, with varying angles 	-
-	R4-NQ			because the fragments were cleaved by the	廿	and gently crenelated, the angle increases with depth, small stress	-
-	5 ft 73%	50	>10	bit; fragments are angular with sharp edges, may have been broken during drilling	片	 fractures between and through the planes, which are laminar to thin 	
-			>10	79.0' - Fracture, 40 deg, 1" thick where there is a parallel fracture, these have been broken	士	bedded - 73.5-75.0' - moderate yellowish	_
80 <u>-</u> -36.9				then another fractured piece to 79.4, the remainder of the rock is unbroken	\pm	brown, (10YR 5/4), fine to medium grained, mild to very mild HCl	R4: 7 minutes
-			NR	Totalisation of the rook is unbroken	+	reaction, medium strong (R3),	Driller's Remark: Lost -
-	81.0				+	12-15% voids (fossil casts), trace laminar bedding, trace organics	circulation at 80.0-80.3'
					f	<u> </u>	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-04

SHEET 6 OF 12

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723843.2 N, 457904.3 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

WATER	LEVELS : 5.5	ft bg	s on 5/	03/07 START : 5/2/2007 EN	ID : 5/3/20	007	LOGGER : M. Faurote, N. Jarzyr	iecki
<0 €	(%)			DISCONTINUITIES	ي	ي [LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	S, S	2 F	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ACE 1TO	TH.,	(%) 🛭	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS	s. 5	ا کِ	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS CORING RATE AND
EPT FR.	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND	, ESS E	Y MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
E S E	REC	ď		THICKNESS, SURFACE STAINING, AND TIGHTN		'n	CHARACTERISTICS	,
			>10	81-81.7' - Fracture zone, rock fragments from 1/4'-1/2", no visible orientation, angular to	om _L_	Ч	75.0-75.75' - Same as 72.9-73.5' except trace organics	
			_	subangular fragments		П	75.75-77.6' - light brown, (5Y 6/4),	
-			7	81.9' - Fracture, undulating, generally	h	十	fine grained, weak to medium strong	
-	R5-NQ			horizontal, irregular 82.2' - Bedding plane, <5 deg, open	F	7	(R2 to R3), 15-30% void space (fossil casts), mild HCl reaction	
-	5 ft 84%	27	5	82.6-83.0' - Fractures, 0-90 deg, open,	H	╁	unless pulverized	-
-	0470			fragments vary in shape and size	$+$ \vdash	나	77.6-79.65' - light olive gray with pale	-
			>5	83.0-83.5' - Fractures, 0-90 deg, open, fragments vary in shape and size		⋢	olive alteration bands, (5Y 5/2 with 10Y 6/2), very fine to medium	-
85 <u> </u>			1	85.7' - Fracture, fracture from 85.7-85.9' do	oes —	╁	grained, moderate to strong HCI	R5: 4 minutes
-41.9			NR	not extend across the core		7	reaction, strong (R4) No Recovery 79.65-81.0'	R5. 4 minutes
	86.0		INIX		H	4	Limestone	
_			0			Q.	81.0-82.2' - light bluish gray grading	End of drilling for the day, 5/2/07 at 86'
			ĽĬ	86.5-86.9' - Fracture zone, fragments <1" x	ч	\Box	to light olive gray, (5B 7/1 to 5Y 6/1), very fine to fine grained, mild HCl	Resume drilling on 5/3/07
				1" average at 1/2" x 1/2"	1	\dashv	reaction, strong to very strong (R4 to	Water level 5.5' below
-			1	07.75! Frontiss or hadding plane 0.20 do	_	ゴ	R5), delayed reaction to HCl, voids	ground surface on 5/3/07 -
-	R6-NQ			87.75' - Fracture or bedding plane, 0-20 de rough, undulating, 1" open,	^{;g,} +	ᅷ	<1/16" over 20% of surface, trace cavities to 1/8", trace organics, poorly	-
-	5 ft	63	0	88.3' - Mechanical break		ᅡ	fossiliferous	-
-	86%			88.5' - Mechanical break	+	+	82.2-83.1' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine to	-
-			>10	89.35' - Fracture, 80 deg, rough, undulating	g, - F	7	medium grained, mild to moderate	_
90 <u> </u>			>10	1/8" open		╧	_ HCl reaction, medium strong to	D0: 0 minutes
-40.9			\vdash	89.7-90.15' - Fracture zone, intersecting fractures, up to 1" x 1/2" fragments, some s	silt -	4	strong (R3 to R4), voids to 1/16" 5% coverage, trace organics	R6: 6 minutes
	91.0		NR	with organics from 89.7-89.8'	╨┢	ヰ	83.1-85.2' - dusky yellow transitioning	Possible start of breccia zone at 89.7-90.5'
			0		Ь	H	to yellowish gray, (5Y 6/4 to 5Y 8/1),	
				Od OEL Manhanian basely		7	fine grained, mild HCl reaction, medium strong to strong (R3 to R4),	
				91.85' - Mechanical break		\exists	voids <1/16" 30-40% coverage	
-			>10	92.6-93.05' - Fracture zone, with some clay	, TH	4	No Recovery 85.2-86.0' Limestone	_
-	R7-NQ			infill		ヸ	86.0-90.3' - Same as 83.1-85.2'	1
-	5 ft 96%	67	3	93.4, 93.75' - Fracture or bedding plane (2)), 🕂	十	except moderately fossiliferous, with	-
-	90%			horizontal, rough, undulating, 5% organics bottom surface of fracture, up to 1/4" open	on -	1	5-10% coverage of cavities to 1/2" No Recovery 90.3-91.0'	-
-			2	93.6' - Fracture, 80 deg, rough, undulating,		╬	Limestone	-
95 <u> </u>			\vdash	organics on 5% of fracture	$ \Box$	4	91.0-93.5' - yellowish gray and light olive gray, (5Y 7/2 and 5Y 8/1), fine	R7: 5 minutes
			0	94.2' - Mechanical break 94.45' - Fracture, 5 deg, smooth, planar,		\Box	to medium grained, mild to moderate	177. O Hilliutes
-	96.0		NR	tight, slight organics on fracture surface	-	╁	HCI reaction, medium strong (R3),	_
_			1	(5-10%) 94.9' - Bedding plane, 5 deg, rough,		ユ	voids <1/16" 25-35% of surface, trace cavities to 1/2", trace organics	
			<u> </u>	undulating, organic staining, open 2", clay		\dashv	93.5-95.8' - yellowish gray, (5Y 8/1),	
				infill with limestone fragments	П	耳	very fine to fine grained, moderate HCl reaction, voids <1/16"	
-			3	95.25' - Mechanical break 96.3' - Mechanical break	Ъ	╛	predominately from 93.8-94.1',]
-	R8-NQ			96.8' - Fracture, 5 deg, organic staining,	—	十	10-20% of surface, <1% cavities to]
-	5 ft 98%	83	2	bedding plane fracture, open 3", infill fines	七	士	1/2", trace fossil casts No Recovery 95.8-96.0'	-
-	90%		\vdash	97.0, 97.05' - Bedding plane (2), smooth, undulating, organics (5-10%) of surface of	+	+	Limestone	-
			0	fracture, up to 1/8" open		다	96.0-100.9' - yellowish gray, (5Y 7/2),	-
100 <u> </u>			\vdash	97.8' - Fracture, 80 deg, rough, undulating, organic staining	· —	╁	fine to medium grained, strong HCI reaction, weak to medium strong (R2	Do: 0 minutos
-50.9			0	98.5' - Mechanical break	二二	7	to R3), 10-20% voids (<1/16") over	R8: 9 minutes
-	101.0		NR)	99.1' - Mechanical break	上	#	surface, trace cavities up to 1/2", moderately fossiliferous	_
			1117	100.2' - Mechanical break		Щ	(casts/molds)	
							•	
ı			i		- 1	- 1		

APPENDIX 2BB-804 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-04

SHEET 7 OF 12

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723843.2 N, 457904.3 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

				IENT : Dietrich D-30 3/N 232, Midd Totally, NQ tools, HW			ORIENTATION : Vertical
WATER	LEVELS : 5.5	ft bg	s on 5		3/2007		
≥O.⊋	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
HH	P.H. KEN	(%) 🛛	[등 8	DEPTH, TYPE, ORIENTATION, ROUGHNESS,]]	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
TAY:	ARE CO	Q	ACJ R F	PLANARITY, INFILLING MATERIAL AND	MB(AND ROCK MASS	SMOOTHNESS, CAVING ROD
SU	CO LEI RE	R	FR.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SY	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
			3	101.2' - Fracture, 5 deg, rough, undulating,		No Recovery 100.9-101.0'	
-				bedding plane fracture, up to 1/8" open	\vdash	- Limestone	1 -
-			0	101.7, 101.9' - Mechanical break (2), high	Н	_ 101.0-106.0' - yellowish gray, (5Y	1 -
_				angle, tight	Ш	8/1), very fine to fine grained, strong to very strong HCl reaction, very]
	R9-NQ	0.5		103.25, 103.5, 104.45' - Mechanical break (3)	Н	weak to weak (R1 to R2), voids	
-	5 ft 100%	85	1	100.20, 100.0, 104.40 - McChambal break (0)		<1/16" 5-10%, trace cavities to 1/4",	SC-1 collected at 103.5-
-	10070				Н	 moderately fossiliferous (casts/molds), <1% oval to circular, 	104.45'
-			0		ш	calcite filled voids	1 -
105_ -61.9				_	H	_	
-01.9			>5	_		_	R9: 4 minutes
	106.0			105.5' - Fractures or mechanical break,	ш		
				multiple fractures intersecting 106.1' - Fracture, 5 deg, smooth, undulating,	Ш	106.0-111.0' - Same as 101.0-106.0'	1
-			3	bedding plane fracture, up to 1/4" open	\Box	except yellowish gray, (5Y 8/1 to 5Y	1 1
-				106.25' - Fracture, 5 deg, smooth, undulating,	Н	7/2), trace planar bedding of variable widths, trace cavities to 1"	1 -
-			1	bedding plane fracture, up to 1/2" open 106.5' - Fracture, 10 deg, smooth, undulating,	ш	-	1 -
_				bedding plane fracture, up to 1/4" open	Н	_]
	R10-NQ	68	1	107.4' - Mechanical break			
	5 ft 100%	00	' '		Н		1
-				108.85' - Mechanical break or bedding plane,	ш	=	1 1
			4	5 deg, tight 109.15' - Fracture, 5 deg, smooth, undulating,	+	-	1 -
110 -66.9				bedding plane fracture, up to 1/4" open —			R10: 3 minutes
			3	109.35 - Fracture, 5 deg, smooth, undulating,	Н	_	K To. 5 minutes
	111.0			bedding plane fracture, up to 1/4" open 109.55' - Fracture, 30 deg, smooth,		_]
				undulating, bedding plane fracture, except 1"	Н	111.0-115.8' - white to yellowish gray,	
-			3	open	ш	 (N9 to 5Y 8/1), very strong HCl reaction, extremely weak to weak 	1 1
-				109.8' - Fracture, 5 deg, smooth, undulating,	ш	(R0 to R2), trace organics, <2%	1 1
-			>10	bedding plane fracture, up to 1/4" open 110.05' - Fracture, high angle	╆	 voids to 1/16", trace wavy bedding, 	1 -
-	544.110			110.45' - Mechanical break, 5 deg, tight	\Box	_ poorly fossiliferous (casts)	-
_	R11-NQ 5 ft	57	>10	110.5' - Mechanical break, 65 deg, rough,	Н	_	l <u> </u>
	96%	0,	"	undulating, dark (possibly organic) 111.2' - Fracture zone, intersecting fractures	Ш		
				up to 1/2" fragments	Н	_	1
115			0	111.6, 111.95, 112.02, 112.25, 112.25, 112.4,	П	-	1 1
-71.9			\vdash	112.6, 112.7, 112.8' - Fracture (9), 0-5 deg, — smooth, undulating, bedding plane fracture,	╂┼┤		R11: 5 minutes
-			1	easily separates	Ш	-	-
1 -	116.0		NR	112.85-113.2' - Fracture zone, intersecting	H	- No Recovery 115.8-116.0'	-
1 _			1	fractures up to 1/2" fragments	口	Limestone]
					$\vdash\vdash\vdash$	116.0-120.95' - Same as	
1 7				116.95, 119.75, 119.8, 120.1, 120.8' -	Ш	 111.0-115.8' except fine to medium grained, 20-30% voids to 1/16", trace] 1
1 -			0	Fracture (5), smooth, undulating, bedding plane fracture, easily separates	+	cavities to 1/2", moderately	1
-	R12-NQ			plane nacture, easily separates		- fossiliferous	1 -
-	5 ft	80	0		Н	-	-
_	99%					_]
			,		H	_	
120			2		Ш	_	1
-76.9				_	Щ		R12: 3 minutes
1 -			4	-	団	_	-
-	121.0		NR/		\square	No Recovery 120.95-121.0'	-
			النت ا		H		



PROJECT NUMBER:

33884.FL

BORING NUMBER:

E-04

SHEET 8 OF 12

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723843.2 N, 457904.3 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

CORING	NIE I NOD AI	ND EC	JUIPIV	MENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	casin	<u>y</u>	ORIENTATION : Vertical
WATER	LEVELS: 5.5	ft bgs	s on 5	/03/07 START : 5/2/2007 END : 5/3	3/200	LOGGER : M. Faurote, N. Jarzyn	iecki
>00				DISCONTINUITIES	υ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표 등 등	Y A A	(%	FRACTURES PER FOOT		임	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
ĦĂ.¥	GT NO	(%) O	FS	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING RATE AND
g S J	E E S	a	RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
Δош	0716	Œ			S		
			2	120.9' - Fracture zone, intersecting fractures,	Н	Limestone	
				fragments up to 1/2" - 121.2' - Fracture, 50 deg, smooth, undulating,	Ш	 121.0-125.7' - yellowish gray, (5Y 8/1), fine to coarse grained, strong 	_
-			2	up to 1/8" open		HCl reaction, very weak to weak (R1	-
-				121.6' - Fracture or mechanical break, -	₽₩	to R2), medium to coarse grained	-
	R13-NQ 5 ft	65	2	horizontal, bedding plane	Ш	zone at 123.2-124.0', trace voids	_
	94%	05	-	122.1' - Fracture, 5 deg, rough, undulating,		<1/16", cavities to 1/4" <2% of	
_				bedding plane, up to 1/4" open - 122.4' - Fracture, 5 deg, rough, undulating,	╨	- surface, moderately fossiliferous	-
-			>5	bedding plane, up to 1/4" open	Ш	(casts/molds), trace ovular voids with calcite infill	-
125_				123.2' - Fracture, 5 deg, rough, undulating, —		— Calcite IIIIII	
-81.9			4	bedding plane, up to 1/4" open	Н		R13: 2 minutes
_	126.0		NR	123.5' - Fracture, 60 deg, undeveloped	Ш	No Decement 405 7 400 01	-
-	126.0		INK	fracture associated with 123.9'	\Box	No Recovery 125.7-126.0'	-
_			>10	123.9' - Fracture, 60 deg, rough, undulating, up to 1/8" open	╀┤	126.0-129.9' - Same as 121.0-125.7'	-
				124.6-124.7' - Fracture zone, intersecting	Ш	except fine to medium grained, trace	
				fractures, fragments up to 1"	$\vdash\vdash$	organics	1
-			0	125.6-125.7' - Fracture zone, intersecting	╁┼┤	-	-
_	D44 NO			fractures, fragments up to 1"	団	_	-
_	R14-NQ 5 ft	70	1	126.4' - Fracture, 75 deg, rough, undulating,	Н	_	_
	98%	70	l '	medium light gray staining 126.5-126.7' - Fracture zone, intersecting	Н		
_				fractures, fragments up to 1"	ш	-	-
-			1	126.95' - Fractures (3), 70 deg, rough,	╂┼┤	-	-
130_				undulating	Н	No Recovery 129.9-131.0'	
-86.9			3	128.4' - Mechanical break	ш	No Recovery 129.9-131.0	R14: 4 minutes
	131.0			128.6' - Fracture, 70 deg, rough, undulating, medium light gray staining	1 + 1		_
-	101.0		NR.	129.4' - Fractures (2), rough, undulating,	т	Limestone	-
_			>10	medium light gray staining, intersecting	ш	- 131.0-135.75' - yellowish gray, (5Y	-
_				fractures	Н	7/2), fine to coarse grained,	_
				130.45' - Fracture, horizontal, rough,		moderate HCl reaction, very weak to	
_			1	undulating, bedding plane fracture 130.6' - Fracture, 75 deg, rough, undulating,	ш	 weak (R1 to R2), voids to 1/16" over 5-10% of surface, trace planar 	_
-	R15-NQ			medium light gray staining, up to 1/4" open	H	bedding of variable widths, rock is	-
_	5 ft	13	3	130.9' - Fracture, horizontal, rough,		- friable at 132.0-133.5', trace fossil	-
	95%			undulating, bedding plane fracture, up to 1/4"	ш	casts	
				open	Ш		1
405			>10	131.2' - Fracture, horizontal, rough,		_	-
135 <u> </u>				undulating, bedding plane fracture, up to 1/8" open	╀┤	_	R15: 3 minutes
-31.9			5	131.3-131.5' - Fracture zone, intersecting -	Н		1713. 3 Hilliutes
	136.0		NR	fractures, up to 1" fragments		No Recovery 135.75-136.0'	
_			\ <u>\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\</u>	131.7-131.85' - Fracture zone, intersecting	$\vdash\vdash$	Limestone	-
-			0	fractures, up to 1/2" fragments	Ш	136.0-140.7' - Same as	-
-			<u> </u>	132.6' - Fracture, 5 deg, bedding plane fracture, open less than 1/8"		_ 131.0-135.75' except mottled with	-
			1	133.1' - Fracture, 55 deg, rough, undulating	Н	light olive gray (5Y 5/2), becoming	
			'	133.8' - Fracture, 0-5 deg, rough, undulating,	Ш	predominantly light olive gray at 138.8-139.1' and 140.1-140.35', trace	1
-	R16-NQ			bedding plane fracture, up to 1/4" open		cavities to 1/4", 5-10% coverage of	1
-	5 ft	76	2	133.9' - Fracture, 55 deg, rough, undulating,	Н	voids to 1/2" with calcite infill from	-
_	94%			up to 1/2" open 134.1-134.95' - Fracture zone, intersecting	ш	_ 139.1-140.1'] .
				fractures fracture zone, intersecting	H		
140 140			3	135.2, 135.25' - Fracture (2), 5 deg, bedding	₽₩	Ī	-
-96.9			<u> </u>	plane fracture, open less than 1/8"	団	-	R16: 3 minutes
			1	135.3' - Fracture, 25 deg, rough, undulating,	\Box	<u></u>	-
	141.0		NR	bedding plane fracture	Н	No Recovery 140.7-141.0'	
]				135.55 - Fracture, <5 deg, rough, undulating,	Ш		1
<u> </u>				bedding plane fracture			
							1
							<u> </u>



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-04

SHEET 9 OF 12

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723843.2 N, 457904.3 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

WATER	LEVELS : 5.5	ft bgs	s on 5/	03/07 START : 5/2/2007 END	: 5/3/20	D7 LOGGER: M. Faurote, N. Jarzyı	niecki
<0₽	(%			DISCONTINUITIES	ഉ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	E RU	R Q D (%)	T.O	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Z j	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
FREN	CECC	Ø	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNE	ss I ≝	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
Бош	0112	Ľ	>10	135.65' - Fracture, <5 deg, rough, undulating		Limestone	
-				bedding plane fracture	' 丰	- 141.0-145.4' - yellowish gray to light	-
-			>10	136.9' - Mechanical break 137.75' - Fracture, 5-10 deg, rough,	+	olive gray, (5Y 7/2 to 5Y 8/1), very fine to fine grained, mild to moderate	-
-	D47.NO			undulating, bedding plane fracture, up to 1/4'	╌╂┴	HCl reaction, strong (R4), trace	_
-	R17-NQ 5 ft	45	>10	open 138.2' - Mechanical break	口	organics, voids to <1/16" over 5-10% of surface, trace cavities to 1", highly	_
-	88%			138.5' - Mechanical break	-	to moderately fossiliferous	_
-			3	138.55' - Bedding plane, 5 deg, rough,	-	decreasing with depth, trace laminar	_
145_				undulating 138.75, 139.1' - Bedding plane (2), 0-5 deg,	4	bedding	
-101.9			1	rough, planar		No Recovery 145.4-146.0'	R17: 7 minutes
l _	146.0		NR	140.15, 140.35' - Bedding plane (2), 0-5 deg, rough, planar, up to 1/2" open	⊥	No Recovery 145.4-146.0	_
_			>10	140.2' - Bedding plane, 5 deg, rough,		Limestone - 146.0-146.5' - Same as 141.0-145.4'	
_			- 10	undulating 141.5' - Fracture, 30 deg, up to 1/4" open	」	except only trace voids to 1/8" size	
			2	142.2-142.3' - Fracture zone, intersecting		146.5-149.4' - dusky yellow to moderate olive brown, (5Y 6/4 to 5Y	
				fractures, up to 1/2" fragments 142.4' - Fracture, 0-5 deg, bedding plane		4/4), medium to coarse grained, mild]
	R18-NQ		_	fracture, olive gray (5Y 3/2) organic staining,	1	HCl reaction, medium strong to strong (R3 to R4), porous, voids	
-	5 ft 80%	53	2	up to 1/4" open 142.6' - Fracture, 0-5 deg, organic staining,	1	<1/16" 20-30% of surface, cavities to	
-				up to 1/4" open	\perp	1/4" 10% of surface, moderately	
150			4	142.85-142.45' - Fracture zone, intersecting fractures, up to 1/2" fragments	1	- fossiliferous (casts/molds) 149.4-150.0' - Same as 146.0-146.5'	
-106.9				143.95-143.6' - Fracture zone, intersecting		No Recovery 150.0-151.0'	R18: 3 minutes
-	151.0		NR	fractures, up to 1/2" fragments 143.7' - Fracture, 0-5 deg, organic staining,	1	-	1
-	.01.9			tight	_ <u> </u>	Limestone	1
-			2	143.9' - Fracture, 0-5 deg, organic staining, up to 1/8" open	1	 151.0-155.0' - yellowish gray, (5Y 8/1 to 5Y 7/2), fine to medium grained, 	1
-				144.0' - Fracture, 0-5 deg, organic staining,	1	mild HCl reaction, medium strong to	1
-			>10	up to 1/8" open 144.3' - Fracture, 0-5 deg, organic staining,	T	strong (R3 to R4), 10% black/olive gray organic staining, voids to 1/16"	1
-	R19-NQ			up to 1/4" open	口	over 5-10% of surface, zone of	1
-	5 ft 80%	23	5	144.5' - Fracture, 15 deg, organic staining, tight		 moderately competent rock with wavy laminar bedding planes at 	1
-	0070			144.8' - Mechanical break	1	153.0-153.5'	-
155			4	145.0' - Fracture, 15 deg, possible organic stain on 50% of surface, up to 1/4" open	#	<u>†</u>	
-111.9				146.0-146.3' - Fracture zone, intersecting	+	No Recovery 155.0-156.0'	R19: 4 minutes
-	156.0		NR	fractures, fragments up to 1/2" 146.9, 146.95' - Fracture (2), 0-5 deg, rough,	+	+	-
-	156.0			undulating, bedding plane fractures, up to	口	_ Limestone	-
-			3	1/8" open 147.1' - Fracture, 20 deg, rough, undulating,	廿	156.0-157.2' - dusky yellow, (5Y 8/1),	SC-2 collected at 156.3-
-				up to 1/4" open	+	medium grained, mild HCl reaction, weak (R2), voids to 1/16" 20-30%,	157.23'
-			1	147.95' - Fracture, 5 deg, rough, undulating, up to 1/4" open	-	cavity to 1/2" 5-10%, moderately	-
-	R20-NQ		0	148.1, 149.1' - Fracture (2), 5 deg, rough,	+	fossiliferous (casts/molds) 157.2-158.1' - yellowish gray, (5Y	-
-	5 ft	37		undulating, up to 1/8" open 148.3' - Fracture, 20 deg, rough, undulating,	\vdash	8/1), fine to medium grained, `	-
-	42%			up to 1/2" open	+	moderate to strong HCl reaction, voids to <1/16" 5-10% of surface,	-
			NR	148.5' - Fracture, 50-60 deg, undeveloped or healed	-	trace cavities to 1/4", trace organics,	-
160 -116.9				149.3, 149.4, 149.8' - Fracture (3), 5 deg,	$-\Box$	trace fossils (casts) No Recovery 158.1-161.0'	R20: 6 minutes
-				rough, undulating, 1/8"-1/4" open 151.6' - Fracture, 70-80 deg, rough,	+	+	-
-	161.0		\vdash	undulating, organic stain on 95% of fracture	+	}	-
				surface, up to 1/4" open	_#	1	
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-04	SHEET	10	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723843.2 N, 457904.3 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

				MENT . Diethor D-30 3/N 232, mud totaly, NQ tools, HW			ORIENTATION : Vertical
WATER	LEVELS: 5.5	ft bg	s on 5	/03/07 START : 5/2/2007 END : 5/	3/200	LOGGER : M. Faurote, N. Jarzyn	iecki
	_			DISCONTINUITIES	m	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOOK TVDE OOLOD	
N P E P	Z, Z, Z	<u> </u>	FRACTURES PER FOOT	DECOMI HON	<u></u>	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
ASE	BEE	(%) _Q	[₽ĕ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Ö	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
무유장	SS SS	Ω	R A	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
SSI	SHR	R O	E H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROFS, TEST RESULTS, ETC.
\vdash			3	151.65' - Fracture, 5 deg, rough, undulating,	1	Limestone	
-				organic staining, bedding plane fracture,		- 161.0-164.6' - yellowish gray with	-
			١,	intersecting, <1/8" open, olive gray (5 Y 3/2)	ш	light olive gray mottling, (5Y 7/2 with	
1 7			4	152.0-152.2' - Fracture zone, fragments up to	Ъ	5Y 5/2), fine to medium grained, mild	1
-	DO4 NO			1", intersecting fractures	╀┷	 to moderate HCl reaction, medium 	-
	R21-NQ 5 ft	16	>10	152.25' - Fracture, <5 deg, rough, undulating,	Ш	strong to strong (R3 to R4), 5-10%	
	72%	10	10	bedding plane fracture, <1/8" open		voids to <1/16" decreasing with	
1 -	12/0			152.4' - Fracture, <5 deg, rough, undulating,	╨	depth, <1% cavities to 1/4", mildly	-
-			4	bedding plane fracture, up to <1/4" open	╁┼	fossiliferous, trace planar bedding	_
165				152.45' - Fracture or mechanical break, <5		No Recovery 164.6-166.0'	
-121.9			NR	deg, rough, undulating, bedding plane — fracture, up to <1/4" open	口		R21: 7 minutes
1 -			INE	152.55' - Fracture, <5 deg, rough, undulating,	╁	_	-
	166.0		<u>L</u> _	bedding plane fracture, tight	╨		
]				152.9' - Fracture zone, fragments up to 1",		Limestone	1
-			5	intersecting fractures		 166.0-170.8' - yellowish gray and 	-
				153' - Fracture zone, fragments up to 1",	\perp	_ dusky yellow in alternating zones of	
				intersecting fractures	\vdash	variable widths (3"-8"), (5Y 7/2 and	
-			1	153.05, 153.15, 153.3' - Fracture (3), <5 deg,	1	- 5Y 6/4), moderate HCl reaction,	1
-	Baa 1::		-	rough, undulating, bedding plane fracture,	\Box	medium strong to strong (R3 to R4), medium strong (R3) zone from	-
	R22-NQ		_	<1/8" open			
1 7	5 ft	62	2	153.4' - Fracture, <5 deg, rough, undulating,	╨	 166.5-167.2', voids to <1/16" 10-20% decreasing with depth, trace cavities 	1
-	96%			bedding plane fracture, up to 1/2" open	+	to 1/2", mild to moderately	-
			3	153.5' - Mechanical break	┸	- fossiliferous decreasing with depth,	_
170				153.6' - Fracture, 10 deg, rough, undulating,		planar bedding of variable widths	
-126.9				bedding plane fracture, up to 1/2" open 154.2, 154.3' - Fracture (2), 10 deg, rough,	╁	plantal seating of randole matter	R22: 7 minutes
			0	undulating, bedding plane fracture, up to 1/4"	╨	_	- Timules
	171.0		NID	open	Н	N - D 470 0 474 0	
1 7			NR.	154.45' - Fracture, 85 deg, rough, undulating,		 No Recovery 170.8-171.0' Limestone 	1 7
-			>5	remineralization, olive gray (5Y 3/2) organic	╨	171.0-176.0' - yellowish gray and	-
				staining	\bot	- dusky yellow in alternating zones of	
]				154.65 - Fracture or bedding plane, 30 deg,	\vdash	variable widths (<4"-6"), (5Y 7/2 and]
-			>10	smooth to rough, undulating, up to 1" open	ш	5Y 6/4), fine to medium grained,	-
-				156.05' - Fracture, 5-10 deg, up to 1/4" open	\Box	 moderate HCl reaction, medium 	-
	R23-NQ		_	156.15, 156.3' - Fracture (2), 5-10 deg, up to	\vdash	strong to strong (R3 to R4), voids	
1 1	5 ft	45	3	1/2" open	+	<1/16" 10-20% of surface, trace	1
-	100%		<u> </u>	157.25' - Fracture, 5 deg, smooth, undulating, bedding plane fracture along abrupt bedding,		 organics, poorly to moderately 	-
			3	up to 1/4" open	$oldsymbol{oldsymbol{oldsymbol{\Box}}}$	fossiliferous (casts/molds)	
175				157.4' - Fracture, healed or undeveloped,	\vdash]
-131.9			-	olive gray (5Y 3/2) organic staining	╂┷	-	R23: 5 minutes
.55			1	161.3' - Fracture, 10 deg, rough, undulating,		_	1.25. 6 111110105
	176.0		Ι΄.	bedding plane, up to 2/3" open			
1 1				161.55' - Fracture, 40 deg, rough, undulating,	╨	176.0-180.7' - Same as 171.0-176.0'	1
-			2	up to 1/2" open	+	 except trace cavities to 1/2", trace 	-
				161.8' - Fracture or bedding plane, up to 1/2"		light olive gray (5Y 5/2) laminae,	
1 1				open		zone of wavy bedding with possible	1
-			2	162.2, 162.45' - Fracture (2), <5 deg, rough,	1	 cross bedding from 176.5-176.95' 	
				undulating, bedding planes, up to <1/2" open	┵		
	R24-NQ			162.3' - Fracture, 80-90 deg, partially healed	\vdash		
-	5 ft	73	1	162.75' - Fracture, 10 deg, rough, undulating, bedding plane		-	
-	94%		<u> </u>	163.15' - Fracture, 10 deg, rough, undulating,	$+$ \square	-	_
			_	bedding plane	\vdash		
180			2	163.35-163.5' - Fracture zone, fractures	1	Ī	1
-136.9			<u> </u>	intersecting, up to 1" fragments	+	_	R24: 6 minutes
-130.9			2	163.8' - Fracture, 10 deg, rough, undulating,	广		NZ4. 0 IIIIIIules
]	181.0		NR	bedding plane, up to 2/3" open	\vdash	No Recovery 180.7-181.0']
-	.51.0		111	163.9' - Fracture, 40 deg, rough, undulating,		_ 140 Aecovery 100.7-101.0	-
				up to 1/2" open	+		
					_		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-04	SHEET	11	OF	12

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723843.2 N, 457904.3 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DEPTH TYPE, ORIENTATION, ROUGHNESS RAMADITY, INFLIEND, MATERIAL AND NESS REAL PROPERTY OF THE PROPERTY OF TH	WATER	LEVELS: 5.5	ft bg	s on 5	/03/07 START : 5/2/2007	END : 5/	3/200	D7 LOGGER : M. Faurote, N. Jarzy	niecki
9 163.95 - Fracture, 10 deg, rough, undulating, along bedding plane, 1-18' open 181.0-185.6' - dusky yellow transitioning with depth to yellowish gray, (5' 6' 64 to 5' 7/2), fine to medium grained, moderate HCI reaction, which gray, (5' 6' 6' 16 5' 7/2), fine to medium grained, moderate HCI reaction, which gray, (5' 6' 6' 16 5' 7/2), fine to medium grained, moderate HCI reaction, week to medium strong R2 to 5', week to medium strong R2 to 6', increasing with depth, highly bedding plane, 14' open 167.15-167.7' Fracture, 6' 90-90 deg, rough, undulating, bedding plane, up to 178' open 163.15' Fracture, 5' deg, rough, undulating, bedding plane, up to 178' open 163.15' Fracture, 6' 90-90 deg, rough, undulating, undulating, undulating, undeveloped or healed, bedding plane 199.8' - Mechanical break, 10 deg, rough, undulating, olive gray (K' 3'2) organic staining on bottom surface, up to 172' regiments 171.45'-17.55' - Fracture, 20, edg, srough, undulating, olive gray (K' 3'2) organic staining on bottom surface, up to 172' regiments 171.25'-Fracture, 5' deg, rough, undulating, bedding plane, possible remineralization 172-5-172.6' Fracture, 5' deg, rough, undulating, bedding plane, possible remineralization 172-5-172.6' Fracture, 5' deg, rough, undulating, bedding plane, possible remineralization 172-5-172.6' Fracture, 5' deg, rough, undulating, bedding plane, possible remineralization 172-5-172.6' Fracture, 5' deg, rough, undulating, bedding plane, possible remineralization 172-5-172.6' Fracture, 5' deg, rough, undulating, light 173.2' Fracture, 5' deg, rough, undulating, bedding plane, possible remineralization 172-5-172.6' Fracture, 5' deg, rough, undulating, light 173.2' Fracture, 5' deg, rough, undulating, light 173.2' Fracture, 5' deg, rough, undulating, light 173.5' Fracture, 5' deg, rough, undulating, light 173.5' Fracture, 6' deg, rough, undulating, light 173.5' Fracture, 5' deg, rough, undulating, light 173.5' Fracture, 10' 4' fragments 10' 4' fragments 10' 4' fragments 10' 4' fragments 10' 4' fragments 10	≥o.⊋	<u>(</u>			DISCONTINUITIES		၂ ဗွ	LITHOLOGY	COMMENTS
9 163.95 - Fracture, 10 deg, rough, undulating, along bedding plane, 118' open 184.05 - Fracture, 80-90 deg 164.05 - Fracture, 80-90 deg 164.35 - Fracture, 80-90 deg 165.31 file, 156.13 file, 156.13 file, 156.25 - Mechanical break (166.1 file, 156.13 file, 156.25 - Mechanical break (166.1 file, 156.13 file, 156.25 - Mechanical break (166.1 file, 156.13 file, 156.25 - Mechanical break (166.1 file, 156.13 file, 156.25 - Mechanical break (166.1 file, 156.13 file, 156.25 - Mechanical break (166.1 file, 156.13 file, 156.25 - Mechanical break (166.1 file, 156.25 file,	TH BELO' RFACE AN VATION (f	RE RUN, IGTH, AND	(%) Q	CTURES FOOT	DEPTH, TYPE, ORIENTATION, ROU	GHNESS,	ABOLIC LC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
R25-NO R25-NO R26	SUB	COF	A Q		THICKNESS, SURFACE STAINING, AND 163.95' - Fracture, 10 deg, rough, u	TIGHTNESS	SYN	CHARACTERISTICS Limestone	DROPS, TEST RESULTS, ETC.
bedding plane, 144* open 118.7 los 17*. Heghanical break (3), 5 deg. smooth, planar, bedding plane, up to 18" open 188.0 NR 188.0	- - -	5 ft			164.05' - Fracture, 80-90 deg 164.2, 164.25' - Fracture (2), 10 deg undulating, bedding plane 164.35' - Fracture, 80-90 deg 166.1, 166.15, 166.25' - Mechanica (3), <5 deg, smooth, planar, beddin	l break g plane		transitioning with depth to yellowish gray, (5Y 6/4 to 5Y 7/2), fine to medium grained, moderate HCl reaction, weak to medium strong (R2 to R3), weak (R2) zone from 181.9-182.9', voids <1/16" 10-20%	-
186.0 NR 18° open 167.15-167.7" - Fracture, 80-90 deg, smooth, planar, bedding plane, up to 18° open 168.15' - Fracture, 45 deg, rough, undulating, bedding plane, 14° open 168.5' - Mechanical break 168.7" - Mechanical break 168.7" - Mechanical break 168.7" - Mechanical break 169.45, 107.35' - Fracture (2), 5 deg, rough, undulating, undeveloped or healed, bedding plane 169.6' - Fracture, 10 deg, rough, undulating, bedding plane 169.6' - Fracture, 10 deg, rough, undulating, olive gray (5Y 3/2) organic staining on bottom surface, up to 1/2' open 172.15' - Fracture, 25 deg, rough, undulating, olive gray (6Y 3/2) organic staining on bottom surface, up to 1/2' open 172.15' - Fracture, 25 deg, rough, undulating, bedding plane, possible remineralization 172.6' - Fracture, 20, 55 deg, rough, undulating, bedding plane, possible remineralization, up to 1/8' open 173.1' - Fracture, 80-90 deg, rough, undulating, light 173.2' - Fracture, 50 deg, rough, undulating, light 173.5' - Mechanical break 174.75, 174.8' - Fracture (2), 55 deg, rough, undulating, bedding plane 173.5' - Mechanical break 174.75, 174.8' - Fracture (2), 55 deg, rough, undulating, bedding plane 173.5' - Mechanical break 174.75, 174.8' - Fracture, 60 deg, rough, undulating, light 173.2' - Fracture, 65 deg, rough, undulating, bedding plane 173.5' - Mechanical break 174.75, 174.8' - Fracture, 60 deg, rough, undulating, bedding plane 173.5' - Mechanical break 174.75, 174.8' - Fracture, 60 deg, rough, undulating, bedding plane 173.5' - Mechanical break 174.75, 174.8' - Fracture, 60 deg, rough, undulating, bedding plane 173.5' - Mechanical break 174.75, 174.8' - Fracture, 60 deg, rough, undulating, bedding plane 173.5' - Mechanical break 174.75, 174.8' - Fracture, 60 deg, rough, undulating, bedding plane 173.5' - Mechanical break 174.75, 174.8' - Fracture, 60 deg, rough, undulating, bedding plane 174.5' - Fracture, 60 deg, rough, undulating, bedding plane 174.5' - Fracture, 60 deg, rough,					bedding plane, 1/4" open 116.7, 167.1, 169.1' - Mechanical b	reak (3), —		fossiliferous from 183.2-184.8', casts/molds up to 1/2", zones of	R25: 5 minutes
bedding plane, 1/4" open 168.5" - Mechanical break, 45 deg, smooth, planar, bedding plane 169.45, 107.35" - Fracture (2), <5 deg, rough, undulating, undeveloped or healed, bedding plane fractures 199.5" - Mechanical break, 10 deg, bedding plane 169.8" - Mechanical break, 10 deg, bedding plane 169.8" - Mechanical break, 55 deg, smooth, planar, bedding plane 171.45-171.55" - Fracture zone, intersecting fractures, up to 1/2" fragments 171.85" - Fracture, <5 deg, rough, undulating, olive gray (50' 32) organic staining on bottom surface, up to 1/2" open 172.15" - Fracture, 56 deg, rough, undulating, bedding plane, possible remineralization 172.4" - Fracture, 10 deg, rough, undulating, bedding plane, possible remineralization 172.8 174.1" - Fracture zone, intersecting fractures, up to 1/2" fragments 172.8 174.1" - Fracture (2), <5 deg, rough, undulating, bedding plane, possible remineralization, up to 1/8" open 173.0" - Fracture, 50 deg, rough, undulating, bedding plane, possible remineralization, up to 1/8" open 173.1" - Fracture, 50 deg, rough, undulating, bedding plane 173.5" - Mechanical break 174.75, Fracture, 50 deg, rough, undulating, bedding plane 173.5" - Mechanical break 174.75, Fracture, 50 deg, rough, undulating, tight 173.2" - Fracture, 50 deg, rough, undulating, tight 173.5" - Fracture (2), <5 deg, rough, undulating, tight 173.5" - Fracture, 50 deg, rough, undulating, tight 173.5" - Fracture, 50 deg, rough, undulating, tight 173.5" - Fracture, 50 deg, rough, undulating, tight 173.5" - Fracture, 50 deg, rough, undulating, tight 173.5" - Fracture, 50 deg, rough, undulating, tight 173.5" - Fracture, 50 deg, rough, undulating, tight 174.75, 715.75" - Fracture, intersecting fractures, 40 deg, rough, undulating, tight 174.75, 715.75" - Fracture, intersecting fractures, 40 deg, rough, undulating, tight	-	186.0			1/8" open ☐ 167.15-167.7' - Fracture, 80-90 deg	g, smooth,	H	thickness from 181.0-181.25', 182.9-183.2', and 184.7-185.6'	-
176.15' - Fracture, <5 deg, smooth, undulating, bedding plane, up to 1/8" open 176.7, 177.4, 179.15' - Fracture (3), <5 deg, smooth, undulating, bedding plane, up to 1/4"					168.15' - Fracture, <5 deg, rough, ubedding plane, 1/4" open 168.5' - Mechanical break, <5 deg, planar, bedding plane 169.45, 107.35' - Fracture (2), <5 dundulating, undeveloped or healed, plane fractures 169.5' - Mechanical break, 10 deg, plane fractures 169.6' - Fracture, 10 deg, rough, unbedding plane 169.8' - Mechanical break, <5 deg, planar, bedding plane 169.8' - Mechanical break, <5 deg, planar, bedding plane 171.45-171.55' - Fracture zone, interactures, up to 1/2" fragments 171.85' - Fracture, <5 deg, rough, uolive gray (5Y 3/2) organic staining surface, up to 1/2" open 172.15' - Fracture, <5 deg, rough, uolive gray (5Y 3/2) organic staining surface, up to 1/2" open 172.15' - Fracture, <5 deg, rough, uolive gray (5Y 3/2) organic staining surface, up to 1/2" open 172.15' - Fracture, 5 deg, rough, unbedding plane, possible remineralization 172.4' - Fracture, 10 deg, rough, unbedding plane, possible remineralization, up to 1/8" open 173.0' - Fracture, 50 deg, rough, unless than 1/8" open 173.0' - Fracture, 50 deg, rough, unbedding plane 173.1' - Fracture, 50 deg, rough, unbedding plane 173.5' - Mechanical break 174.75, 174.8' - Fracture (2), <5 deundulating, bedding plane, possible remineralization, up to 1/4" open 175.7-175.75' - Fracture, intersectir fractures, up to 1/4" fragments 176.15' - Fracture, <5 deg, smooth, undulating, bedding plane, up to 1/8 176.7, 177.4, 179.15' - Fracture (3)	smooth, eg, rough, bedding bedding bedding dulating, smooth, ersecting indulating, on bottom indulating, ation ecting , rough, dulating, ation ecting , rough, dulating, g, rough, estimate of the section of the sectio		Bottom of Boring at 186.0 ft bgs on	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-04	SHEET	12	OF	12	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723843.2 N, 457904.3 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING	IVIL ITIOD A	ND L	ZOIFIV	/IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HV	v cas	SILIĆ	-	ORIENTATION : Vertical
WATER	LEVELS : 5.5	ft bas	s on 5	/03/07 START : 5/2/2007 END : 5	5/3/20	007	7 LOGGER : M. Faurote, N. Jarzyn	iecki
				DISCONTINUITIES	T		LITHOLOGY	COMMENTS
≳∩⊊	(%			÷	۶ 📙	უ	LITIOLOGI	COMMENTS
O A S	ŽN.≻		SH	DESCRIPTION	1 -	ĭ.	ROCK TYPE, COLOR,	CIZE AND DEDTH OF CACING
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%	FRACTURES PER FOOT		- }	SYMBOLIC LOG	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
±₹€	E F OV		FS	DEPTH, TYPE, ORIENTATION, ROUGHNESS,		S	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
989	RNA	R Q D (%)	ZA ER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	. 3	≥ I	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	038	~		THICKNESS, SURFACE STAINING, AND HIGHTNESS	، ا ر	S)	CHARACTERISTICS	
				177.25' - Fracture, vertical, rough, undulating	Т			
-				178.05' - Mechanical break	H		-	-
				178.4' - Mechanical break	1		_	_
				178.5' - Mechanical break	1			
1 -				178.6, 179.35, 180.55' - Fracture (3), <5 deg,	+		=	-
1 4				smooth, undulating, bedding plane, up to 1/8"	1		=	_
				open	1			
1 1				179.25' - Fracture, <5 deg, smooth,	1		-	-
-				undulating, bedding plane, tight 180.25' - Fracture, 50 deg, rough, undulating	4		=	-
				181.05, 181.15, 181.6, 181.7, 181.9, 182.95' - -	1			
1 7				Fracture (6), <5 deg, rough to smooth,	1			-
-				undulating	+		-	-
				181.4' - Fracture, 65-75 deg, rough,	_			
]				undulating]
-				181.65' - Fracture, 85 deg, rough, undulating	+		-	-
				181.8' - Fracture, 85 deg, rough, undulating,	4		_	-
				open up to 1/4"				
1 1				182.4, 183.1, 184.1, 184.5' - Fracture (4), <5	1		-	1
1 -				deg, rough to smooth, undulating	4		_	-
				183.05' - Fracture, 75-85 deg, rough,				
1 7				undulating	1			1
-				183.5' - Mechanical break	+		=	-
				184.6' - Fracture, 60 deg, rough, undulating 184.85-185.6' - Fracture zone, <10 deg,	1		_	_
				rough to smooth, undulating, bedding plane	1			
-				fractures	1		_	
1 -				iractures	4		_	-
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-05	SHEET	1	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722853.5 N, 457850.2 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 252345, mud rotary, auto hammer, AWJ rods, 4-7/8" drag bit

ORIENTATION : Vertical

						auto hammer, AWJ rods, 4			ORIENTATION: Vertical
WATER	LEVELS	: 1.61 π	ogs on 6/		START : 4/10/2007	END: 4/18/2007 SOIL DESCRIPTION	LOGGE	R:I	R. Bitely, K. Coke, A. Erickson, W. Elliott COMMENTS
종무 <i>章</i>	CAMPIE	INTERVA	\1 (f)	STANDARD PENETRATION		GOIL DEGONIF HON		-	5 CONTINIENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE		. ,	TEST RESULTS	SOIL NAME,	USCS GROUP SYMBOL,	COLOR,	9	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
A A THE		RECOVI			MOISTURE C	CONTENT, RELATIVE DEN Y, SOIL STRUCTURE, MIN	ISITY OR	2	D DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
SUR			#TYPE	6"-6"-6" (N)	CONSISTENC	T, SOIL STRUCTURE, WIIN	IERALUGT	5	instruvientation
42.6	0.0					Sand With Organics (SP			SS-1: First 6" was weight of hammer
-		1.3	SS-1	0-2-3		lack grading to medium I t, loose, very fine to fine		1	4
-	1.5			(5)	20-30% organics	s, fines decreasing with d		1	Water level is based on Ground Water
-	1.0				\sand, roots		/	1	Monitoring at LNP site (FSAR Table - 2.4.12.08)
-								1	
-								1	-
-								1	-
-								1	-
-								1	1
5	5.0							1	1
37.6	0.0				Poorly Graded S			†	<u> </u>
-		1.0	SS-2	2-3-3		ellowish brown, (10YR 6 fine to fine grained, 3% n			<u>-</u>
-	6.5			(6)	\plastic fines, silic	a sand		ſĹ	_
-	0.0				Fat Clay With Sa	and (CH) Nue to pale olive, (5B 6/2	to 10Y 6/2)	1	1
-					moist, medium s	tiff, high plasticity, no dila	atancy, 20%	1	1
-					very fine silica sa	and		1	1
-								1	1
-								1	1
-								1	1
10	10.0							1	1
32.6					Clayey Sand (SC				
-		1.2	SS-3	5-7-8 (15)	moist. medium d	blue to pale olive, (5B 6/2 ense, fine to medium gra	2 to 10Y 6/2), ained, 24%	1	<u>H</u>
-	11.5			(13)	_ \medium plasticity	y fines, iron cemented sa		1	-
-					Poorly Graded S	Sand (SP) y pale orange, (10YR 8/2	2). wet.	1	1
-					medium dense, v	very fine to fine grained,	trace /	1	1
-					nonplastic fines,	trace black mineral grain	1S	1	
								1	
]	1
15	15.0								
27.6				0.00	Poorly Graded S	Sand With Silt (SP-SM) y pale orange to pale yell	lowich		
		1.0	SS-4	6-9-9 (18)	brown, (10YR 8/2	2 to 10YR 6/2), wet, med	ium dense,		
	16.5			(15)	very fine to fine o	grained, 6% nonplastic fir	nes, silica		
					Sandy Lean Cla				
					15.55-16.0' - pale	e yellowish brown, (10YF medium plasticity, slow d	8 6/2), wet,		
					40-45% very fine	to fine silica sand	iialai icy,		
_									
_									
20								\perp	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-05	SHEET	2	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722853.5 N, 457850.2 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

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WATER	LEVELS	: 1.61 ft t	ogs on 6/	14/07	START : 4/10/2007	END: 4/18/2007	LOGGER	₹ : R.	Bitely, K. Coke, A. Erickson, W. Elliott
≥∩≎				STANDARD		SOIL DESCRIPTION		ဗ္ဂ	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE INTERVAL (ft) PENETRATION TEST RESULTS				COU NAME	SYMBOLIC LOG	DEDTIL OF CACING DOLLING DATE		
		RECOVE	ERY (ft)			E, USCS GROUP SYMBOL, CONTENT, RELATIVE DEI		Ö	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
F A A			#TYPE	6"-6"-6"		CY, SOIL STRUCTURE, MIN		MB	INSTRUMENTATION
SU				(N)				S	
22.6	20.0				Silty Sand (SM))	0(0)		
-	1	1.0	SS-5	6-9-10	20.0-21.0 - pale	yellowish brown, (10YR very fine to fine grained,	6/2), wet, -	1111	1
-	04.5			(19)	nonplastic fines,	, silica sand	50-4070		-
-	21.5						-	ł	-
-							-	-	-
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l _]						_		
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25 <u> </u>	25.0				Silty Sand (SM)	1		717	_
- 17.0				6-7-6	25.0-26.0' - San	ne as 20.0-21.0'	-		-
l -		1.0	SS-6	(13)					
	26.5								
-	1						-	1]
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l -							_		_
_							_		
30	30.0								
12.6					Lean Clay (CL)				
-	1	1.3	SS-7	4-6-8	30.0-31.3' - pale	e yellowish brown to dark g greenish gray in last 0.1	yellowish -		7
-			00.	(14)	to 10YR 1/2 to 5	5G 6/1), moist, stiff, medi	um plasticity.		-
-	31.5				no dilatancy, 5-1	10% very fine silica sand		-	-
-							-		-
l _							_		
-]						_	1	
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-	1						-	1	-
-	-						-	ł	-
35	35.0				014.0 (011)			7.17	_
7.6				4-4-4	Silty Sand (SM) 35.0-36.2' - light) t olive gray, (3Y 5/2), moi:	st to wet -		_
		1.2	SS-8	(8)	loose, very fine	to fine grained, 30% low	plastic fines,		
	36.5			(5)	$_{ ightharpoonup}$ silica sand, med	dium bluish gray (5B 5/1)	clay lens	Ш	1
-					\from 35.4-35.6'			1]
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-05

SHEET 3 OF 11

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722853.5 N, 457850.2 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 252345, mud rotary, auto hammer, AWJ rods, 4-7/8" drag bit

ORIENTATION: Vertical

RILLIN	G METH	OD AND	EQUIPM	<u>ENT : CME 55 S/I</u>	N 252345, mud rotary, auto hammer, AWJ rods, 4-7/8" drag bit	ORIENTATION : Vertical
/ATER	LEVELS	: 1.61 ft l	bgs on 6/	14/07	TART : 4/10/2007 END : 4/18/2007 LOGGER : R. Bitely, K. Coke, A	. Erickson, W. Elliott
				STANDARD	SOIL DESCRIPTION	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	AL (ft)	PENETRATION TEST RESULTS	l l l	
		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF DEPTH OF	CASING, DRILLING RATE, FLUID LOSS, TESTS, AND
RFA EVA			#TYPE	6"-6"-6"		STRUMENTATION
				(N)		
2.6	40.0				Lean Clay (CL) 40.0-41.5' - dark gray, (N3), moist, stiff, medium	
		1.5	SS-9	2-4-5 (9)	plasticity, no dilatancy, 40.7-40.8' organic soil (OH)	
_	41.5			(0)	seam, light olive gray (5Y 6/1), brittle organic layer	
_					40.45- 40.65'	
-	1				-	
-	1					
-	-					
_						
_					4 1	
_					<u> </u>	
5	45.0					
2.4					Lean Clay (CL)	
_	1	1.5	SS-10	0-1-2	45.0-46.5' - Same as 40.0-41.5' except 45.2-45.6' seam of silty sand (SM), light olive gray (5Y 6/1), very	
-	46.5			(3)	fine to fine silica sands, 20% nonplastic fines	
-	40.0				 	
-						
-					-	
_					4 1	
_					_	
_					<u> </u>	
0	50.0]	
'.4					Silty Sand (SM)	
_	1	1.5	SS-11	3-4-7	50.0-50.65' - dark gray, (N3), moist to wet, medium	
-	E1 E			(11)	possible organics, 1/4" clayey organic seam, silica	
-	51.5				sand	
-					Organic Soil (OL) 50.65-50.85' - dusky yellowish brown, (10YR 2/2),	
_					moist, stiff, low to medium plasticity, rapid dilatancy	
_					Elastic Silt (MH)	
_					50.85-51.4' - yellowish gray, (5Y 7/2), moist, stiff, low to medium plasticity, rapid dilatancy, mild to moderate -	
_					HCI reaction, carbonate	
_					Organic Soil (OL)	
5	55.0				51.4-51.5' - Same as 50.65-50.85' except olive black, (5Y 2/1)	
2.4					Silt With Sand (ML)	
_	1	1.5	SS-12	14-27-36	55.0-56.5' - light olive gray, (5Y 5/2), moist, hard, low	
-	56.5			(63)	plasticity, rapid dilatancy, mild HCl reaction, 20% very -	
-	50.5					
-	1					
-					-	
_						
_]]	
_]]	
_					Driller's Remar	k: Harder drilling at 59.0'
60] [



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-05

SHEET 4 OF 11

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722853.5 N, 457850.2 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 252345, mud rotary, auto hammer, AWJ rods, 4-7/8" drag bit

ORIENTATION: Vertical

					N 202040, Mud Totally, auto Hammer, AVVJ Tods, 4-776 drag bit ORIENTATION : Vertical
WATER	LEVELS	. ι.ο ι π ί	ogs on 6/		START : 4/10/2007 END : 4/18/2007 LOGGER : R. Bitely, K. Coke, A. Erickson, W. Elliott SOIL DESCRIPTION COMMENTS
<u></u>	CAMPIE	INTERVA	I (#)	STANDARD PENETRATION	SOIL DESCRIPTION 0
DN (SAMPLE		` '	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, 으로 DEPTH OF CASING, DRILLING RATE,
H B		RECOVE			MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
-17.4	60.0			(14)	Silty Sand And Limestone (SM)
-		1.5	SS-13	26-29-30	60.Ō-61.5' - moderate yellowish brown, (10YR 5/4),
-		1.5	33-13	(59)	wet, very dense, fine to coarse grained, mild HCl reaction, 25-30% low plastic fines, 30-40%
-	61.5				gravel-sized lime stone, 1/4" organic layer at 61.3'
-					4 1
-					
-					- Drillaria Damarik, Danaria alayat 62 01
-					Driller's Remark: Reports clay at 63.0'
-					.
_					
65	65.0				
-22.4				2 40 40	Elastic Silt (MH) ↑ 65.0-65.4' - moderate yellowish brown, (10YR 5/4), (-7)))
		1.5	SS-14	2-10-10 (20)	wet, very stiff, low to medium plasticity, rapid
	66.5			\ · · /	\dilatancý, moderate HCl reaction, carbonate material \rightarrow\ \text{Organic Soil (OH)}
					Organic Soil (OH) (65.4-65.65' - brownish black, (5YR 2/1), moist, soft, _
					Limestone Fragments
					grained, mild HCl reaction
					11
-					1
70	70.0				1
-27.4	70.0				Silt With Sand (ML)
-		1.0	SS-15	11-16-7	70.0-71.0' - moderate yellowish brown, (10YR 5/4),
-	71.5			(23)	│ HCl reaction, 15-20% fine to coarse sand-sized, trace / │
-	71.5				\fine gravel-sized limestone fragments, carbonate / - material
-					- Indichai
-					
-					
-					Driller's Remark: Lost circulation at 73.5'
-					- I
					-
75 <u> </u>	75.0				Silt With Sand (ML)
-		4.4	00.40	1-3-2	75.0-76.1' - moderate yellowish brown to dusky
-		1.1	SS-16	(5)	yellowish brown, (10YR 5/4 to 10YR 2/2), wet,
-	76.5				∖rapid dilatancy, mild HCl reaction, trace fine / -
-					\gravel-sized limestone; organic seam at 75.85-76.0' / _
-					
-					
-					
-					- I - I - I - I - I - I - I - I - I - I
-					Driller's Remark: Hard zone 79.0-80.0'
80					



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-05	SHEET	5	OF	11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722853.5 N, 457850.2 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

WATER	LEVELS	: 1.61 ft l	ogs on 6/1	14/07	START: 4/10/2007 END: 4/18/2007 LOGGER: R. Bitely, K. Coke, A. Erickson, W. Elliott
				STANDARD	SOIL DESCRIPTION O COMMENTS
N AND	SAMPLE	INTERVA	L (ft)	STANDARD PENETRATION TEST RESULTS	
H BE ACE ATIO		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
-37.4	80.0	0.9	SS-17	41-50-50	Silty Sand And Limestone (SM)
-	80.8	0.9	33-17	(100)	80.ố-80.9' - moderate yellowish brown, (10YR 5/4), ————————————————————————————————————
-					reaction, 25% low plastic fines, 35% of sample is fine to coarse gravel-sized limestone fragments
l .					Begin Rock Coring at 81.5 ft bgs See the next sheet for the rock core log
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100					1 1
100					



PROJECT NUMBER:

33884.FL

BORING NUMBER:

E-05 SHEET 6 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722853.5 N, 457850.2 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

				MENT . CIVIE 33 3/N 232343, Mud Totally, NQ tools, HW C	<u>.</u>		ORIENTATION : Vertical
WATER	LEVELS: 1.6	1 ft b	gs on	6/14/07 START : 4/10/2007 END : 4/	18/200	D7 LOGGER: R. Bitely, K. Coke, A.	Erickson, W. Elliott
>				DISCONTINUITIES	ڻ ا	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
BB. 이	ER, A	(%	FRACTURES PER FOOT		[일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YFA AFA	SEF	(%) _Q	PE	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	l BC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
		S. O	유	THICKNESS, SURFACE STAINING, AND TIGHTNESS	\	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	81.5			04 Cl. Machanical broads 75 days arrest	H	Limestone	Continue drilling, switch to
-			>10	81.6' - Mechanical break, 75 deg, smooth, undulating	口	- 81.5-83.3' - moderate yellowish	rock coring 04/11/07 at
I _				82.1-82.5' - Fracture zone (>5), rough,	Н	brown, (10YR 5/4), fine to medium	08:00
			>10	undulating, 2" gravel-sized fragments,	ш	grained, mild HCl reaction, very weak	
	R1-NQ		- 10	angular	Н	 to weak (R1 to R2), voids increasing with depth along the surface 	1
-	4 ft 45%	13		82.5-82.8' - Fracture or mechanical break, smooth, undulating, open with 1/2"-2"	ш	83.0-83.3' - yellowish gray, (5Y 7/2)	1
-	45%			opening	Ш	No Recovery 83.3-85.5'	-
-			NR	83.0-83.2' - Fracture or mechanical break,	Н	_	D4: 0 minutes
85				very fine to fine grained	П		R1: 8 minutes
-42.4	85.5				Н		
			>10	85.5-85.9' - Fracture zone, rough, undulating,	Ш	Limestone	1
-				1-1/2" gravel-sized fragments, mostly <1" -	Н	 85.5-85.9' - moderate yellowish brown, (10YR 5/4), fine to medium 	1 1
-				-	口	grained, mild HCl reaction, very weak	1
-				-	₽	 to weak (R1 to R2), voids cover 5% 	1 -
-				-	Ш	surface area	1
	R2-NQ 5 ft	0		_	Н	No Recovery 85.9-90.5'	
	8%	U	NR		口		
-				_	Ш		1
-				-	ш	_	
				-	Н	_	R2: 2 minutes
90 <u> </u>					ш	<u> </u>	——————————————————————————————————————
	90.5				Н		1
I _			>5	90.5-91.0' - Fracture zone (>5), smooth, undulating, 2" gravel-sized fragments, -	ш	Limestone - 90.5-92.5' - Same as 85.5-85.9'	
				angular	Н	except moderately fossiliferous	
				91.5, 91.7, 92.4' - Fracture or mechanical	Ш	(molds and casts)	1
-			>10	break (3), smooth, undulating	ш	_	1
-	R3-NQ		-	-	ш	_ 92.5-93.2' - moderate yellowish	1
-	5 ft	24	0	02.0! Machanical brook	Н	 brown, (10YR 5/4), fine grained, 	-
	54%			93.0' - Mechanical break -	Ш	moderate HCl reaction, weak (R2),]
				_	Щ	small (1/16") voids over 5% of the surface, trace silt	
			NR		Ш	No Recovery 93.2-95.5'	1
95				·	\Box	-	R3: 8 minutes
-52.4	05.5			95.7' - Mechanical break	버		
-	95.5			95.9, 96.8, 97.25, 97.6, 97.7, 98.1, 98.4,	Ш	Limestone	SC-1 collected at 95.9-
-			1	98.5, 99.2, 100.3' - Fracture or mechanical	Ш	95.5-95.9' - light olive gray, (5Y 5/2),	96.7' –
-				break (10), 40 deg and 45 deg, rough,	H	very fine to medium grained,	
			>2	undulating, healed	Ш	moderate HCl reaction, very weak (R1), trace organics]
			~		Щ	95.9-100.3' - pale yellowish brown,]
	R4-NQ			_	Ш	(10YR 6/2), fine grained, moderate	1 1
-	5 ft	88	4	-	口	 HCl reaction, weak (R2), small (1/16") voids cover 15% of the 	1 1
-	100%			-	Н	surface, large voids (3/16") cover	1
-			2	-	Ш	 less than 5% of the surface, trace 	1 4
				_	H	organics	SC-2 collected at 99.1-
100			>10		口		100.3' R4: 11 minutes
-57.4	100.5		10	100 2 100 El. Froeture ==== (> 40) 45 d==	Н		
				100.3-100.5' - Fracture zone (>10), 45 deg, rough, undulating, 2" diameter gravel	Ш		1 1
1 -			6	fragments	Н	_	1 1
					Ħ		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-05 SHEET 7 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722853.5 N, 457850.2 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT: CME 55 S/N 252345, mud rotary, NQ tools, HW casing

ORIENTATION · Vertical

CORING	METHOD A	ND E	QUIPN	IENT : CME 55 S/N 252345, mud rotary, NQ tools, HW	casing		ORIENTATION : Vertical
WATER	LEVELS: 1.6	31 ft b	gs on (6/14/07 START : 4/10/2007 END : 4	/18/200	7 LOGGER: R. Bitely, K. Coke, A.	Erickson, W. Elliott
300	<u> </u>			DISCONTINUITIES	U	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - 105 -62.4	R5-NQ 5 ft 64%	30	6 >10 NR	101.5-101.7, 102.2- 102.6, 102.7- 103.0, 103.4-103.7' - Fracture (>10), rough, undulating, gravel fragments with <1" in size, angular 101.5, 101.7, 101.9, 102.3, 103.0, 103.4' - Fracture or mechanical break (6), rough, undulating, open (3/4")		Limestone 100.3-100.5' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, very weak (R1), trace organics, trace silt 100.5-103.7' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCl reaction, weak (R2), zone of breccia fragments pale yellowish brown ([10YR 6/2], weak [R2], moderate HCl reaction) within 10YR 5/4 matrix from 100.5-101.4', trace organics, small (<1/16") voids	R5: 8 minutes
-			>10	106.6, 107.1' - Mechanical break, tight		 cover 15-25%, few large (3/16") voids, weak zone (R1) at 102.6-102.7' No Recovery 103.7-105.5' Limestone 	
- - -	R6-NQ 5 ft 85%	75	3	107.4-107.6' - Fracture (4), horizontal, rough, undulating, small (1/2") fragments 108.0' - Fracture (2), 50 deg and 50 deg, rough, undulating, tight to open up to 3/16"		105.5-109.8' - pale yellowish brown to moderate yellowish brown, (10YR 6/2, 10YR 5/4), fine grained, moderate HCI reaction, weak (R2), trace organics, small voids (<1/16")	SC-3 collected at 108.3- 109.8'
- 110 -67.4	110.5		NR	-		cover 25% of the surface, larger voids (3/8"x3/4") cover 10% of the surface fossiliferous (molds and casts), trace organics No Recovery 109.8-110.5'	R6: 10 minutes
- - -	R7-NQ		>10 >5	110.7-110.9, 111.4-111.7' - Fracture zone, horizontal and vertical, rough, undulating, 3/8" and larger size rock fragments 111.1' - Fracture, 60 deg, rough, undulating, tight to open up to 1/16" 111.2' - Fracture, horizontal, smooth,		Limestone 110.5-112.4' - moderate yellowish brown, (10YR 6/4), very fine to fine grained, moderate HCI reaction, very weak to weak (R1 to R2), 1/16" voids cover 20-30% of the surface, larger	
- - -	5 ft 76%	38	2	undulating, open 112.0' - Fracture, 70 deg, rough, undulating, intersecting, one is tight and other is open up to 1/16" 112.4' - Fracture, horizontal, rough and		voids (3/16") cover less than 5%, fossil molds and casts 112.4-114.3' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCI reaction, very weak	Driller's Remark: Water loss at 113.0'
- 115 -72.4	115.5		NR	undulating on one face, smooth and undulating on the other, open 113.4' - Fracture, 65 deg, rough, undulating, open up to 1/16"		- (R1), small voids (1/16") cover 35% of the surface up to 3/16" size voids cover about 5% of the surface - No Recovery 114.3-115.5'	R7: 6 minutes
- - -			0	114.0, 114.1' - Fracture, horizontal, rough, undulating, open, possible bedding plane		Limestone 115.5-118.9' - moderate yellowish - brown to pale yellowish brown, (10YR 5/4 to 10YR 6/2), very fine to	
-	R8-NQ 5 ft 68%	64	1 0	117.2, 117.4' - Fracture zone (>2), rough, undulating, up to 1/2" gravel-sized fragments, angular 118.1' - Fracture, horizontal, rough, undulating, tight to open up to 3/16"		fine grained, moderate HCI reaction, very weak to weak (R1 to R2), 3/16" sized voids cover 20-30% of the surface area, fossil molds cast up to 3/16" cover 5% of the surface area, some mottling with grayish orange	
120 -77.4	120.5		NR	-		(10YR 7/4) below 117.0' No Recovery 118.9-120.5'	R8: 6 minutes
_			2	120.8, 121.0, 121.6, 121.9, 122.0, 122.3' - Mechanical break (6), rough, undulating	Ħ	-	
1							1



PROJECT NUMBER:

33884.FL

BORING NUMBER:

E-05

SHEET 8 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722853.5 N, 457850.2 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

COMING	I WETHOD A	ND L	ZOIFIV	IENT: CME 55 S/N 252345, mud rotary, NQ tools, HW c	asiriy		ORIENTATION : Vertical
WATER	LEVELS : 1.6	1 ft b	gs on (18/20		
≥∩≘	_ (9			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	507	ROCK TYPE, COLOR,	CIZE AND DEDTIL OF CACING
HUNE	RUI ÆR	Q D (%)	불	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
FF F	NG CO	Q	PAC R	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
SU	SER	A O	E H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
				120.8-120.9' - Fracture zone, rough,		Limestone	
-			4	undulating, gravel-sized fragments <1/4"	╂┯	- 120.5-121.0' - yellowish gray, (5Y	-
-	R9-NQ			diameter, angular, no openings >1/4" 121.9, 122.0' - fit tightly with opening up to		7/2), fine grained, mild to moderate HCl reaction, medium strong to	-
_	5 ft	24		1/16"	╀┷	strong (R3 to R4), small voids (1/16")	-
_	42%				\Box	cover 15% of the surface	-
I _			NR		ᅪ	121.0-122.6' - light olive gray, (5Y – 5/2), fine grained, mild to moderate	_
			INE			HCl reaction, weak to medium strong	
125					╨	(R2 to R3), small voids (1/16") cover	R9: 5 minutes
-82.4	125.5			-	口	— 10-25% of the surface, moderately fossiliferous with fossil casts and	_
-	120.0			125.5-126.4' - Fracture zone, horizontal and	╁┈	molds about 5% of the surface	-
-			>10	70 deg, rough and smooth, undulating, rock	 	No Recovery 122.6-125.5'	-
-				fragments from 3/16"-1-1/2" in size, few fragment faces match together	╚	Limestone 125.5-126.4' - yellowish gray, (5Y	-
-			>3	126.8' - Fracture, 20 deg, rough, undulating,	\blacksquare	 7/2), fine grained, strong HCI 	-
_			لنا	tight and open(1/8")	上	reaction, very weak to weak (R1 to R2), few small voids (1/16"), 3/4"	I .
	R10-NQ			127.1-127.2' - Fracture, horizontal, rough, undulating, open, some small (1/2")	H	L thick of light olive gray 5Y 5/2	
	5 ft 70%	34	1	fragments		limestone (slow HCl, medium strong	Driller's Remark: Hard
_			>5	127.4' - Fracture, horizontal, smooth, planar	╨	[R3]) is present (interval unknown	material at 128.0'
-			_	and undulating, open 127.6' - Fracture, horizontal, rough,		due to fractured nature of the interval)	-
			ND	undulating, tight with some openings up to	╂	126.4-129.0' - light olive gray and	R10: 8 minutes
130_ -87.4			NR	1/16"		grayish orange, (5Y 5/2 and 10YR	TO 0 minutes
-07.4	130.5			128' - Fracture, horizontal, rough, undulating, tight with some openings up to 1/16"	╨	7/4), mottled, fine grained, mild HCl reaction, weak to moderately strong	_
			1	128.7-129.0' - Fracture zone, horizontal,	上	(R2 to), moderately fossiliferous, few	_
				rough and smooth, undulating to planar,	\vdash	small voids (1/16") cover about 20%	
1 7				fragment faces do not fit together 130.55' - Fracture, horizontal, rough,	\top	of the area, large voids and fossil molds/casts up to 3/8"x9/16" cover	_
1 -				undulating, open	╁	5% at 127.2-127.4' is a zone of light	-
-	R11-NQ			3, 4, 4	仜	olive grey (5Y 5/2) limestone, slow	Driller's Remark: Soft
-	5 ft	7	NR		+	HCl reaction, medium strong to strong (R3 to R4), no small voids as	material throughout the run -
-	8%		'\'\		+	fossil molds/casts, another 1" thick	-
_					┵	zone is present at about 129.0'	_
_					\perp	No Recovery 129.0-130.5' - Limestone	
135					Т	130.5-131.0' - pale yellowish brown	R11: 1 minutes
-92.4	135.5			_		and grayish orange, (10YR 6/2 and	
1 7	-			135.55' - Fracture, horizontal, smooth, planar	世	- 10YR 7/4), mottled, fine grained, moderate to strong HCl reaction,	1
-			7	and undulating, open	$+$ \Box	very weak (R1), small voids (1/16")	-
-			1	135.65, 135.75, 136.3, 136.35' - Fracture, horizontal, smooth, planar, tight to open up to	世	- cover about 10%, 3/16" size cavities No Recovery 131.0-135.5'	-
-				1/8", appear to be bedding plane	+-	Limestone	-
-	B. 6. 5. 5			135.7-136.1' - Bedding plane	上	_ 135.5-136.0' - yellowish gray and	-
_	R12-NQ 5 ft	0		136.0, 136.2' - Fracture, horizontal, smooth, planar and undulating, open	\vdash	grayish orange, (5Y 7/2 and 10YR	
	22%	•		136.1-136.7' - rock fragments	工	7/4), mottled, fine grained, mild HCl reaction, strong (R4), some thinly	_
]			NR	136.5' - Fracture, horizontal, smooth, planar	\vdash	laminated bedding at 135.5-135.7',	1
				and undulating, open	1	bedding angle 0-5 deg	
140					╁	136.0-136.2' - yellowish gray, (5Y 7/2), fine grained, strong HCl	R12: 4 minutes
-97.4				_	仜	reaction, extremely weak (R0), very	_
-	140.5			140.5-140.7' - Fracture zone, smooth,	+	_ fossiliferous	-
-			>10	undulating, 1/2" fragments	#	}	-
			\sqcup	<u> </u>	世		
							1



PROJECT NUMBER:

33884.FL

BORING NUMBER:

E-05 SHEET 9 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722853.5 N, 457850.2 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND FOUIPMENT: CMF 55 S/N 252345, mud rotary, NO tools, HW casing

ORIENTATION · Vertical

CORING M	METHOD AI	ND EC	QUIPN	MENT: CME 55 S/N 252345, mud rotary, NQ tools, HW o	asing		ORIENTATION : Vertical
WATER LE	EVELS : 1.6	1 ft b	gs on (6/14/07 START : 4/10/2007 END : 4/	18/200	17 LOGGER: R. Bitely, K. Coke, A.	Erickson, W. Elliott
300	<u>~</u>			DISCONTINUITIES	(J)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - 145 -1024	R13-NQ 5 ft 1 44%	12	>10 2 NR	141.3-142.0' - Fracture zone, horizontal and vertical, rough and smooth, undulating, numerous fragments from 3/16"-2" in size 142.4-142.7' - Fracture, horizontal and 60 deg, rough, undulating, open, both fractures have several small (about 3/16") fragments		Limestone 136.2-136.6' - Same as 135.5-136.0' except thinly laminated bedding, bedding angle about 5 deg No Recovery 136.6-140.5 140.5-141.2' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, weak (R2), fossiliferous, small voids (1/16") cover about 25% of the surface, large voids (up to 3/16"x3/8") cover about 5% of the surface area	Driller's Remark: Become harder at 143.0'
- - - - -	R14-NQ 5 ft 1 80%	20	>10 5 >10	145.7' - Fracture, 10 deg, rough, undulating, tight with some open up to 3/16" 146.0-146.4' - Fracture zone, rough and smooth, undulating, Numerous small fragments 3/16"-1" 146.4-147.0' - Fracture, 80 deg, smooth, undulating, tight 146.7' - Fracture, 5 deg, smooth, undulating, tight, appears to be along bedding plane 147' - Fracture, 10 deg, rough, undulating,		141.2-142.7' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCl reaction, medium strong (R3), small voids (<1/16") cover 10% of the surface area, large voids (3/16"x3/4") cover about 5%, fossiliferous No Recovery 142.7-145.5' Limestone 145.5-146.2' - Same as 141.2-142.7' 146.2-148.6' - yellowish gray to	Driller's Remark: Piece stuck in core, pullout, clean and then run last 2.0'
150 -107.4 15	50.5		NR >10	open, few fragments 147.1' - Fracture or mechanical break, 45 deg, rough, undulating, open 147.4-148.2' - Fracture zone, horizontal and 70 deg, rough, undulating, several fragments 1"-3" in size, undulating, many fragments fit together, fragments at 148.0' shows coring		grayish orange, (5Y 7/2 to 10YR 7/4), fine grained, moderate HCl reaction, medium strong (R3), thinly laminated bedding from 146.4-147.0' and 148.2-148.6', trace voids (1/16") 148.6-149.5' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction,	R14: 22 minutes
- - - - 155 -112.4	R15-NQ 5 ft 1 66%	16	>10 6 2 NR	marks in 2 directions 148.2' - Fracture, horizontal, smooth, planar, open 148.7' - Fracture or mechanical break, 10 deg, rough, undulating, tight to open up to 3/8" 149.5-149.7' - Fracture, 65 deg, rough, undulating, tight to open up to 3/8" 149.7' - Fracture, horizontal, rough, undulating, open up to 3/8" 150.0-151.2' - Fracture zone, rough, undulating, some dark staining, gravel-sized fragments		medium strong to strong (R3 to R4), very fossiliferous (mold and casts), less than 1/16" size voids cover about 25% of the surface area. voids and fossil molds (up to 3/8"x3/4") cover 15% of the surface area, trace organics No Recovery 149.5-150.5' Limestone 150.5-151.7' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, very weak to weak (R1 to R2), small	
- - - - - - - - - - - - - - - - - - -	R16-NQ 5 ft 46%	30	2 4 1 NR	fragments 151.2-151.4' - Fracture (2), vertical and 70 deg, rough, undulating, dark, tight to open up to 3/16",10% stain coverage on both surface 151.5-151.9' - Fracture zone, horizontal and 60 deg, rough, undulating, several fragments up to 1-1/2", few pieces fit together 152.3, 152.4, 152.6, 152.9' - Fracture (4), 40 deg and 50 deg, rough, undulating, fracture in alternating direction, tight, some open up to 3/16" 152.6-152.9' - Fracture, 70 deg, rough, undulating, tight to open up to 1/16" 153.2' - Fracture, 55 deg, rough, undulating, dark, tight, 10% dark staining 153.3, 153.4' - Fracture (2), horizontal, smooth, undulating, open 153.4-153.55' - Fracture zone		voids (up to 1/16") cover about 15% surface, few large voids 151.7-153.8' - yellowish gray, (5Y 7/2), fine grained, mild HCl reaction, strong (R4), fossiliferous, 2-13/32 zone of light olive gray (5Y 5/2) mottling at about 151.5', small voids (<1/16") cover 5% of surface, few larger voids (fossil molds) No Recovery 153.8-155.5' Limestone 155.5-155.6' - dark yellowish brown, (10YR 4/2), fine grained, strong to moderate HCl reaction, very weak (R1), laminated bedding, trace voids (<1/16")	R16: 5 minutes SC-4 collected at 160.5- 161.4'



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-05 SHEET 10 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722853.5 N, 457850.2 E (NAD83)

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

				IENT: CME 55 S/N 252345, mud rotary, NQ tools, HW c			ORIENTATION : Vertical
WATER	LEVELS : 1.6	1 ft b	gs on (18/20		
≥□€	(%			DISCONTINUITIES	100	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION]]	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
	S Ŧ,Ä	(%) Q	158	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
E 돈	NG:	ØΒ	I AC	PLANARITY, INFILLING MATERIAL AND	₩	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
교양교	SHR	ď	HH	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Š	CHARACTERISTICS	BROLO, TEOLINEOGETO, ETO.
			6	153.7, 153.75' - Fracture (2), horizontal,	\Box	Limestone	
-				smooth and undulating, rough and	1—	- 155.6-156.7' - light olive gray, (5Y	-
-	R17-NQ			undulating, moderately tight 155.6' - Fracture, rough, planar, open	1	5/2), fine grained, mild HCl reaction, medium strong to strong (R3 to R4),	-
-	5 ft	28		155.7-156.2' - Fracture, 70 deg, rough,	╂╨	- small voids (<1/16") cover about 15%	-
l -	32%			undulating, tight and open (1/16")	ш	surface, moderately fossiliferous, few	-
l _			NR	156.7, 156.8' - Fracture, horizontal, rough, planar, open	ᅪ	3/16" fossil molds and casts - 156.7-157.8' - dusky yellow, (5Y 6/4),	
1 -				157.2' - Fracture, 20 deg, rough, undulating,		fine grained, mild to moderate HCl	
165				tight	╨	reaction, very weak (R1), becoming	R17: 4 minutes
-122.4				157.4' - Fracture, 50 deg, rough, undulating, —	士	— weak to moderately strong (R2 to	_
-	165.5			tight 157.6' - Fracture, 30 deg, rough, undulating,	╁	R3) by 157.6', laminated bedding 156.7-157.2', moderately	-
_			7	tight	╨	fossiliferous, small voids (<1/16")	_
l _				161.4' - Bedding plane, smooth, planar	┰	cover about 5% surface area, few	_
				161.8-162.1' - Bedding plane, horizontal, smooth, planar, open		large voids No Recovery 157.8-160.5'	
_			4	165.5-165.9, 166.6' - Bedding plane (3),	1	Limestone	-
-	R18-NQ			smooth, planar	╁	160.5-162.1' - dusky yellow to light	-
-	5 ft	17	4	166.2' - Fracture, horizontal, rough,	厂	olive gray, (5Y 6/4 to 5Y 5/2), fine	-
-	64%			undulating, open 166.4' - Fracture, horizontal, rough,	╁┼	grained, moderate HCl reaction, medium strong (R3), small voids	-
l _				undulating, open		(<12/16") cover 15% of the surface	_
1				166.7' - Fracture, 5 deg, smooth, undulating,	\vdash	area, few large voids (3/16")	
170			NR	open 167.1' - Fracture, 5 deg, rough, undulating,	工	No Recovery 162.1-165.5'	R18: 12 minutes
-127.4	470 5			tight with open up to 3/16"	╁	165.5-166.3' - Same as 160.5-162.1'	_
-	170.5			167.4, 167.9' - Fracture (2), horizontal, rough,	世	166.3-167.2' - moderate olive brown,	-
-			4	undulating, open 167.7' - Fracture, 30 deg, rough, undulating,	₩	(5Y 4/4), fine grained, mild HCl reaction, medium strong (R3), small	-
-				tight with open up to 1/16"	ፗ	voids (<1/16") cover 50% of the	-
l -			4	168.1, 168.7' - Fracture (2), horizontal, rough,	┢	surface area, few larger voids	_
				undulating, open		(3/16"), moderately fossiliferous,	_
1 7	R19-NQ			170.5-170.8' - Fracture, 80 deg, closed 170.8, 171.2, 172.0, 172.2' - Fracture (4),	\vdash	fragments of gray limestone (up to 3/8") inclusion from 167.0-167.2'	
-	5 ft 84%	45	>10	horizontal, rough, undulating	世	167.2-168.7' - yellowish gray, (5Y	-
-	0470			170.8-171.2' - Fracture, 80 deg, open up to	╁	- 7/2), mild to moderate HCl reaction,	-
-			>10	3/16" 171.7' - Fracture, horizontal and 40 deg.	-	medium strong (R3), laminated bedding 168.0-168.2', small voids	-
-				rough, undulating, dark	╨	- (1/16") cover 5% of the surface area	
175			0	172.5' - Fracture, 50 deg, dark gray, tight with _	上	No Recovery 168.7-170.5'	R19: 13 minutes
-132.4	175.5		NR	open up to 3/16" 172.7' - Fracture, horizontal, smooth,		Limestone - 170.5-174.7' - light olive gray to	
I -				undulating, open		yellowish gray, (5Y 5/2 to 5Y 7/2),	1
1 -			>10	173.0-173.8' - Fracture zone, horizontal and	┰	mild to moderate HCl reaction,	·
1 -				vertical, rough, undulating, dark, many	士	- strong (R4), voids (up to 1/16") cover	-
-			4	3/16"-2" size fragments, some faces are smooth and planar	+-	10% surface area, zone of increased small voids (20%) from 173.4-173.6',	-
-				174.0, 174.1, 174.2' - Fracture (3), 5 deg,		fewer larger voids (3/16")	
I _	R20-NQ 5 ft	7		rough, undulating, open	$oldsymbol{\perp}$	No Recovery 174.7-175.5']
	30%	1		174.4' - Fracture, 60 deg, smooth, undulating, tight		Limestone 175.5-177.0' - Same as 170.5-174.7'	
-			NR	175.8, 175.9' - Fracture or mechanical break,	1—	except increased amount of voids	1
-				20 deg and 30 deg, rough, undulating, tight	世	(30%) from 175.9 to 176.5	·
-				175.8-176.0' - Fracture, vertical, rough, undulating, open	$+$ \square	No Recovery 177.0-180.5'	R20: 6 minutes
180 <u>-</u> 137.4				176.1-176.3' - Fracture zone, rough,		 -	
-137.4	180.5			undulating, several 1" size fragments, no		<u> </u> -	
			5	identifiable fracture angle	╨	1	_
1				176.3, 176.4, 176.5, 176.55, 176.65' - Fracture, horizontal, rough, undulating, open			
				The second of th			
$\overline{}$			_			•	•

APPENDIX 2BB-820 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-05	SHEET	11	OF	11	

ORIENTATION: Vertical

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1722853.5 N, 457850.2 E (NAD83)

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing

ELEVATION: 42.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

WATER LEVELS: 1.61 ft bgs on 6/14/07 START: 4/10/2007 END: 4/18/2007 LOGGER: R. Bitely, K. Coke, A. Erickson, W. Elliott DISCONTINUITIES LITHOLOGY COMMENTS DEPTH BELOW SURFACE AND ELEVATION (ft) CORE RUN, LENGTH, AND RECOVERY (%) 90 FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS 176.7, 177.0' - Fracture, horizontal, smooth, Limestone SC-5 collected at 181.7-0 planar, open 180.5-180.8' - moderate yellowish 183.4' 180.6, 180.7, 180.8, 180.9, 181.5, 181.6, 181.7" - Fracture (7), horizontal, smooth, brown, (10YR 5/4), fine grained, moderate HCI reaction, weak (R2), R21-NQ planar to undulating, openings ranging from thinly laminated bedding, few small 45 0 5 ft voids (<1/16") 180.8-181.7' - moderate yellowish 72% 1/16"-3/8", no faces match to other 181.4' - Fracture, horizontal, smooth, >10 brown, (10YR 5/4), fine grained, undulating, open moderate to strong HCI reaction, 183.4' - Fracture, horizontal, rough, very weak (R1), thinly laminated undulating, open R21: 9 minutes NR 185 bedding (10 deg angle), zone of olive gray (5Y 3/2) lamination about 183.7-184.1' - Fracture zone, horizontal and -142.4 vertical, rough and undulating, smooth and 185.5 planar, 1/2"-1- 1/2" size rock fragments 1/16"-3/16" thick with 1/2" spacing from 181.3-183.6' 183.4-183.7' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCl reaction, medium strong (R3), fragments (3/16"x3/8") of gray limestone present in the yellowish gray matrix, up to 1/16" voids cover about 15% of the surface area, up to 3/16" voids cover 5% of the surface area 183.7-184.1' - light olive gray and grayish orange, (5Y 5/2 and 10YR 7/4), fine grained, mild HCl reaction, medium strong (R3), thinly laminated, few small voids (1/16") No Recovery 184.1-185.5' Bottom of Boring at 185.5 ft bgs on 4/18/2007



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-06	SHEET	1	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

						ry, auto nammer, Avvj rods,			ORIENTATION: Vertical
WATER	LEVELS	: 5.5 ft b	gs on 5/02	2/U <i>1</i>	START : 5/2/2007	END : 5/4/2007	LOGGE	≺ : C. T	
200				STANDARD		SOIL DESCRIPTION		ا ا	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	0011 11414	IE 11000 000110 01/4 4001	001.00	SYMBOLIC LOG	DEDTIL OF CACINIC DRILLING DATE
불병은		RECOVE	ERY (ft)			IE, USCS GROUP SYMBOL, E CONTENT, RELATIVE DEI		Ιž	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
F A A			#TYPE	6"-6"-6"		ICY, SOIL STRUCTURE, MIN		₩ W	INSTRUMENTATION
SU ELI				(N)				ς	
42.8	0.0				Poorly Graded	Sand With Silt (SP-SM)		114	
-		1.1	SS-1	1-1-2	U.U-1.1' - DrOWr	nish black, (5YR 2/1), mois e grained, color grades to l	St, very loose, light gray	1出]
-	4.5			(3)	(N7) below 0.6	', 6% nonplastic fines, orga	anics /	11:11	-
-	1.5				decreasing with	h depth, silica sand		┨	-
-								4	-
l -								4	_
l _								┚	
								ı	
-								1	1
-								1	1
								1	-
5 37.8	5.0				Sandy Fat Clay	v (CH)		/ //	_
"-				1-3-4	5.0-6.0' - very l	light gray, (N8), moist, med	dium stiff,		-
l -		1.0	SS-2	(7)	high plasticity.	no dilatancy, with iron oxic	de staining		_
l _	6.5				(5.0-5.3'), 25-3 particles, silica	0% very fine grained, trace	e organic /	╛	
					particies, silica	i Saria		ı	
-								1]
-								1	-
-								┨	-
-								-	-
l -								4	
I _								1	_
10	10.0							ı	
32.8					Sandy Lean C	lay (CL)			_
-		1.5	SS-3	1-2-3	10.0-11.5' - Sai (N7) medium r	ime as 5.0-6.0' except thin plasticity, 41% fine sand, s	light gray,	V ///	1
-	11 5			(5)	(147), mediam p	plasticity, 4170 line sana, s	diay ocurro	V ///	-
-	11.5							Y ///	-
-								-	-
-								4	
I _								1	_
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-								1]
-								1	1
	45.0							1	-
15 <u> </u>	15.0	-			Sandy Fat Cla	v (CH)		//	First reaction to HCl
		, .		1-4-7	15.0-15.2' - Sa	me as 5.0-6.0'		4 [
-		1.1	SS-4	(11)	Silt (ML)]
I -	16.5				15.2-16.1' - gra	ayish orange, (10YR 7/4), i	moist, soft,	1	
					reaction. 5% ver	y rapid dilatancy, mild to mery fine sand-sized, carbor	nate material]
-							,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1]
-								1	1
-								1	
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-								-	-
-								1	
20		<u> </u>						\perp	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-06	SHEET	2	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

						ry, auto nammer, Avv3 rous,			ORIENTATION : Vertical
WATER	LEVELS	: 5.5 ft bo	us on 5/02		START : 5/2/2007	END : 5/4/2007	LOGGER	(; U.	Sump COMMENTS
30₽				STANDARD PENETRATION		SOIL DESCRIPTION		၅	COIVIIVIEN 15
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	MAIN IIOS	IE, USCS GROUP SYMBOL	COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
ACE		RECOVE	ERY (ft)		MOISTURE	E CONTENT, RELATIVE DE	NSITY OR	30	DRILLING FLUID LOSS, TESTS, AND
무유실			#TYPE	6"-6"-6"	CONSISTEN	ICY, SOIL STRUCTURE, MI	NERALOGY	ΥMΕ	INSTRUMENTATION
22.8	00.0			(N)	Clayey Sand ((CC)		S	
	20.0			3-4-5	20.0-21.3' - yel	llowish gray, (5Y 8/1), mois	st to wet,		_
l -		1.3	SS-5	(9)	loose, very fine	e to fine grained, no HCl re	eaction, 18%		_
l _	21.5				medium to high	h plastic fines, silica sand		////	_
]
-							_	1	1
-							-		1
-							-		1
-							-		
-							-		-
25 <u> </u>	25.0				→ Clayey Sand ((SC)		////	-
-		1 2	00.0	8-20-49	\ 25.0-25.2' - Sa	ame as 20.0-21.3' except d	lark yellowish /-		-
-		1.3	SS-6	(69)	brown, (10YR				-
-	26.5					th Limestone (SM) ayish orange to dark yellov	vish orange.		-
-					(10YR 7/4 to 1	0YR 6/6), moist to wet, ve	ry dense, low _		
-					fines fine grav	erate HCl reaction, 15-20% rel-sized limestone, fine to	6 low plastic -		_
l _						rbonate materials	_		_
-							_		1
30	30.0						-	1	1
12.8	00.0					th Limestone (SM)		Π	
-		1.5	SS-7	31-31-55	30.0-31.1' - Sa	ame as 25.2-26.3'	-		1
-	24.5			(86)	Silt (ML)				-
-	31.5				↑ 31.1-31.5' - ligh	ht brown, (5YR 6/4), moist	, hard, low		-
-					\plasticity, rapid	d dilatancy, mild HCl reacti d, carbonate material	on, trace very / ₋		-
-					VIII e sand-sized	u, carbonate material			-
-							-		-
-							_		
-							-		_
I -							_]
35	35.0								
7.8					Silty Sand (SN	M)	4/2) moint	$\ \ $]
I -		1.3	SS-8	39-47-45 (92)	very dense, fin	rk yellowish brown, (10YR ne to coarse grained, mild t	. →/∠), ITIOISI, = to moderate		1
1 -	36.5			(32)	HCl reaction, 3	30% nonplastic fines, trace	to 10% fine	Ш	1
-	- 3.0				\gravel-sized lin	mestone, carbonate materi	iai / -		1
1 -				l			-		-
-							-		
-							-		-
-				l			-		-
-							-		-
-							-		-
40								Ш	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-06	SHEET	3	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

						ary, auto nammer, Avvo rous,				ORIENTATION : Vertical
WATER	LEVELS	: 5.5 ft b	gs on 5/0:	2/07 S	START : 5/2/2007	END : 5/4/2007	LOGG	<u>⊧R :</u>	C.	
30₽				STANDARD PENETRATION		SOIL DESCRIPTION		\dashv	ဗ္ဗ	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA		TEST RESULTS	SOII NAM	ME, USCS GROUP SYMBOL	COLOR		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H BI ACE ATIC		RECOVE	ERY (ft)		MOISTURE	E CONTENT, RELATIVE DE	NSITY OR		30L	DRILLING FLUID LOSS, TESTS, AND
LEV.			#TYPE	6"-6"-6" (N)	CONSISTEN	NCY, SOIL STRUCTURE, MI	NERALOGY	- 1	χM	INSTRUMENTATION
2.8	40.0	0.6	SS-9	56-50/1	Sandy Silt (MI	L)		\dashv	ĬI	
-	40.0 40.6	0.6	55-9	(106/7")	40.0-40.6' - gra	ayish orange to pale yellow	wish brown,	A	Щ	-
-					(10YR 7/4 to 1	IOYR 6/2), mottled, moist, d, nonplastic, rapid dilatan	hard, fine to	H		-
-					moderate HCI	reaction, 38% fine to coar	se	/-		-
-					\sand-sized, tra \material	ace fine gravel-sized, carb	onate	-		-
-					imateriai			4		-
-								4		-
-								4		_
-								4		_
-								4		_
45 -2.2	45.0				Cond : Oils (55)			Д,	\mathbf{H}	_
-2.2	ΛE O	0.3	SS-10	36-50/4 (86/10")	Sandy Silt (MI 45.0-45.8' - Sa	L) ame as 40.0-40.6' except 1	1/4" thick	4		_
-	45.8			(00,10)	vertically exter	nded black organic seam f		/╬	Щ	_
_					\45.4-45.8'			′ ┨		_
-								4		_
_								4		_
_								4		_
_								4		_
_								1		
_								1		
50	50.0									_
-7.2				05.40.45	Sandy Silt (MI	L) Howish gray, (5Y 7/2), moi	ist hard fine		Ш	
_		0.2	SS-11	25-43-45 (88)	to coarse grain	ned, nonplastic, rapid dilat	ancy, mild		Ш	
	51.5			(55)		33% fine to coarse sand-sicarbonate material, trace of		/出	щ	
					\graver-sizeu, c	carbonate material, trace o	ngariics			
								1		
								1		
								1		_
1 7								1]
1 7								1]
55	55.0							1]
-12.2		0.8	SS-12	43-50/4	Silt With Sand	d (ML)		\exists	\prod	
	55.8	0.0	00-12	(93/10")	55.0-55.8' - Sa moderate brow	ame as 50.0-51.2' except o vn, (5YR 4/4), 10-15% sar	grading to nd-sized and	1	Ш	1
					thin organic le			/ 🕇		1
								1		
								1]
-								1		
-								1		
-								1		1
-								1		-
60								+		
- 00_								+	\dashv	-



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-06	SHEET	4	OF	11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

						ary, auto hammer, AWJ rods END : 5/4/2007	LOGGE		ORIENTATION : Vertical
WATER	LEVELS	: 5.5 π Β	gs on 5/0.		START : 5/2/2007	SOIL DESCRIPTION	LUGGE	T	COMMENTS
}9€1	SAMPLE	INTERVA	Al (ff)	STANDARD PENETRATION TEST RESULTS		35.2.2.2.3014111014		90	33
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAWFLE	RECOVE		TEST RESULTS	SOIL NAM MOISTURE	ME, USCS GROUP SYMBOI E CONTENT, RELATIVE DE	L, COLOR, ENSITY OR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH SURF/ ELEV/			#TYPE	6"-6"-6" (N)	CONSISTEN	NCY, SOIL STRUCTURE, M	INERALOGY	SYMB	INSTRUMENTATION
-17.2 - - - - -	60.0	0.1	<u>(SS-13</u>)	50/1.5 (50/1.5")	Limestone Fra 60.0-60.1' - ye grained, mild t fragments	agments ellowish gray, (5Y 7/2), fine to moderate HCl reaction,	e to coarse sand-sized	-	- - - - -
- 65_ -22.2 -	65.0 65.2	0.2	SS-14	50/2.0 (50/2.0")	Begin Rock Co	agments ame as 60.0-60.1' oring at 66.0 ft bgs sheet for the rock core log		- - - - - -	- - - -
- - - - 70_ -27.2					See the next s	sieet for the rock core log	_	- - - -	- - - - -
- - - -								- - - -	- - - - - -
75							_	- - - - - -	- - - - - - - - - -
- 80								_	-



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-06 SHEET 5 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

CORING	CORING METHOD AND EQUIPMENT: CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION: Vertical								
WATER	WATER LEVELS: 5.5 ft bgs on 5/02/07 START: 5/2/2007 END: 5/4/2007 LOGGER: C. Sump								
	<u> </u>			DISCONTINUITIES	(J	LITHOLOGY	COMMENTS		
N (±)	, Q.%		Ś	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	1		
표유현	P. A. C.	(%	A P		일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND		
YFA YFA	SOV	(%) Q	VCT PFC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	JBC I	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD		
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	S O	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.		
	66.0			66.0' - Fracture, horizontal, rough	Н	Limestone	Numerous low angle to		
-			5	66.2' - Fracture, horizontal, rough	\vdash	 66.0-69.9' - pale yellowish brown, 	vertical healed fractures -		
-				66.4' - Fracture, 45 deg, rough, semi planar 66.6, 66.8, 67.3' - Fracture, 45 deg and 60	Ш	(10YR 6/2), fine to medium grained, strong HCl reaction, weak (R2),	-		
-			1	deg, non-planar	Н	- dissolution along bedding plane	-		
l -	R1-NQ	8			ш	lamination, spaced (1/16"-1/4"), voids (1/16"-3/16") cover 10% surface	_		
			4	68.1-68.2' - sandy interbed	Н				
	5 ft 78%	0	4	68.1, 68.5, 68.8, 68.9' - Fracture (4), rough, undulating, irregular, non-planar	Ħ				
-			40	69.0-69.9' - Fracture zone (>10)	Ш	-	-		
70			>10		口	-	-		
-27.2				_	Н	No Recovery 69.9-71.0'	R1: 5 minutes		
-			NR		H	_	-		
-	71.0			71.0.72.01 Erocture zone frommente	Н	Limentone	-		
-			>10	71.0-72.0' - Fracture zone, fragments	Д	Limestone - 71.0-72.3' - Same as 66.0-69.9'	0.5" organic seam -		
l _					Н	except very weak (R1), increasing	_		
			- 10	72.0-73.0' - Fracture zone, fragments	H	percent small voids, friable 72.3-75.6' - moderate vellowish			
-			>10		Ш	brown, (10YR 5/4), very fine to fine	I -		
-	R2-NQ			73.1' - Fracture, vertical, rough, undulating	14	grained, very weak to weak (R1 to	-		
-	5 ft 72%	23	1		ш	 R2), finely laminated, trace voids/cavities, dissolution texture 	-		
-	12/0			74.1, 74.2, 74.4, 74.5, 74.6, 74.8, 74.8, 74.9' - Bedding plane or mechanical break (8), <5	Н	along the bedding plane (1/4" thick)	-		
-			7			-	-		
75 <u> </u>				deg. rough, planar, open <1/16"	Н				
-32.2			2	75.1-75.2' - Fracture or mechanical break, 80	ш	_	R2: 8 minutes		
l _	76.0		NR	deg and vertical, rough, planar, tight	Н	No Recovery 75.6-76.0'	_		
					Ħ	Limestone	Intact core 19.2" (76.1-		
			0		Н	 76.0-78.3' - grayish yellow to orangish gray, (5Y 8/4 to 10YR 7/4), 	77.7') break to reduce size - SC-1 collected at 76.1-		
-					ш	strong HCl reaction, weak (R2),	76.9'		
-			>10		ш	 voids (up to 1/16") cover 15-20% of the surface, cavities up to 3/4" 	-		
-	R3-NQ	33	0	77.7-78.1' - Fracture zone, <1/2" fragments	Н	diameter (10-20 per foot), fossil	-		
-	5 ft				口	 molds and solution cavities, dark 	-		
-	46%				Н	brown /black staining on some larger cavities, light to dark gray fine	-		
-			ND		ш	 grained inclusions, rip up clasts 	-		
80			NR	_	Н	between 77.0-77.5', needle-like			
-37.2					Ħ	organic imprints on fracture surface, dark brown layering visible over 3/4"	R3: 4 minutes		
I -	81.0				H	zone			
-				81.1, 81.2, 81.4, 81.5' - Fracture or	Щ	No Recovery 78.3-81.0' Limestone	1		
I -			4 med	mechanical break (4), rough, irregular	Ш	81.0-84.0' - Same as 76.0-78.3']		
-				82.1' - Fracture, rough, planar, dark	Н	except strong HCl reaction, voids	-		
-			2	gray/black, possible organic pyrite	口	(1/16") and cavities cover 15-25% of the surface, fossiliferous with molds	-		
-	R4-NQ			82.4' - Fracture, rough, undulating	₽	and casts (lot more than molds)	-		
-	5 ft	37	>10	82.9-83.3' - Fracture zone, percent of large cavities (>1/2") increasing in this zone	П	-	-		
-	60%			oatilioo (* 172) morodollig ili tillo zono	Н	- N. B	-		
_					Ħ	No Recovery 84.0-86.0'	_		
85			ND		世				
-42.2			NR	_	\square		R4: 4 minutes		
-	86.0				Ш]		
	00.0				\Box				
					•		•		

APPENDIX 2BB-826 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-06 SHEET 6 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

				IENT : CIVIE 35 3/N 232345, Midd Totally, NQ tools, HW C				ORIENTATION : Vertical
WATER	LEVELS : 5.5	ft bg	s on 5	02/07 START : 5/2/2007 END : 5/4	1/200	LOGGER : C. Sump	_	
> -	· ·			DISCONTINUITIES	_{(D}	LITHOLOGY		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,		
E H	N A K	(9)	J. C	5200 M 11011	일	MINERALOGY, TEXTURE,		SIZE AND DEPTH OF CASING,
FÄÄ	ER OVE	(%) Q	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	B	WEATHERING, HARDNESS,		FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
F S S	RNN	Ø	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ž	AND ROCK MASS CHARACTERISTICS		DROPS, TEST RESULTS, ETC.
ОΩШ	074	ď	ш а	THICKNESS, SON ACE STAINING, AND HOTTNESS	S			
					ш	No Recovery 86.0-89.7'		Driller's Remark: 86.0-89.5'
-				-	Н	=		very soft; possible void, – lost 20 % circulation, no
-				-		-		recovery likely in this zone
I -				-	₽₩	_		-
			NR		Н			
	R5-NQ							1
-	5 ft	7		-	ш	-		-
-	26%			-	H	_		_
I _				_		_ Limestone		
90					Н	89.7-89.9' - yellowish gray, (5Y 7/2),		
-47.2			>10	89.9' - Discontinuity (sharp) between	ш	wery fine to fine grained, strong HCI		R5: 3 minutes
-			[10	moderately dense limestone and limestone with large percent voids, possible missing	\Box	reaction, medium strong (R3), fossiliferous, voids (1/16"-1/8") cover		-
-	91.0			material material	H	- 15-20% of the surface, trace oval		-
			>10	89.9-91.0' - Fracture, rough, irregular		cavities (up to 1/2") (possible fossil	П]
]			[10	fractures on 2-4" core pieces, 1"-2" zone of		molds) molds and casts, black	$\ \ $	Clay interbed 91.7-92.2'
1 -				fragments 1/2"-1-1/2" in size (upper	144	│ infilling in some voids, sharp contact │ with below	Н	J.a., intorpod 0 1.7 02.2
-			2	weathered/bleached) 91.0-91.2' - Fracture zone, 3/4"-1-3/45" size	Н	89.9-91.2' - yellowish gray to pale		
I -				fragments	Ш	- olive, (5Y 7/2 to 10 Y 6/2), medium	Ш	
	R6-NQ	15	2	91.6' - Fracture or mechanical break, rough,	Н	strong (R3), fossiliferous, voids	Ш	
	5 ft 70%	15	-	undulating	Ш	(1/4"-3/4" solution cavities) cover	П	SC-2 collected at 92.6-
-	. 0,0		1	91.7, 92.2 - Fracture, sharp contact between	Ш	25-30% of the surface, smaller	Ш	93.4'
-				limestone and gravelly lean clay (CL) interbed	H	fragments appear weathered or bleached possible void related, dark		-
95				92.7' - Fracture, planar and stepped, parting —		black (possible lignite) and light gray	$\ \ $	
-52.2			NR	surface on end of core piece, fine laminations	ш	fine (silt sized) infilling in some voids	Ш	R6: 8 minutes
-	96.0			93.5' - silt interbed (nonplastic)	Н	91.2-91.7' - Same as 89.9-91.2'	Ш	Steady drill rate across run -
-	30.0			93.9' - sharp contact with limestone		except yellowish gray, (5Y 7/2), very fine to fine grained, 1/16"-1/8" voids	Ш	Driller's Remark: 100%
-			0	94.1' - Fracture or mechanical break, vertical, rough, undulating	₽	cover the surface		loss of circulation at 97.0'
I _				Tough, undulating	H	- Lean Clay (CL)		below ground surface
						91.7-92.2' - yellowish gray, (5Y 7/2),	Ш	
				_	₽	medium plasticity, strong HCl		1
-	R7-NQ			-	団	reaction, few gravel-sized (1/4"-3/4")		-
-	5 ft	11		-	Н	limestone fragments at 91.7-91.8', 25% fine silt	Ш	-
_	14%		NR		Н	25% lifte sitt - 92.6-93.5' - yellowish gray, (5Y 7/2),		_
					Ш	strong HCl reaction, medium strong		
100				-	\mathbb{H}	to strong (R3 to R4), fine grained silt		1
-57.2				_	世	Limestone		R7: 3 minutes
_				-	Щ	92.2-92.6' - yellowish gray, (5Y 7/2),		Driller's Remark: Possible -
_	101.0			_	H	fine grained, weak (R2), finely - laminated (1/10"-1/4")		void 100.0-102.0'
]						Silt (ML)		Driller's Remark: Void at
-			NR	-	Ш	93.5-93.9' - moderate yellowish		100.0-102.0' based on -
-			\vdash	-	Н	brown, (10YR 5/4), nonplastic, few		barrel advancement ("fell"), setting temporary casing at
-			0	-	\Box	gravel-sized (1/16-3/16") limestone		106.0'
					Н	fragments (<10%)		
]	R8-NQ				Ш	Limestone 93.9-94.5' - moderate yellowish		1
-	5 ft	0		-	\Box	brown, (10YR 5/4), moderate HCl		1
-	20%			-	Н	reaction, weak (R2), small voids		-
_			NR		ш	cover 20-30% of surface		
105			` ' `		Н	No Recovery 94.5-96.0'		
-62.2				_	$\vdash\vdash\vdash$	_		R8: 4 minutes
-				-	Ш	-		-
	106.0				\vdash		_	



PROJECT NUMBER:

33884.FL BORING NUMBER:

E-06 SHEET 7 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 5.5	ft bgs	s on 5	/02/07 START : 5/2/2007 END : 5/4	1/200	7 LOGGER : C. Sump	
≥∩≎	(%)			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH B FACE	E RU STH, OVEI	(%) _Q	STUF	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP' SURI ELE\	COR	RQI	FRA(PER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
						Limestone	
-			1	106.8-107.7' - Fracture zone, limestone - fragments	ь	 96.0-96.7' - pale yellowish brown, (10YR 6/2), strong HCl reaction, very 	-
-	R9-NQ 5 ft 84%		>10		H	weak (R1), fossiliferous, up to 1/16"	1
-					Ħ	 voids cover 20-25% of surface, cavities/molds up to 1/2" cover 5-7%, 	1
-			0 10	smooth to slightly rough, planar, 1/2"-1"	Ħ	easily broken by hand, punky texture	1
-		39	>10	spacing -	Ħ	 No Recovery 96.7-102.0' Limestone Fragments 	1
			1	-	H	102.0-103.0' - Same as 96.0-96.7' - except yellowish gray, (5Y 7/2), fine	
110			1 NR	109.4, 110.0' - Fracture (2), horizontal, rough, undulating		grained, moderate HCl reaction,	
-67.2						weak (R2), 1"-2" fragments, medium strong to strong, almost conchoidal	R9: 5 minutes
_	111.0					fracture	
-			>10		口	No Recovery 103.0-106.0' Limestone	
-						106.0-110.2' - grayish orange, (10YR 7/4), strong HCl reaction, very weak ∫	
_			0	<u>-</u>	Ш	(R1), voids (1/16"-1/8") cover	Driller's Remark: 112.5- 114.0' possible void
_				-	₽	10-15% of the surface, larger cavities/fossil molds (up to 1/2")	-
_	R10-NQ 5 ft	0		-	oxdot	cover less than 5% (variably spaced)	-
-	42%			-	口	but in concentrated in zones, white chalky carbonate infilling in some	-
-			NR	-	上	cavities/molds, limestone 1-1/2" fragments from 107.0-107.7', 1/2"-1"	-
115 <u> </u>					団	horizontal partings (bedding plane)	R10: 2 minutes
-				-	Н	from 107.7-108.5' No Recovery 110.2-111.0'	
-	116.0			- 116.0-116.2' - Fracture zone, limestone	╁	Limestone	Easily broken by hand
-	R11-NQ 5 ft 98%	70	3 3 2	fragments -	F	111.0-112.0' - Same as 106.0-110.2' except 1/2"-2" horizontal partings	"rotten rock" -
-				116.2, 116.7, 117.1, 117.2, 117.6, 118.0, 118.5, 118.8, 119.2, 119.3' - Bedding plane (10), horizontal, rough, undulating	Ħ	Silt (ML) 112.0-112.6' - grayish orange, (6YR 7/4), nonplastic, strong HCl reaction	1
-					H		-
-				-	Ħ	Limestone	1
_				-	H	 112.6-113.1' - Same as 111.0-112.0' No Recovery 113.1-116.0' 	1
				-	dash	Limestone 116.0-120.9' - very pale orange,	1
120				- 119.7-119.9' - Fracture zone, limestone	\vdash	(10YR 8/2), medium to coarse	1
-77.2			2	fragments	F	grained, strong HCl reaction, very weak to weak (R1 to R2), up to 1/16"	R11: 4 minutes
	121.0		NR	120.2' - Fracture (60), rough, semi planar	口	size voids cover 25% of the surface, 1/4" cavities and fossil molds cover	
_			4	120.9' - Bedding plane, horizontal, slightly rough, planar _	口	up to 5% surface	
-			2	121.3, 121.7, 121.8' - Fracture (3), horizontal, rough, undulating	上	No Recovery 120.9-121.0' Limestone	
-				121.9' - Fracture, 30 deg, rough, undulating	H	_ 121.0-126.0' - Same as 116.0-120.9'	
-				122.2' - Fracture, 45 deg, rough, semi planar 122.6' - Fracture, 45 deg, rough, semi planar	F	except slightly more competent, 123.5-126.0' zone of weak rock (R2)	-
-	R12-NQ 5 ft	60	0	-		-	-
-	100%			-	H	-	-
-			2	124.4, 124.7, 125.3' - Fracture or bedding	片	_	-
125 -82.2				plane (3), horizontal, slightly rough, undulating, open to <1/8"		_	R12: 4 minutes
-			1	undulating, open to < 1/0	Н	-	-
	126.0						-
	_						

APPENDIX 2BB-828 Rev. 7



PROJECT NUMBER:

33884.FL

BORING NUMBER:

E-06 SHEET 8 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT: CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION: Vertical

世後 地方的 ローラボ DEFTIT, TIPE, OKIENTATION, ROUGHNESS, WEATHERING, HARDINGS, HARDINGS, HARDING HARD	CORING	METHOD A	ND EC	JUIPIV	MENT: CME 55 S/N 252345, mud rotary, NQ tools, HW c	asıng		ORIENTATION : Vertical
Section Sect	WATER	LEVELS : 5.5	ft bg	s on 5	/02/07 START : 5/2/2007 END : 5/	4/200	7 LOGGER : C. Sump	
Title No	200	(9)			DISCONTINUITIES	ڻ	LITHOLOGY	COMMENTS
Title No	ANE (ft.	Ž V V V V V V V V		ES	DESCRIPTION] [SIZE AND DEPTH OF CASING
Title No	ACE ATIO	TH.,	(%)	F.0	DEPTH. TYPE, ORIENTATION, ROUGHNESS.]		FLUID LOSS, CORING RATE AND
Title No	EPT URF LEV	ORE	αD	ZAC ER F	PLANARITÝ, INFILLING MATERIAL AND	ΥMB	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
1		025	α.	##	TRICKNESS, SURFACE STAINING, AND TIGHTINESS	Ś		
126.5 - Fracture, 3c deg, rough, undusting, rough, irredusting, repair to sub-particular station planar, irregular regular regular 127.9 - Fracture, 60 deg, rough, semi planar, regular regul	_			1	. <u></u> <u>.</u>	Ш		
R13-NC 88% 43 88% 45 88	_					Н	7/2), strong HCl reaction, very weak	_
127.6 127.	_			3		Д	(R1), small voids (1/16-1/8") cover - variable percent of surface area	_
130						Ш	cavities up to 1/2" cover less than 5%	_
130				3		Н	of surface, easily broken by hand, - fossil molds filled with white chalk	_
130			45	٥	dark gray thin coating on surface (possible		carbonate material, at 129.9' abrupt	_
undulating, semi planar parting 131.0				2		Ħ		
131.0				3	undulating, semi planar parting	Н	= gray (31 o/1)	
131.0	-87.2			3		Ш		R13: 5 minutes
131.0-131.3' - Fracture, limestone fragments 131.0-133.3' - Same as 126.0-130.4'		131.0		NR	g,g,g	Ш	No Recovery 130.4-131.0'	_
136.0 132.9' - Fracture, horizontal, smooth, limestone fragments 133.2' - Fracture, horizontal, smooth, limestone fragments 133.2' - Fracture, horizontal, smooth, limestone fragments 133.3' - 134.3' - pale olive gray to dusky yellow, (10Y 6/2 to 5Y 6/4), fine grained, most particulate staining/coating on some fracture faces (possible pyrite) 136.0' - Dark gray/black fine grained particulate staining/coating on some fracture faces (possible pyrite) 136.4' - Fracture, - (10 deg, rough, undulating, open 136.5' - Fracture or mechanical break, 60 deg and 70 deg, rough, undulating, light 137.2' - 137.4' - Fracture zone, no visible orientation, 1/2' width total core diameter fragments 141.0				- 40	131.0-131.3' - Fracture, limestone fragments	Н		_
R14-NO 5 ft 66% 33 2-10 132.9' - Fracture, horizontal, smooth 133.2' - Fracture, horizontal, smooth 133.2' - Fracture, horizontal, smooth, limestone fragments 132.9' - Fracture, horizontal, smooth, limestone fragments 133.3-134.3' - pale olive gray to dusky yellow, (10Y 6/2 to 5Y 6/4), fine grained, moderate HCI reaction, weak to medium strong (R2 to R3), trace fine lamination (<1/6') No Recovery 134.3-136.0' R15-NO 5 ft 0 0 40% 0 15 7				>10		Ħ	- 131.0-133.3° - Same as 126.0-130.4°	_
R14-NO 5 ft 66% 33 2-10 132.9' - Fracture, horizontal, smooth 133.2' - Fracture, horizontal, smooth 133.2' - Fracture, horizontal, smooth, limestone fragments 132.9' - Fracture, horizontal, smooth, limestone fragments 133.3-134.3' - pale olive gray to dusky yellow, (10Y 6/2 to 5Y 6/4), fine grained, moderate HCI reaction, weak to medium strong (R2 to R3), trace fine lamination (<1/6') No Recovery 134.3-136.0' R15-NO 5 ft 0 0 40% 0 15 7	_					Ħ	_	-
133.2 - Fracture, horizontal, smooth, limestone fragments limestone limestone fragments limestone fragments limestone fragments limestone fragments limestone fragments limestone limestone limestone limestone limestone fragments limestone limeston	_			1		Н	_	-
limestone fragments 136.0	_	R14-NQ				Ш	_	-
136.0 NR 136.0 - Dark gray/black fine grained particulate staining/coating on some fracture faces (possible pyrile) 136.0 - Fracture, <10 deg, rough, undulating, tight 137.2 - 137.4' - Fracture zone, fragments to 2" angular to sub angular, fine black particles or fracture fagments 141.0 - St 1	_		33	>10		ш		-
136.0 NR 136.0' - Dark gray/black fine grained particulate staining/coating on some fracture faces (possible pyrite) 136.4' - Fracture, <10 deg, rough, undulating, upth 136.5' - Fracture or mechanical break, 60 deg, and 70 deg, rough, undulating, light 137.2-137.4' - Fracture zone, fragments to 2" angular to sub angular, fine black particles on fracture faces (possible pyrite or organics) 141.7-142.3' - Fracture (3), 45 deg and 60 deg, rough, undulating, light 137.2-157.4' - Fracture zone, no visible orientation, 1/2" width total core diameter fragments Value V	-	3070		0		ш	fine grained, moderate HCl reaction,	-
No Recovery 134.3-136.0' 136.0	125					Н	 weak to medium strong (R2 to R3), trace fine lamination (<1/16") 	-
136.0" - Dark gray/black fine grained particulate staining/coating on some fracture faces (possible pyrite) 136.4" - Fracture, <10 deg, rough, undulating, open 136.5" - Fracture or mechanical break, 60 deg and 70 deg, rough, undulating, tight 136.7" - Mechanical break, 10 deg and 20 deg, rough, undulating, tight 137.2-137.4" - Fracture zone, no visible orientation, 1/2" width total core diameter fragments				NR	_	Ħ		R14: 6 minutes
136.0" - Dark gray/black fine grained particulate staining/coating on some fracture faces (possible pyrite) 136.4" - Fracture, <10 deg, rough, undulating, open 136.5" - Fracture or mechanical break, 60 deg and 70 deg, rough, undulating, tight 136.7" - Mechanical break, 10 deg and 20 deg, rough, undulating, tight 137.2-137.4" - Fracture zone, no visible orientation, 1/2" width total core diameter fragments	-	126.0				Ш	_	-
faces (possible pyrite) 136.4' - Fracture, <10 deg, rough, undulating, open 136.55' - Fracture or mechanical break, 60 deg and 70 deg, rough, undulating, tight 137.2-137.4' - Fracture zone, no visible orientation, 1/2" width total core diameter fragments 141.0 141.	-	130.0			136.0' - Dark gray/black fine grained	Н	_ Limestone	-
141.0 R15-NQ 5 ft 0 40%	-			>10		Ш		Driller's Remark: Void
140	-					ш		135.0-138.0'
deg and 70 deg, rough, undulating, tight 136.7' - Mechanical break, 10 deg and 20 deg, rough, undulating, tight 137.2-137.4' - Fracture zone, no visible orientation, 1/2" width total core diameter fragments 141.0	-			>10		ш	in shape up to 3/4", fossil casts and	-
140	-	R15-NO				Н		-
141.0 137.2-137.4' - Fracture zone, no visible orientation, 1/2" width total core diameter fragments 141.0 141.0 141.0 141.35-141.7' - Fracture zone, fragments to 2" angular to sub angular, fine black particles on fracture faces (possibly pyrite or organics) 141.7-142.3' - Fracture (3), 45 deg and 60 deg, rough, planar, healed 141.8, 142.3' - Fracture (2), 50 deg, rough, planar, open 1/8" 142.4, 142.55' - Mechanical break (2), <5 deg, fragments to 3" angular 143.9' - Mechanical break, <5 deg, rough, planar, open (1/4") NR 137.2-137.4' - Fracture zone, no visible orientation, 1/2" width total core diameter fragments Limestone 141.0-143.6' - yellowish gray to olive gray, (5Y 7/2 to 5Y 5/2), strong HCl reaction, medium strong (R3), variable zones of voids/cavities (up to 1/2") 143.6-144.0' - moderate olive brown, (5Y 4/4), strong HCl reaction, weak (R2), porous limestone, numerous voids (1/16"-1/8") and cavities wides (1/4"-3/4"), weak slightly friable medium coarse sand-sized particles	-	5 ft			136.7' - Mechanical break, 10 deg and 20	Ħ	-	-
NR orientation, 1/2" width total core diameter fragments 141.0	-	40%				世	_	-
Limestone 141.0 141.35-141.7' - Fracture zone, fragments to 2" angular to sub angular, fine black particles on fracture faces (possibly pyrite or organics) 141.7-142.3' - Fracture (3), 45 deg and 60 deg, rough, planar, healed 141.8, 142.3' - Fracture (2), 50 deg, rough, planar, open 1/8" 142.4, 142.55' - Mechanical break (2), <5 deg, rough, planar, open 142.55-143.8' - Fracture zone, 40 deg and 60 deg, fragments to 3" angular 143.9' - Mechanical break, <5 deg, rough, planar, open (1/4") R15: 5 minutes Limestone 141.0-143.6' - yellowish gray to olive gray, (5Y 7/2 to 5Y 5/2), strong HCl reaction, medium strong (R3), variable zones of voids/cavities (up to 1/2") 143.6-144.0' - moderate olive brown, (5Y 4/4), strong HCl reaction, weak (R2), porous limestone, numerous voids (1/16"-1/8") and cavities 143.6-144.0' - moderate olive brown, (5Y 4/4), strong HCl reaction, weak (R2), porous limestone, numerous voids (1/16"-1/8") and cavities 143.6-144.0' - moderate olive brown, (5Y 4/4), strong HCl reaction, weak (R2), orous limestone, numerous voids (1/16"-1/8") and cavities 144.9' - Mechanical break, <5 deg, rough, planar, open (1/4") 145.5-143.8' - Fracture zone, 40 deg and 60 deg, fragments to 3" angular 146.7-102.2 147.5-142.3' - Fracture (2), 50 deg, rough, planar, open (1/4") 148.6-144.0' - moderate olive brown, (5Y 4/4), strong HCl reaction, medium coarse sand-sized particles 149.6-144.0' - moderate olive brown, (5Y 4/4), strong HCl reaction, weak (R2), orous limestone, numerous voids (1/16"-1/8") and cavities 149.6-144.0' - moderate olive brown, (5Y 4/4), strong HCl reaction, weak (R2), orous limestone, numerous voids (1/16"-1/8") and cavities 149.6-144.0' - moderate olive brown, (5Y 4/4), strong HCl reaction, weak (R2), orous limestone, numerous voids (1/16"-1/8") and cavities				NR	orientation, 1/2" width total core diameter	\Box	_	-
Limestone 141.0 141.35-141.7' - Fracture zone, fragments to 2" angular to sub angular, fine black particles on fracture faces (possibly pyrite or organics) 141.7-142.3' - Fracture (3), 45 deg and 60 deg, rough, planar, healed 141.0-143.6' - yellowish gray to olive gray, (5Y 7/2 to 5Y 5/2), strong HCI reaction, medium strong (R3), variable zones of voids/cavities (up to 1/2") 143.6-144.0' - moderate olive brown, (5Y 4/4), strong HCI reaction, weak (R2), porous limestone, numerous voids (1/16"-1/8") and cavities (R2), porous limestone, numerous voids (1/16"-1/8") and cavities (1/4"-3/4"), weak slightly friable medium coarse sand-sized particles	140 -97 2				iraginents	囯		R15: 5 minutes —
Limestone 141.35-141.7' - Fracture zone, fragments to 2" angular to sub angular, fine black particles on fracture faces (possibly pyrite or organics) 141.7-142.3' - Fracture (3), 45 deg and 60 deg, rough, planar, healed 141.0-143.6' - yellowish gray to olive gray, (5Y 7/2 to 5Y 5/2), strong HCl reaction, medium strong (R3), variable zones of voids/cavities (up to 1/2") 141.8, 142.3' - Fracture (2), 50 deg, rough, planar, open 1/8" 142.4, 142.55' - Mechanical break (2), <5 deg, rough, planar, open 1/42.55-143.8' - Fracture zone, 40 deg and 60 deg, fragments to 3" angular 143.9' - Mechanical break, <5 deg, rough, planar, open (1/4") 143.6-144.0' - moderate olive brown, (5Y 4/4), strong HCl reaction, weak (R2), porous limestone, numerous voids (1/16"-1/8") and cavities (1/4"-3/4"), weak slightly friable medium coarse sand-sized particles	-					丗	_	-
141.35-141.7' - Fracture zone, fragments to 2" angular to sub angular, fine black particles on fracture faces (possibly pyrite or organics) on fracture faces (possibly pyrite or organics) 141.7-142.3' - Fracture (3), 45 deg and 60 deg, rough, planar, healed 141.8, 142.3' - Fracture (2), 50 deg, rough, planar, open 1/8" 142.4, 142.55' - Mechanical break (2), <5 deg, rough, planar, open 1/42.55-143.8' - Fracture zone, 40 deg and 60 deg, fragments to 3" angular 143.6-144.0' - moderate olive brown, (5Y 4/4), strong HCl reaction, weak (R2), porous limestone, numerous voids (1/16"-1/8") and cavities 143.9' - Mechanical break, <5 deg, rough, planar, open (1/4") R16: 12 minutes R	-	141.0				\mathbb{H}	Limestone	_
2" angular to sub angular, fine black particles on fracture faces (possibly pyrite or organics) 141.7-142.3' - Fracture (3), 45 deg and 60 deg, rough, planar, healed 141.8, 142.3' - Fracture (2), 50 deg, rough, planar, open 1/8" 142.4, 142.55' - Mechanical break (2), <5 deg, rough, planar, open 1/8." 143.6-144.0' - moderate olive brown, (5Y 4/4), strong HCl reaction, medium strong (R3), variable zones of voids/cavities (up to 1/2") 143.6-144.0' - moderate olive brown, (5Y 4/4), strong HCl reaction, medium strong (R3), variable zones of voids/cavities (up to 1/2") 143.6-144.0' - moderate olive brown, (5Y 4/4), strong HCl reaction, weak (R2), porous limestone, numerous voids (1/16"-1/8") and cavities (1/4"-3/4"), weak slightly friable medium coarse sand-sized particles	_			>10		Ħ	 141.0-143.6' - yellowish gray to olive 	-
R16-NQ Str 15 15 15 15 10 141.7-142.3' - Fracture (2), 50 deg, rough, planar, open 1/8" 142.4, 142.55' - Mechanical break (2), <5 deg, rough, planar, open 1/8. 142.55-143.8' - Fracture zone, 40 deg and 60 deg, fragments to 3" angular 143.9' - Mechanical break, <5 deg, rough, planar, open (1/4") 143.6-144.0' - moderate olive brown, (5Y 4/4), strong HCI reaction, weak (R2), porous limestone, numerous voids (1/16"-1/8") and cavities (1/4"-3/4"), weak slightly friable medium coarse sand-sized particles	_				2" angular to sub angular, fine black particles	H	gray, (5Y 7/2 to 5Y 5/2), strong HCl	-
deg, rough, planar, healed 141.8, 142.3' - Fracture (2), 50 deg, rough, planar, open 1/8" 142.4, 142.55' - Mechanical break (2), <5 deg, rough, planar, open 142.55-143.8' - Fracture zone, 40 deg and 60 deg, fragments to 3" angular 143.9' - Mechanical break, <5 deg, rough, planar, open (1/4") 143.6-144.0' - moderate olive brown, (5Y 4/4), strong HCI reaction, weak (R2), porous limestone, numerous voids (1/16"-1/8") and cavities (1/4"-3/4"), weak slightly friable medium coarse sand-sized particles	_			>10	141.7-142.3' - Fracture (3), 45 deg and 60	₽		_
planar, open 1/8" 142.4, 142.55' - Mechanical break (2), <5 deg, rough, planar, open 142.55-143.8' - Fracture zone, 40 deg and 60 deg, fragments to 3" angular 143.9' - Mechanical break, <5 deg, rough, planar, open (1/4") 143.6-144.0' - moderate olive brown, (5Y 4/4), strong HCl reaction, weak (R2), porous limestone, numerous voids (1/16"-1/8") and cavities (1/4"-3/4"), weak slightly friable medium coarse sand-sized particles	_				deg, rough, planar, healed	囯		_
142.4, 142.55' - Mechanical break (2), <5 deg, rough, planar, open 142.55-143.8' - Fracture zone, 40 deg and 60 deg, fragments to 3" angular 143.9' - Mechanical break, <5 deg, rough, planar, open (1/4") 183.6-144.0' - moderate olive brown, (5Y 4/4), strong HCI reaction, weak (R2), porous limestone, numerous voids (1/16"-1/8") and cavities (1/4"-3/4"), weak slightly friable medium coarse sand-sized particles	_			>10		Ш	_	_
145 - 102.2 NR 142.55-143.8' - Fracture zone, 40 deg and 60 deg, fragments to 3" angular 143.9' - Mechanical break, <5 deg, rough, planar, open (1/4")	_				142.4, 142.55' - Mechanical break (2), <5	Н		_
deg, fragments to 3" angular voids (1/16"-1/8") and cavities 143.9' - Mechanical break, <5 deg, rough, planar, open (1/4") voids (1/16"-1/8") and cavities (1/4"-3/4"), weak slightly friable medium coarse sand-sized particles						H	(R2), porous limestone, numerous	_
planar, open (1/4") 143.9 - Medical break, <5 deg, fough, medical sized particles Planar, open (1/4") medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5 deg, fough, medical break, <5				NR	deg, fragments to 3" angular	H	voids (1/16"-1/8") and cavities	
No Boomer 444 0 440 01	-102.2			' ' ' '		Н	(174 -374), weak slightly friable medium coarse sand-sized particles	R16: 12 minutes
		146.0			F, 6 Po ()	\blacksquare		
						Ш		

APPENDIX 2BB-829 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-06 SHEET 9 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT: CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION: Vertical

CORING	NETHOD A	ND EC	JUIPIV	MENT: CIME 55 S/N 252345, mud rotary, NQ tools, HW o	asing		ORIENTATION : Vertical
WATER	LEVELS: 5.5	ft bgs	s on 5	/02/07 START : 5/2/2007 END : 5/	4/200	LOGGER : C. Sump	
> ~				DISCONTINUITIES	U	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
H H H	RUH A.H.	Q D (%)	URE TOC	DEDTIL TYPE ODIENTATION POLICUNESS	1 월	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
PTH	RE) [ACT R FC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	MBC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SCIE	SAR	S.	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
				146.0-147.0' - Bedding plane, horizontal,		Limestone	
-			>10	planar, numerous partings spaced at	╂┼┤	 146.0-147.0' - dark yellowish orange, 	-
-				1/2"-1-1/2" apart		(10YR 8/6), coarse grained, strong HCl reaction, weak (R2), friable	-
-			2	147.3' - Fracture, 60 deg, rough, undulating,	Ш	- disaggregates into medium	_
				semi planar fracture	Ш	sand-sized particles, numerous small	
	R17-NQ			147.6' - Fracture, 30 deg, rough, semi planar 148.2' - Fracture, 10 deg, rough, planar	\vdash	voids over 30% of surface	SC 4 collected at 149.3
1 7	5 ft 74%	29	2	148.3' - Fracture, 10 deg, rough, pianal 148.3' - Fracture, 50 deg, slightly rough, semi	Н	 147.0-149.4' - medium gray to yellowish gray, (N5 to 5Y 7/2), very 	SC-4 collected at 148.3- 149.4'
-	,,			planar	Ш	fine to fine grained, mild HCl	-
450			3	149.4-149.7' - Bedding plane, horizontal,	丗	- reaction, medium strong (R3),	-
150_ -107.2				planar	╂┼┤	1/16"-3/16" size voids concentrated in thin (<1/10") horizontal zones	R17: 7 minutes
-107.2			NR		世	 spaced at 6"-1.2' apart 	IX17.7 IIIIIIules
_	151.0				Щ	149.4-149.7' - moderate yellow	
				151.1' - Fracture, horizontal, rough,		brown and yellowish gray, (10YR 5/4), laminated, contorted wavy	
7			2	undulating	\square	bedding planes	
1 7				151.3' - Fracture, vertical, rough, undulating to non planar, 3" long		No Recovery 149.7-151.0'	1
-			3	152.1' - Fracture or mechanical break, 60	Ш	Limestone 151.0-155.5' - light olive gray to	-
-	R18-NQ			deg, rough, undulating	丗	yellow gray, (5Y 5/2 to 5Y 7/2),	-
-	5 ft	33	9	152.1, 152.5' - Fracture, horizontal, rough 153.0, 155.5' - Fractures (2), horizontal,	\vdash	_ moderate HCl reaction, very weak to	_
	90%			rough, planar to undulating	lacksquare	weak (R1 to R2), sparse voids (1/16"-1/8"), and cavities (up to 1/2")	
			4		Ш	above 152.5', percent of voids	
155			4		Ш	increase beyond 152.5', 25-30%	
-112.2			3	_	\Box	porous by volume, somewhat friable	R18: 5 minutes
-	450.0		NR			_ disaggregates into medium sand-sized particles, voids/cavities	-
-	156.0		1411	156.0-156.4' - Fracture zone, limestone	╂┴┤	 oriented horizontally, cavities 	-
-			2	fragments	団	increase in size (up to 1-1/4") with depth	-
-				156.4, 156.7' - Bedding plane, horizontal,	┢┼	− No Recovery 155.5-156.0'	_
			1	smooth, planar		Limestone Fragments	
			_ '	157.5' - Fracture or mechanical break, 15	Ш	156.0-156.4' - Same as 151.0-155.0'	Redox changes possibly
1	R19-NQ			deg, rough, undulating 157.7' - Fracture, sharp contact with grayish	Ш	 except slough Limestone 	
-	5 ft 60%	35	1	yellow limestone (surfaces do not match)	1	156.4-157.7' - very pale orange,	
-	00 /0			158.9' - Fracture, horizontal, smooth, planar		 (10YR 8/2), fine to medium grained, 	-
-					╂┴┤	strong HCl reaction, weak (R2), very small voids (1/16"), fossiliferous	-
160_ -117.2			NR	_	口	— (1/16"-1/8")	D10: 7 minutes
-111.2					H	157.7-159.0' - yellowish gray to	R19: 7 minutes
	161.0					grayish yellow, mottled with light gray, (5Y 7/2 to 5Y 8/2 mottled with	
				404.0.404.4.404.51.55.1151(0)	Ш	N7), very fine to medium grained,	
			4	161.3, 161.4, 161.5' - Bedding plane (3), horizontal, smooth, planar	Ш	strong HCl reaction, medium strong	
-				161.9' - Fracture, horizontal, rough, planar	H	(R3), sharp contactNo Recovery 159.0-161.0'	
-			3	162.5-162.6' - Fracture zone, contact with		Limestone	Change in redox conditions
-				olive brown limestone, limestone fragments	Щ	_ 161.0-162.4' - medium gray, (N 5),	- Change in redox conditions
_	R20-NQ 5 ft	0	>10	162.7' - Fracture or mechanical break,	Ш	moderate HCl reaction, medium	
	88%	5	10	vertical	\square	strong (R3), with thin yellowish gray lamination zones of small cavities	
1 1				162.9' - Fracture, horizontal, rough, non planar	Ш	(<3/4"), 6"-8" spacing otherwise tight	
165			>10	163.3, 163.4, 163.5, 163.6' - Fracture (4),	Щ	and dense, sharp contact	1
-122.2				horizontal, smooth, planar —	丗		R20: 9 minutes
-			NR	163.5-163.8' - Fracture zone, limestone fragments	+	_	=
L	166.0		INIX	- 3	\vdash		
ldot							

APPENDIX 2BB-830 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-06	SHEET	10	OF	11	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

			<u> </u>	NENT : CIVIE 33 3/N 232343, Mud Totally, NQ 10018, HW 0	-aog		ORIENTATION : Vertical
WATER	LEVELS: 5.5	ft bgs	s on 5	/02/07 START: 5/2/2007 END: 5/	4/200	7 LOGGER : C. Sump	
				DISCONTINUITIES	Т	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)			 	SYMBOLIC LOG		22
N ¥ N	ZAN ZAN		FRACTURES PER FOOT	DESCRIPTION	J O	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
표병은	S.H.	(%) _Q	150	DEDTIL TYPE OPIENTATION POLICUNESS	٦ _Ĕ [MINERALOGY, TEXTURE,	FLUID LOSS, CORING RATE AND
₽₽¥	35E	٥	D.Y.	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	/BC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	SEN SE	S S	S.F.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	ξ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
□ 07 Ш	014	ш	44		0)		
				164.2-165.4' - Fracture, <25 deg and >70	\vdash	Limestone	
_			>10	3, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,	1	- 162.4-163.4' - moderate olive brown,	1 1
-				166.0-166.5' - Fracture zone, limestone	╀	(5Y 4/4), medium strong to strong	1 -
			>10	fragments 166.5' - Fracture or mechanical break,	ш	(R3 to R4), voids (1/16-1/8") cover - 20-30% of surface, horizontally	
			/10	horizontal, rough, undulating	\vdash	oriented cavities (up to 1") in zones,	1
-	R21-NQ			167.1-167.4' - Bedding plane, horizontal,	╂┴	thin medium gray limestone	1 -
I _	5 ft	40	4	smooth, 3/4" thick limestone fragments	┰	- fragments	
	88%	70	7	167.7' - Bedding plane, horizontal		163.4-163.6' - medium strong to	
-	0070			168.4, 168.5' - Fracture (2), horizontal, rough	╨	strong (R3 to R4)	1
_			>10		╁┯	- 163.6-165.4' - moderate olive brown,	-
170				deg, smooth	\vdash	(5Y 4/4), coarse grained, moderate	
-127.2			2	168.9' - Fracture, horizontal, rough,		HCl reaction, medium strong (R3),	R21: 10 minutes
-				undulating		fossiliferous, voids (1/16-1/4") cover	
	171.0		NR	169.1' - Bedding plane, horizontal, smooth	Ш	5-25% of surface	
1 7				169.4' - Fracture, horizontal, fine grained	1	No Recovery 165.4-166.0'	1 1
-			>10	limestone	╂┷┤	_ Limestone	1 -
				169.4-169.7' - Bedding plane, horizontal,	т	166.0-170.4' - grayish yellow, (5Y	
]				smooth, planar, limestone fragments		8/4), fine grained, weak (R2), poorly	1
-			>10	(1/4"-1/2" thick)	┨┷	fossiliferous, 1/16"-1/8" voids over	1 -
I _				170.1-170.4' - Fracture, horizontal, slightly	ᅪᅮ	less than 10% of surface in thin	
	R22-NQ			rough, fracture faces indicate partial	\vdash	zones (1/2"-1-1/2" thick) on 1.0-1.5'	
-	5 ft	0	>10	recrystallization 171.0-171.2' - Fracture zone, angular	╂┯	spacing, cavities (up to 1/2") sparse and occur in zones with higher void	1
_	68%			limestone fragments		content, thinly bedded zones 4"-6"	1
			>10	171.2, 171.4' - Fracture or mechanical break,	\vdash	thick on 2.0-3.0' intervals, with fine	
475				horizontal, smooth, 45 deg fracture on 3"	1—	grained zones rock is weak (R2) to	1 1
175_				core piece —	╂┷	medium strong (R3)	
-132.2			NR	171.4-171.8' - Mechanical break, 80 deg,		No Recovery 170.4-171.0'	R22: 10 minutes Start of shift 5/4/07
	176.0			rough, undulating, fracture is on a 5" core	Ъ	Limestone	Start of Stillt 5/4/07
-	170.0			piece	╂┴	171.0-174.4' - grayish yellow grading	1 1
_			1	171.8' - Fracture, horizontal, rough	┦	to yellowish gray, (5Y 8/4 to 5Y 7/2),	1 4
				171.9' - Mechanical break, 45 deg, rough		fine grained, moderate to strong HCl	
				172.1-172.2' - Fracture zone, limestone	Ш	reaction, weak (R2), finer grained	1 7
-			3	fragments	╁	than above, voids (1/16"-1/8")	1 -
				17Ž.2-172.4' - Bedding plane, horizontal, smooth, planar, numerous partings across	\vdash	concentrated in thin horizontal zones - along bedding plane/lamination	
	R23-NQ			the zone, parting interval range from 1/4"-4"	\top	(1/16"-1/4") and very thin beds	1
-	5 ft	42	5	with most between 1/2"-2", laminated to very	匚	(1/2"-1-1/2") void rich zones, fine	1 -
-	88%			thinly bedded limestone	┵	grained laminated zones, high void	1
				176.3' - Fracture, horizontal, rough,	\vdash	zones spaced at 1.0'	1
400			4	undulating	1	No Recovery 174.4-176.0'	1
180				177.6, 177.7, 177.8' - Bedding plane (3), –	$-\Box$	— Limestone	
-137.2			2	horizontal, smooth		176.0-178.3' - moderate olive brown,	R23: 12 minutes
1 7	191 0		NR	178.0, 178.1, 178.15' - Bedding plane (3),	\vdash	(5Y 4/4), weak (R2), cavities ranging	1
-	181.0			horizontal, smooth	+	- in size from 1/4"-1" cover 5-8% of	1
			1	178.3' - Fracture, horizontal, smooth, planar,		surface, cavities elongated in	l J
			'	contact with fine grained limestone	Ш	horizontal direction, horizontal]
-				178.8' - Fracture, horizontal, smooth, planar,	1	partings 1"-2" spacing in 177.3-178.3'	1 1
-			2	contact with void rich limestone below	┵	178.3-178.6' - moderate yellowish	1
			-	178.8-179.0' - Fracture zone, limestone fragments		gray, (5Y 7/2), very fine to fine grained, mild HCl reaction, medium	1
-	R24-NQ			179.1' - Fracture or mechanical break. 75		strong to strong (R3 to R4), sharp	1
-	5 ft	30	9	deg, rough	+	contact with the above, interbed	-
	100%			179.6, 179.7' - Fracture, rough, non planar	\vdash	178.6-180.4' - Same as 178.3-178.6'	1
1 7				and undulating	1	except olive brown, (5Y 4/4), strong	1 1
-			2	179.95' - Bedding plane, horizontal, smooth	+	HCl reaction, weak (R2), 1/16"-1/8"	-
185_				180.15' - Bedding plane, horizontal, smooth,		size voids cover 20-30% of surface,	1
-142.2				planar	\vdash	porous, laminated	7
-			3	180.4' - Bedding plane, horizontal, smooth,	1	No Recovery 180.4-181.0'	
	186.0			planar	\perp		
							1
			L				

APPENDIX 2BB-831 Rev. 7



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-06	SHEET	11	OF	11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723312.3 N, 457814.1 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

CORING	INETHODA	IND EC	ZUIFIV	IENT: CME 55 S/N 252345, mud rotary, NQ tools, HW (Jasing			ORIENTATION : Vertical
WATER	LEVELS : 5.5	5 ft bas	s on 5/	/02/07 START : 5/2/2007 END : 5	/4/200)7	LOGGER: C. Sump	
			0.10/		T	Ť		COMMENTS
≥O.⊋	(%	L		DISCONTINUITIES	l S	H	LITHOLOGY	COIVIIVIEN I S
OA 5	-iN ≻		တ္တ.	DESCRIPTION	1 2	L	ROCK TYPE, COLOR,	
出出한	57.11	<u>@</u>	AF			L	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
∓X₹	N F F S	0 0	[DEPTH, TYPE, ORIENTATION, ROUGHNESS,	<u>0</u>	L	WEATHERING, HARDNESS,	
문주년	888	g	Ä∺		Į₹	L		
	225	~	E 5	THICKNESS, SURFACE STAINING, AND TIGHTNESS	တ်	L	CHARACTERISTICS	1,
DEPTH BELOW SURFACE AND SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS 181.5' - Fracture or mechanical break, high angle deg, rough, undulating, 8" long 182.6, 182.8' - Fracture, horizontal, smooth, planar, partings at zones of increased small voids 183.0-184.0' - Bedding plane, horizontal, slightly to moderately rough, planar, Variable spacing from 1/2"-2-3/4" 184.25' - Fracture, horizontal, rough, non planar, inclined lamination 184.7' - Fracture, horizontal, smooth, planar 185.6, 185.7' - Fracture (2), horizontal, rough, undulating, contacts of thin fine grained interbed 185.9' - Fracture, horizontal, slightly rough, planar	SAMBORIC FOO		WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS Limestone 181.0-186.0' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), mild HCI reaction, weak to medium strong (R2 to R3), fossiliferous (molds and casts) and voids (1/16-1/8") in horizontal zones 2"-4" thick and 1"-1-1/2" spaced apart, trace cavities (up to 3/4"), fossils and larger voids show preferred orientation (horizontal), fossil and void poor material is finely laminated with dark gray lamination < 1/8" thick, spaced variably throughout the rock, horizontal parting are bedding plane controlled, Inclined laminations in sections, cross bedding possible Bottom of Boring at 186.0 ft bgs on 5/4/2007	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC. R24: 12 minutes Inclined laminations in sections, cross bedding possible Complete coring at 08:50 AM
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-07	SHEET	1	OF	10	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723243.7 N, 458250.5 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit

DRILLIN	GMETH	OD AND	EQUIPMI	ENT: Dietrich D-t	50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 3.0 ft bo	gs on 6/06	6/07	START: 6/5/2007 END: 6/7/2007 LOGGER: J. Burkard, C. Dellaria, B. Ellis
				STANDARD	SOIL DESCRIPTION 5 COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
필입한		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTH A			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
필앙급				(N)	
41.7	0.0			4.0.0	Organic Material (OL) 0.0-0.1' - plant roots
l _		1.1	SS-1	1-2-2 (4)	Poorly Graded Sand (SP)
	1.5			(- /	\(\cap 0.1-1.1'\) - olive grav to light olive grav. (5Y 3/2 to 5Y \(\sigma\)
					5/2), moist, loose, no HCl reaction, silica present
	1				1 1
_	1				1 1
-	1				1 1
-	-				1 1
-	-				1 1
5 36.7	5.0				Poorly Graded Sand With Silt (SP-SM)
-	-	1.0	SS-2	8-8-6	5.0-6.0' - dusky yellow to yellowish gray, (5Y 6/4 to 5Y
-	-	1.0	33-2	(14)	7/2), wet, loose, no HCl reaction, mottling at 5.6-5.7'
-	6.5				
-	-				
-					- 1
-					1 1
-					
-					
l -					
10	10.0				
31.7		0.9	SS-3	25-50/5	Lean Clay (CL)
l _	10.9			(75/11")	Organic Material (OL)
					\\\10.1-10.3' - brownish black, (5YR 2/1), contains roots \ \
					\silt (ML)
					moderate to strong HCl reaction
-					1 1
-	1				1 1
-	1				1 1
15	15.0				1 1
26.7	15.4	0.4	SS-4	50/4.5	Silt (ML)
-				(50/4.5")	15.0-15.4' - grayish yellow, (5Y 8/4), wet, soft to medium stiff, moderate to strong HCl reaction
-	-				(mediant still, moderate to strong from reaction)
-	1				
-	1				
-					1 1
-	-				
-	-				1 1
-	-				1 1
-					
20					
1					
				1	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-07	SHEET	2	OF 1	0

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723243.7 N, 458250.5 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

WATER	LEVELS	: 3.0 ft bo	s on 6/06	6/07 5	START : 6/5/2007 END : 6/7/2007 LOGGER : J. Burkard, C. Dellaria, B. Ellis
				STANDARD	SOIL DESCRIPTION 5 COMMENTS
LOW N (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	
H BE ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
21.7	20.0	0.0	SS-5	50/3	Limestone Fragments
-				(50/3")	20.0' - grayish yellow, (5Y 8/4), mild HCl reaction, trace voids on fragment surfaces, trace fossil casts
-					and molds, very little recovery
					1
]
_					<u> </u>
_					<u> </u>
_					-
					-
25 <u> </u>	25.0				Silt With Sand (ML)
-		1.0	SS-6	18-25-35	25.0-26.0 grayish orange, (10YR 7/4), wet to moist, of to medium stiff, delayed moderate HCl reaction
-	26.5			(60)	Solit to medium still, delayed moderate noi reaction
_	20.0				1
]
]
_					<u> </u>
-					-
-					-
30 <u> </u>	30.0				Silty Sand (SM)
-		0.9	SS-7	4-13-6	30.0-30.9 - dark yellowish orange, (10YR 6/6), wet, soft, delayed moderate HCl reaction
-	31.5	0.0		(19)	Soit, delayed moderate not reaction
-	01.0				1
]
_					_
-					-
					-
35 6.7	35.0 35.2	0.0	SS-8	50/2	Limestone Fragments
-				50/2 (50/2")	Limestone Fragments 35.0' - few limestone chips recovered in split spoon, chips too small to assess
-					Chips too shiall to assess
_					1
]
-]]
-					
-					
40					-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-07	SHEET	3	OF	10	

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723243.7 N, 458250.5 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit

WATER LEVELS: 3.0 ft bgs on 6/06/07 LOGGER: J. Burkard, C. Dellaria, B. Ellis START: 6/5/2007 END: 6/7/2007 SOIL DESCRIPTION COMMENTS STANDARD Log DEPTH BELOW SURFACE AND ELEVATION (#) PENETRATION TEST RESULTS SAMPLE INTERVAL (ft) SYMBOLIC SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND CONSISTENCY, SOIL STRUCTURE, MINERALOGY INSTRUMENTATION 6"-6"-6" #TYPE (N) Silt With Limestone Fragments (ML) 40.0 40.0-41.25' - moderate yellowish brown, (10YR 5/4), 5-11-13 SS-9 1.3 wet, medium stiff, moderate to strong HCl reaction, (24)gravel size particles up to 1" 41.5 45 -3.3 0.3 SS-10 50/3 Silt With Limestone Fragments (ML) (50/3")45.0-45.25' - Same as 40.0-41.25 Driller's Remark: Lost 100% circulation from 47.5-48.0' 11:36 Pump chain broken, repair took 40 minutes 13:20 Drill crew begins to insert HW casing 50 50.0 Poorly Graded Sand With Silt (SP) -8.3 50.0-50.7' - grayish yellow, (5Y 8/4), wet, loose, delayed mild HCl reaction 8-2-1 0.7 SS-11 (3)51.5 55 55.0 $-13.\overline{3}$ Silt With Limestone Fragments (ML) 55.0-56.0' - pale yellowish brown, (10YR 6/2), wet, soft, moderate to strong HCI reaction 4-10-2 SS-12 1.0 (12)56.5 60



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	E-07	SHEET	4	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723243.7 N, 458250.5 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

WATER	LEVELS	: 3.0 ft b	gs on 6/06	6/07 5	START : 6/5/2007 END : 6/7/2007 LOGGE	ER :	: J. I	Burkard, C. Dellaria, B. Ellis
				STANDARD	SOIL DESCRIPTION	Т		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		٦	SYMBOLIC LOG	
필일은		RECOVE	ERY (ft)	12011120210	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	1	OLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
EVA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	-	MB	INSTRUMENTATION
-18.3				(N)	Cila Milaba Lincontona Francoscata (MIL)	4	Ś	Deille de Deve de Koon le die rediendelie
-10.3	60.0			9-5-5	Silt With Limestone Fragments (ML) 60.0-61.1' - moderate yellowish brown, (10YR 5/4),	4		Driller's Remark: Keep losing circulation, now advancing casing to 60'
-		1.1	SS-13	(10)	wet, soft, delayed strong HCl reaction, organic black (N1) limestone fragments up to 3/4"	\bot	Ш	=
_	61.5				(IVT) limestone magnifications up to 5/4	4		_
-						4		-
-						4		-
-						+		-
-						4		-
-						4		-
						+		-
65 <u> </u>	65.0				Silty Limestone Fragments (GM)	١.		_
-		0.9	SS-14	3-10-11	65.0-65.9' - yellowish brown, (10YR 5/4), wet, medium	-	.	-
-	00.5	0.5	33-14	(21)	dense, strong HCl reaction, limestone fragments up to	/₹	ш	-
-	66.5					1		-
-						1		-
-						1		-
-						1		
_						1		_
-						1		_
70	70.0					1		_
-28.3	70.1	0.0	SS-15	50/0.75 (50/0.75")	Limestone Fragments 70.0' - yellowish gray, (5Y 7/2), delayed mild to	П		Driller's Remark: Casing set to 70.0', will begin rock coring on 6/6/07
				(00,0110)	I \moderate HCl reaction, trace fossil casts/molds, few /			a seguir room serining en e, e, e, e,
_					thin fragments 3/4"-1" Begin Rock Coring at 70.0 ft bgs]		
					See the next sheet for the rock core log			
_						1		_
_						1		_
_						1		_
-						1		_
-						4		_
75 <u> </u>					-	4		_
-55.5						4		-
-						+		-
-						+		-
-						+		-
-						+		-
-						1		-
-						1		-
-						1		-
80						1		-
						†		



PROJECT NUMBER:

33884.FL

BORING NUMBER:

E-07 SHEET 5 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723243.7 N, 458250.5 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

CORING	I WE I HOD AI	ND E	JUIPIV	MENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	casing	}	ORIENTATION : Vertical
WATER	LEVELS: 3.0	ft bg	s on 6	/06/07 START : 6/5/2007 END : 6/	7/200	LOGGER : J. Burkard, C. Dellaria	, B. Ellis
305	· -			DISCONTINUITIES	ניז	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		တ္သ	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표원인	Z Y Z	(%	FRACTURES PER FOOT		일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YH X	SGTE	Q D (%)	CT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	₽ BO	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	RESO.	S.	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	70.0				H	Limestone	Start coring at 08:00 on
-	R1-NQ		0	70.5, 70.8' - Mechanical break (2), <5 deg		- 70.0-70.9' - pale yellowish brown to	6/6/07
-	1.5 ft 60%	33		and 10-20 deg, rough, undulating, open 1/16"	₽	grayish orange, (10YR 6/2 to 10YR	Water level at 3.0' below
I _	71.5		NR	and tight, respectively	Ш	7/4), fine grained, strong HCl reaction, medium strong (R3), voids	ground surface R1: 1 minute -
			0	71.7, 72.0, 72.4-72.8' - Mechanical break (3)	Н	(<1/16") over 5-10% of surface	Driller's Remark: Possible
			0	, ,	П	No Recovery 70.9-71.5'	sand at bottom of run,
-				•	₩	 Limestone 71.5-74.5' - pale yellowish brown to 	could have resulted in loss - of recovery
-			1	73.0' - Fracture, 5 deg, smooth, undulating	口	grayish orange, (10YR 6/2 to 10YR	SC-1 collected at 72.9-
-	R2-NQ				H	 7/4), medium to fine grained, strong 	74.0'
-	5 ft	28	0			HCl reaction, medium strong (R3), voids (<1/16") over 5-10% of surface,	_
l _	60%			74.0, 74.2' - Mechanical break (2), <10 deg, rough, undulating, open 1/8"	Н	- 10% cavities up to 5/8", black	
75				rough, undulating, open 170	Ш	organic infill	
-33.3					\mathbb{H}	No Recovery 74.5-76.5'	
-			NR	,	П	-	R2: 4 minutes
-					₩	-	-
-	76.5			76.5-76.7' - Fracture zone, rough, undulating,	口	Limestone	-
-			>10	no visible orientation	┢┼	- 76.5-79.5' - dusky yellow, (5Y 6/4),	-
I _						medium grained, mild to moderate	_
			0		Н	HCl reaction, medium strong (R3), - fossil casts and molds, voids (<1/16")	
			0	78.1' - Mechanical break	Ш	over 25-50% of surface, cavities up	1
-	R3-NQ				\mathbb{H}	to 3/8"	1
-	5 ft	87	0			-	-
-	96%		_	79.4, 79.6' - Mechanical break (2), <5 deg	₽	79.5-81.3' - Same as 76.5-79.5'	1
-38.3			1	deg, rough, undulating, open	口	— except voids (<1/16") over 10-30% of	_
-30.5				80.1' - Fracture, 5 deg, smooth, undulating	┢	surface	
			0			_	R3: 5 minutes
	81.5		NR		H	No Pagayony 94 2 94 5'	
1 7			igcup	81.6, 81.8, 82.0, 82.3' - Bedding plane or	Ш	 No Recovery 81.3-81.5' Limestone 	1
-			4	mechanical break (4), <10 deg, rough,	+	81.5-82.6' - dusky yellow, (5Y 6/4),	1
-				undulating, tight to <1/16" open 82.5-83.0' - Fracture zone, rough, undulating,		- medium grained, mild HCl reaction,	-
-			>10	angles undeterminable	╂╫	weak to medium strong (R2 to R3), surface cavities up to 1/2", fossil	-
-				83.4' - Mechanical break or bedding plane,	Ш	 casts and molds 	
	R4-NQ 5 ft	8		4 - Mechanical break of bedding plane, <5 deg, rough, undulating, tight	\mathbb{H}	82.6-83.5' - yellowish gray, (5Y 7/2),	Core barrel got rock sample jammed in the
	40%	J		J. J. J. J. J. J. J. J. J. J. J. J. J. J		fine to medium grained, strong HCl reaction, very strong (R5), trace	barrel causing the lost
85					$\vdash \vdash$	surface voids	recovery
-43.3			NR	_	П	No Recovery 83.5-86.5'	
-					+	_	R4: 3 minutes
-					F	_	-
_	86.5				╀┤	Limontono	-
			>10	86.7' - Mechanical break, 5-10 deg, rough,	Щ	Limestone - 86.5-90.6' - dusky yellow, (5Y 6/4),	
			10	undulating, tight	H	medium grained, moderate to strong	
]				87.2-88.1 Fracture zone, rough, undulating, angles between 70-90 degrees		HCl reaction, weak to medium strong	1
-			>10	angles settles in the set degrees	++	 (R2 to R3), voids (<1/16") over 80-75% of surface, surface cavities 	1
-	R5-NQ			88.4' - Mechanical break, <5 deg, rough,	団	up to 1", trace amount of fossil casts	-
-	5 ft	48	0	stepped, open 1/8"	+	and molds	-
-	82%					- -	-
90					\vdash		



PROJECT NUMBER:

33884.FL

BORING NUMBER:

E-07

SHEET 6 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723243.7 N, 458250.5 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 3.0	ft bgs	s on 6	/06/07 START : 6/5/2007 END	6/7/200	D7 LOGGER : J. Burkard, C. Dellari	a, B. Ellis
30₽	(%			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
ELO N (f	AND AND RY (9	_	ZES T	DESCRIPTION		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNES	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-48.3			0		\Box		
1 [NR	90.4' - Fracture or mechanical break, <5 deg, rough, undulating, open	工	No Recovery 90.6-91.5'	R5: 5 minutes
l _	91.5		INIX	5 / 5 I	上	1	
l -			0		上	Limestone 91.5-94.8' - Same as 86.5-90.6'	
-			Ľ		-		
-			0	92.7' - Fracture or mechanical break, 5-10	\perp	1	
-	DO NO			deg, rough, planar, open 93.3' - Fracture or mechanical break, 10 deg,		- -	-
-	R6-NQ 5 ft	68	0	rough, undulating, tight	#	1	-
-	82%			94.5' - Fracture or bedding plane, 5 deg,	#	1-	-
95 <u> </u>			1	rough, undulating, open	士	— 94.8-95.6' - dusky yellow, (5Y 6/4),	-
-				95.2' - Fracture, 10 deg, smooth, undulating, trace clay infilling	\pm	medium to fine grained, strong HCl reaction, weak to medium strong (R2	R6: 6 minutes
-			NR	95.4' - Mechanical break or fracture	+	to R3), trace surface voids, organic staining	-
-	96.5			96.5-96.7' - Fracture zone	\Box	No Recovery 95.6-96.5'	-
-			4	97.0' - Fracture or mechanical break	口	Limestone 96.5-98.4' - pale yellowish brown to	SC-2 collected at 97.0-
-					\Box	gravish orange. (10YR 6/2 to 10YR	98.0'
-			0		\pm	 7/4), fine grained, moderate HCl reaction, medium strong (R3), 15% 	1
-	R7-NQ			98.4' - Bedding plane, <5 deg, rough, undulating, tight	Ъ	surface voids 98.4-99.6' - pale yellowish brown to	1
-	5 ft 62%	48	0	undulating, tight	1	very pale orange, (10YR 6/2 to 10YR	1
100					F	8/2), medium grained, strong HCl reaction, medium strong to strong	1
-58.3			ND		井	(R3 to R4), voids (<1/16") over	
1 _			NR		片	20-40% of surface, cavities up to 1/2", fossil casts and molds	R7: 5 minutes
l _	101.5				\perp	No Recovery 99.6-101.5'	
-			0		上	Limestone - 101.5-102.7' - Same as 98.4-99.6'	
-			0	102.3-102.4' - Fracture, <5 deg, rough,	┵	except increase in the number of	
-				undulating, open 1" with 1" fragment	\Box	surface cavities No Recovery 102.7-106.5'	-
-	R8-NQ				\perp	1	-
-	5 ft	15			口	1	-
-	24%		NR		士	<u>}</u>	
105_ -63.3					士	 -	-
-					\perp	<u>†</u>	R8: 3 minutes
-	106.5				+	<u>†</u>	
-	100.0				F	Limestone	
-			0	106.9' - Mechanical break, 10-20 deg, rough, undulating, tight	#	106.5-108.5' - grayish orange, (10YR 7/4), medium grained, strong HCl	SC-3 collected at 106.9- 107.9'
-		5 ft 40			1	reaction, weak (R2), 15-20% surface]
-			0	107.9' - Mechanical break, <5 deg, rough, planar, tight	1#	voids	1
	R9-NQ		1	108.5' - Fracture, 5-10 deg, rough to smooth,	1	[]
	5π 56%		Ė	undulating		1	
110					$oldsymbol{oldsymbol{eta}}$		
						<u>I</u>	



PROJECT NUMBER:

33884.FL

BORING NUMBER:

E-07

SHEET 7 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723243.7 N, 458250.5 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS : 3.0	ft bg:	s on 6	/06/07 START : 6/5/2007 END : 6/	7/2007	7 LOGGER : J. Burkard, C. Dellaria	a, B. Ellis
				DISCONTINUITIES	U	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A B B A T 10 A T	RUT. VER.	(%) 🛭	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	٦ ا	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
	ORE ENG	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND	/MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	2 2 2	<u>~</u>	# #	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	
-68.3			NR	_	Н	Limestone - 108.5-109.3' - pale yellowish brown,]
l _					Ш	(10YR 6/2), medium grained, mild	R9: 2 minutes
l _	111.5				Ш	HCl reaction, weak to medium strong (R2 to R3), voids (<1/16") over	
			>10	111.6' - Bedding plane or mechanical break,	Н	20-40% of surface, no surface	
			/10	<5 deg, rough, undulating, open 111.9-112.2' - Fracture zone, rough,	H	cavities No Recovery 109.3-111.5'	1
				undulating, angle undeterminable	Ħ	Limestone	1
-			0	440.01.14	Н	111.5-115.0' - Same as 108.5-109.3'	1
-	R10-NQ			113.3' - Mechanical break, <5 deg, rough, undulating, open <1/16"	Ш	=	1 1
-	5 ft 70%	43	>10	113.4-113.8' - Fracture zone, rough,	ш	=	1
115			2	undulating, angle undeterminable 114.2, 114.6' - Bedding plane or mechanical	Н	-	1
-73.3			_	break (2), <5 deg, rough, undulating, open to	口	No Recovery 115.0-116.5'	
-			NR	1/8"	Ш	-	R10: 3 minutes
-			141		₩	-	1 -
-	116.5				囯	Limestone	1
-			1	-	団	- 116.5-117.5' - Same as 108.5-109.3'	1 -
-				117.2' - Bedding plane or mechanical break, <5 deg, rough, planar, open to 1/8"	H	No Recovery 117.5-121.5'	1 -
-				S deg, rough, planar, open to 1/6		-	1 -
-	D44 NO			-	Ш	_	1 -
-	R11-NQ 5 ft	13			Н	_	1 -
l -	20%		NR		Ш	_	1
120 -78.3				_	Ш	_	_
-70.3					Н	=	
					Ħ	-	R11: 3 minutes
l -	121.5			_			
l _			0	121.6, 121.8-122.0' - Mechanical break (2),	Н	Limestone - 121.5-123.4' - grayish orange, (10YR]
l _				vertical, rough, undulating, tight	\square	7/4), medium grained, mild HCl	
			2	122.8, 123.0' - Mechanical break or fracture	団	reaction, weak to medium strong (R2 to R3), trace fossil casts and molds,]
I -				(2), <5 deg, rough, undulating, tight	Н	voids (<1/16") over 15-20% of]
	R12-NQ		2	123.4-123.7' - Fracture, 5 deg, smooth, planar	H	surface, cavities up to 1/4" - 123.4-123.7' - yellowish gray, (5Y	1
	5 ft 70%	48	2	·	Щ	7/2), fine grained, mild HCl reaction,	1
125			1	124.4' - Bedding plane or mechanical break, <10 deg, rough, undulating, open 1" with 1"	Ш	strong (R4), fragmented	1
-83.3				fragment	Ш	— 123.7-125.0' - Same as 121.5-123.4' No Recovery 125.0-126.5'	1
-			NR		Ш	-	R12: 3 minutes
-	126.5				Н	-	1
-	120.0			126.7. 126.9. 126.0! Machanical brook (2)	Ħ	_ Limestone	1
-			0	126.7, 126.8, 126.9' - Mechanical break (3), 10-20 deg, rough, undulating, open <1/16"	Ħ	 126.5-127.9' - yellowish gray, (5Y 7/2), medium grained, mild HCl 	1
-			0	127.6, 127.8' - Mechanical break (2), <5 deg,	Ш	reaction, medium strong (R3), fossil	1
-				rough, undulating, tight to open 1/16"	Ю	- casts and molds, voids (<1/16") over	
-	R13-NQ				団	20-30% of surface No Recovery 127.9-131.5'	
-	5 ft	13			Н	-	
	28%		NR		H	-	
130			1417		H		



PROJECT NUMBER:

33884.FL

BORING NUMBER:

E-07

SHEET 8 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723243.7 N, 458250.5 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

CORING	NIL ITIOD AI	ND L	ZUIFIV	IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	Casiii	<u>y</u>	ORIENTATION : Vertical
WATER	LEVELS: 3.0	ft bg	s on 6	06/07 START : 6/5/2007 END : 6/	7/200	7 LOGGER : J. Burkard, C. Dellaria	, B. Ellis
	<u> </u>			DISCONTINUITIES	(J	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	- FOG	ROCK TYPE, COLOR,	
표원한	ER'A	(%	젊		음	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
T Ä K	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Q D (%)	FCT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	ВВ	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
		ď	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-88.3	014				+ "		
-00.5					亡	<u>-</u>	
I .					╨		R13: 2 minutes
	131.5						
-				131.5' - Fracture, 5 deg, rough, planar	Ъ	Limestone	<u> </u>
-			2	131.6' - Fracture, 5 deg, smooth, planar		- 131.5-135.5' - dusky yellow to	-
-				132.1' - Bedding plane or mechanical break, <5 deg, rough, planar, tight	╨	grayish yellow, (5Y 6/4 to 5Y 8/4), medium grained, mild HCl reaction,	-
_			0	132.5-133.1' - Bedding plane (multiple), <5	╁┰	- medium strong (R3), organic	-
l -				deg, rough, planar, open <1/16"		staining, fossil casts and molds,	_
	R14-NQ 5 ft	33	>10	133.8' - Mechanical break or fracture	\vdash	voids (<1/16") over 20-40% of - surface	
	80%	33	10	134.0-134.7' - Fracture zone	Ш	- Surface	
135					╆	<u> </u>	
-93.3			3	134.7-135.3' - Fracture, 80 deg, tight 135.1' - Mechanical break, <5 deg, rough,		-	_
-				planar, tight	╀	No Recovery 135.5-136.5'	R14: 5 minutes
- 1			NR		厂	- Necovery 100.0-100.0	1717. J IIIIIIules
I -	136.5				┰	_	
				136.5-137.3' - Fracture zone, rough,		Limestone	
			>10	undulating, no visible orientation, organic staining	╨	 136.5-137.1' - dusky yellow, (5Y 6/4), medium grained, weak to medium 	<u> </u>
-					仜	strong (R2 to R3), voids (<1/16")	-
-			6	137.7-138.3' - Fracture zone, rough, undulating, no visible orientation	╁	over 30-50% of surface, organic	-
_	D45 NO			undulating, no visible offeritation		staining 137.1-140.7' - yellowish gray, (5Y	-
_	R15-NQ 5 ft	22	0	138.9, 139.4' - Mechanical break (2)	╨	- 7/2), fine grained, mild to moderate	l -
	84%			130.9, 139.4 - Mechanical break (2)	\perp	HCl reaction, voids (<1/16") over	_
140				139.5-140.5' - Fracture zone, rough,	\vdash	10-15% of surface, organic staining,	
-98.3			>10	undulating, no visible orientation —		— surface cavities up to 1"	
-					╨	<u> </u>	R15: 7 minutes
-			NR		世	No Recovery 140.7-141.5'	-
_	141.5			444 F 440 FL Freeture Tone rough	╁	Limontono	-
-			>10	141.5-142.5' - Fracture zone, rough, undulating, no visible orientation	世	Limestone - 141.5-142.6' - light olive gray to	
			L		$oldsymbol{oldsymbol{oldsymbol{\square}}}$	yellowish gray, (5Y 5/2 to 5Y 7/2),	
				142.7' - Fracture, 5 deg, smooth, undulating	\vdash	medium grained, mild HCl reaction,	1
1 -			2	143.1' - Mechanical break		 medium strong to strong (R3 to R4), 20-40% voids 	· -
-	l R16-NQ			143.3' - Fracture, 15 deg, smooth, undulating	╁	142.6-144.5' - yellowish brown,	SC-4 collected at 143.4-
1 -	5 ft	40	0	143.5-145.9' - Mechanical break (4), <5 deg,	\coprod	 (10YR 6/2), fine to medium grained, 	144.5'
-	90%		\vdash	rough, undulating, open <1/16"	+	strong HCl reaction, weak to medium strong (R2 to R3), 10% voids on	-
145_			0	_	\Box	— surface	
-103.3			Ľ		╨	144.5-146.0' - moderate olive brown,	
1 -			0		ш	(5Y 4/4), medium grained, mild HCl	R16: 7 minutes
-	146 5		NR	145.9' - Fracture, 70-80 deg, rough,	╁	reaction, very weak to weak (R1 to R2), voids (<1/16") over 40-60% of	·
-	146.5			undulating, tight		surface, fossil casts molds	-
-			0	146.9, 147.5, 147.8' - Mechanical break (3),	╀	No Recovery 146.0-146.5'	-
-			<u> </u>	<5 deg, rough, undulating, tight	厂	Limestone 146.5-148.1' - dusky yellow to light	-
I -			0		\vdash	olive gray, (5Y 6/4 to 5Y 5/2),] .
						medium grained, mild HCl reaction,	
1 -	R17-NQ				╨	weak to medium strong (R2 to R3),]
-	5 ft 100%	97	0	148.8' - Mechanical break, <10 deg, rough, undulating to planar, open to 1/4"	仜	_ 30-50% voids, trace cavities	·
1	100%		\vdash	andulating to plantal, open to 1/4	╁	-	-
150					+		
					1		



PROJECT NUMBER:

33884.FL

BORING NUMBER:

E-07 SHEET 9 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723243.7 N, 458250.5 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

CORING	NIETHOD AI	ND EC	אורוו	/IENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	casin	<u> </u>	ORIENTATION : Vertical
WATER	LEVELS: 3.0	ft bgs	s on 6	/06/07 START : 6/5/2007 END : 6/3	7/200	LOGGER : J. Burkard, C. Dellaria	, B. Ellis
200	(9)			DISCONTINUITIES	ل ا	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S.	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
뿝병흔	AUN H, A	(%	R P	DEDTIL TYPE OBJECTATION BOUGHNESS	1일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
F ₹ ×	RE F	Q D (%)	P.F.	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	₽ BC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	COI	S.	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-108.3			0		ш	148.1-150.5' - pale yellowish brown,	SC-5 collected at 149.4-
-				150.2' - Mechanical break, <5 deg, rough, undulating	\vdash	 (10YR 6/2), fine grained, moderate to 	150.3'
-			1	150.4' - Fracture, 50-60 deg, rough,		strong HCl reaction, medium strong (R3), 10-15% voids, 10% cavities	R17: 5 minutes
-	151.5			undulating, tight	Н	- 150.5-151.5' - Same as 148.1-150.5'	_
l _			2	151.1' - Bedding plane or fracture, 5 deg, smooth, undulating, trace silica sand infill	Ш	except yellowish gray, (5Y 7/2),	_
			-	151.6' - Bedding plane or fracture, 5 deg,	Н	20-30% voids	
-				rough, undulating	Ш	- 151.5-154.0' - Same as 148.1-150.5'	1
-			0	151.7' - Fracture, <5 deg, rough, undulating - 152.2' - Bedding plane, <5 deg, rough,	Ш	_	1
-	R18-NQ			undulating to planar, tight	丗	<u></u>	l -
-	5 ft	43	0	152.7-153.2' - Fractures, 55-65 deg, rough, -	Н	154.0-155.4' - light olive gray, (5Y	
-	94%			undulating, open <1/16" to partially healed	Ш	- 5/2), fine grained, mild to moderate	4
155			>10	154.7' - Mechanical break, 5-10 deg, rough,	Щ	HCl reaction, weak (R2), 10-30%	
-113.3			L	undulating	Ш	voids, trace cavities	
-			3	155.0-155.9' - Fracture zone, possibly mechanical breaks	Н	155.4-155.9' - moderate yellowish	R18: 5 minutes
-	156.5		NR		ш	 brown, (10YR 5/4), medium grained, mild HCl reaction, weak to medium 	1
-	130.5		INIX	156.5-157.7' - Fracture zone, dominantly <10	Ш	strong (R2 to R3), 20-40% voids	1
-			>10	deg, angular to subangular fragments	団	_ 155.9-156.2' - yellowish gray, (5Y 7/2), fine grained, moderate HCl	1 -
-				1"-3-1/2"	\vdash	reaction, medium strong to strong	l -
l _			0	157.7-158.2' - Mechanical break (3), rough,		(R3 to R4), no voids	_
l _				undulating, open <1/8"	Ш	No Recovery 156.2-156.5' Limestone	
	R19-NQ			158.7, 159.0' - Mechanical break (2), <10	ш	156.5-156.8' - Same as 155.9-156.2'	
-	5 ft 60%	20	0	deg, rough, undulating to planar, open	Н	156.8-159.5' - light olive gray, (5Y	1
160				⁻		 5/2), fine to medium grained, mild to moderate HCl reaction, medium 	1
-118.3				_	╫	strong to strong (R3 to R4)	-
-			NR	-	Ш	No Recovery 159.5-161.5'	R19: 4 minutes
-				-	Н	_	-
-	161.5				H	,	
_			0	161.5-161.6' - Mechanical break, multiple breaks, no visible orientation, limestone -	Н	Limestone - 161.5-165.2' - Same as 156.8-159.5']
				fragments to 1"	Ш	except medium grained, mild HCl	
-				161.9' - Mechanical break or fracture	Н	reaction, 20-40% voids	1
-			>10	162.3-163.2' - Fracture zone, rough, undulating, angles undeterminable	口	_	1
-	R20-NQ		<u> </u>	163.4, 164.5' - Mechanical break (2)	ᡛ᠊ᡰ	_	SC-6 collected at 163.4-
-	5 ft	37	0	-	Ш	_	164.5'
-	74%			-	\Box	_	-
165_			0		口		
-123.3				_	Ш	No Recovery 165.2-166.5'	l J
			NR		Ш	•	R20: 5 minutes
-	166.5				Ш	_] 1
-	100.0			-	H	_ Limestone	1
-			0	167.0, 167.4' - Mechanical break or fractures	Ш	 166.5-175.5' - yellowish gray to 	-
-				(2)	Н	dusky yellow, (5Y 7/2 to 5Y 6/4), fine grained, moderate to strong HCl	-
-			0	167.8, 167.9, 168.3' - Mechanical break or -	Ш	- reaction, weak (R2), 10-20% voids,	-
I -				fractures (3)	H	fossiliferous zone from 167.3-167.6']
	R21-NQ		4	168.7-169.0' - Fracture, 10-30 deg, rough,	Ш	(molds and casts)	
	5 ft 100%	62	4	undulating	Щ		1
170				169.3, 169.6, 170.0' - Mechanical break (3)	Ш	_] 1
170					\vdash		
				1			1



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-07 SHEET 10 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723243.7 N, 458250.5 E (NAD83)

ELEVATION: 41.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

COMING	INCTITOD A	ND L	ZUIFIV	MENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	Casiii	<u>y</u>	ORIENTATION: Vertical
WATER	LEVELS: 3.0	ft bg	s on 6	/06/07 START : 6/5/2007 END : 6/	7/200	7 LOGGER : J. Burkard, C. Dellaria	, B. Ellis
	<u> </u>			DISCONTINUITIES	ניו	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	9	ROCK TYPE, COLOR,	
ᆱ병흔	H, H, M,	(%	NE TO		SYMBOLIC	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YFA Y	SOV	Q D (%)	SET	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	l BC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SCE	RENEW	A Q	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	l \	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-128.3			1		H		
-					F	-	R21: 5 minutes
-			0	170.6' - Fracture, 5 deg, rough, undulating 170.9' - Mechanical break	╀	_	-
-	171.5			170.0 Wediamod break	ш	<u> </u>	_
l _			>10	171.7' - Mechanical break	Ш		_
			10	172.1-172.9' - Fracture zone			
-					Ш	-	_
-			>10	-	ш	-	-
-	R22-NQ			173.3' - Mechanical break	世	-	-
-	5 ft	7	>10	173.6-175.5' - Fracture zone	₩	-	_
-	80%					-	_
175_			>10		₽		
-133.3					口		
1 -					\vdash	No Recovery 175.5-176.5'	R22: 5 minutes
1 -	176.5		NR		Ľ]
-	170.0			176.5-176.7' - Fracture zone, irregular,	╨	Limestone	-
-			3	angular rock fragments to 1"	仜	- 176.5-177.5' - light olive gray, (5Y	-
-				177.3' - Fracture, 30 deg, rough, planar	\vdash	5/2), fine grained, moderate to strong HCl reaction, extremely weak to	-
-			2	177.4' - Fracture, horizontal, rough, planar 177.8-178.1' - Fracture zone, irregular		- weak (R0 to R2), 10-30% voids, 10%	_
l -				angular rock fragments, top and bottom	╀	cavities	_
l _	R23-NQ 5 ft	37	3	fractures are horizontal, rough, planar	ш	177.5-181.0' - moderate yellowish - brown, (10YR 5/4), fine grained,	_
	90%	31	٦	178.6, 179.1, 179.4' - Fractures (3), 0-5 deg, rough, planar	Н	weak to medium strong (R2 to R3),	
180				179.5' - Fracture, 50 deg, rough, undulating	H	10-20% voids	1
-138.3			1		Ľ	_	
-			4	180.5, 180.6, 180.85, 180.9' - 0-10 deg,	╙	-	R23: 5 minutes
-			NR	rough, planar		No Recovery 181.0-181.5'	-
-	181.5		INIX		\vdash	Limestone	-
1 -			1		岸	- 181.5-182.5' - moderate yellowish	_
1 -				182.3' - Fracture, 30 deg, rough, undulating,	₽	brown, (10YR 5/4), fine to medium	_
1			1	possible mechanical break	Ш	grained, weak to medium strong (R2 to R3), 10-30% voids	
1 7				182.9' - Fracture, 20 deg, smooth, planar	\vdash	182.5-185.0' - pale yellowish brown,	
1 -	R24-NQ			400.75! Experience 60 descriptions du l'	Ľ	(10YR 6/2), fine grained, medium	-
-	5 ft 94%	72	4	183.75' - Fracture, 60 deg, rough, undulating 184.1' - Fracture, horizontal, rough,	╨	 strong (R3), 10-20% voids, trace cavities 	Used natural break at _ 183.75' to box to preserve
-	J + /0		\vdash	undulating	仜	_ Gavines	specimen -
185_ -143.3			1	184.3' - Fracture, 10 deg, smooth, planar	╁	 185.0-186.2' - pale yellowish brown,	_
1				184.4' - Fracture, horizontal, smooth, planar 184.8' - Fracture, horizontal, smooth,	F	 (10YR 6/2), fine to medium grained, 	P24: 7 minutos
1 -			2	undulating	片	weak to medium strong (R2 to R3),	R24: 7 minutes
1 -	186.5		NR	185.7' - Fracture, 50 deg, rough, undulating 186.4' - Fracture, 5 deg, rough, undulating	Ш	20-40% voids, 20-30% cavities up to 5/8", fossil casts and molds	
1				100.4 - Fracture, 5 deg, rough, undulating		No Recovery 186.2-186.5'	Bottom of hole at 186.5',
1 -					1	Bottom of Boring at 186.5 ft bgs on	end of boring at 09:53,
1 -					1	- 6/7/2007	6/7/07
1 -					1	-	-
1 -					1	-	-
1 -					1	-	-
1 -					1	-	-
					$oxed{oxed}$		
1					1		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-08

SHEET 1 OF 10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722897.6 N, 458228.0 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten, T. Williams

DRILLING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

					·	tary, auto naminer, Avvo rou			ONIENTATION: Vertical
WATER	LEVELS	: 4.41 ft l	ogs on 3/	D6/07 S	START : 2/15/2007 T	END : 2/23/2007	LOGGEF	: R.	Gomez, R. Bitely, T. Stewart
>				STANDARD		SOIL DESCRIPTION		ı	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				SYMBOLIC LOG	
표상한		RECOVE	ERY (ft)	120111200270		E, USCS GROUP SYMBOL,		일	DEPTH OF CASING, DRILLING RATE,
H H H				6"-6"-6"		CONTENT, RELATIVE DEN CY, SOIL STRUCTURE, MIN		BC	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			#TYPE	(N)	CONCIONENC	51, 0012 011 1001 01 12, Will	LIBEOGI	SYI	INOTHER MENTALISM
42.4				()				Н	Start drilling at 10:57 AM
-							-	H	using 3-7/8" drag bit -
-							-	l	Water level is based on Ground Water
I _							_	ı	Monitoring at LNP site (FSAR Table -
									2.4.12.08)
							_	1	_
-							-	1	-
-							-	H	-
_	3.5				Ciltu Cond (CM)	N	_	717	-
_				0.04	Silty Sand (SM)	vellow, (10YR 6/6), wet, lo	nse fine -		<u>_</u>
		1.0	SS-1	3-3-4 (7)	grained silica sa	and, 15% nonplastic fines,	, trace		
5	5.0			(1)	organics				_
37.4	0.0								
-							-	l	-
-							-	l	-
_							_	ı	_
									_
								l	Driller's Remark: Silts and sands at 7.0',
_							_	1	harder drilling -
-							-	l	-
-	8.5				Cilty Cand With	h Limestone Fragments (CM)	11111	Driller's Remark: Switch to 3-7/8" tri-cone
_				4-7-6	8.5-10.0' - vello	wish gray mottled with ligh	nt brown. (5Y -		roller drill bit
_		1.5	SS-2	(13)	8/1 with 5YR 5/6	6), wet, medium dense, fir	ne to coarse		_
10	10.0			(- /	grained, strong	HCl reaction, 20% nonpla	stic fines,		
32.4					carbonate mate	urse gravel sized limestone	e tragments,		
-					\(\text{carbonato mate}\)		/ -	1	-
-							-	l	Driller's Remark: Hard drilling at 11'
-							-	l	-
_							_	l	_
									_
					I				
1 7	13.5						-		-
-	13.5				Silty Sand (SM))			-
-		1.5	000	10-5-6	13.5-15.0' - San	ne as 8.5-10.0' except 40-	45% fine to -		-
-		1.5	SS-3	(11)	coarse gravel si 15-20% nonplas	ized, 35% fine to coarse s	and sized,		-
15	15.0				15-20% HORPIAS	SUC IIIIES		Ш	
27.4							_		_
					I				
-							_		-
-							-		-
-					I		-		-
-							-		-
_					I		_		_
	18.5								
1 7					Silty Sand With	h Limestone Gravel (SM)			_
-		1.5	SS-4	4-6-6	18.5-20.0' - San	me as 8.5-10.0'	_		-
			55 .	(12)			-		-
20	20.0							Ш	
					I				



PROJECT NUMBER:	BORING NUMBER:			
338884.FL	F-08	SHEET	2 OF 10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722897.6 N, 458228.0 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten, T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

,						ary, auto hammer, AWJ ro			OHIENTATION: Vertical	
WATER	LEVELS	: 4.41 π ι	ogs on 3/0		START : 2/15/2007	END: 2/23/2007 SOIL DESCRIPTION	LOGGER		Gomez, R. Bitely, T. Stewart COMMENTS	
≥ 9€	SAMPI F	INTERVA	AL (ft)	STANDARD PENETRATION				-0G	5521116	
DEPTH BELOW SURFACE AND ELEVATION (ft)	0,vii EE	RECOVE	- '	TEST RESULTS	SOIL NAME,	USCS GROUP SYMBOL	, COLOR,	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,	
THT.			#TYPE	6"-6"-6"	MOISTURE C CONSISTENCY	CONTENT, RELATIVE DE Y, SOIL STRUCTURE, MI	NSITY OR NERALOGY	MBO	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	
			,,,,,	(N)				SΥ		
22.4							_		_	
_							_		_	
-							-		_	
_							_		-	
-							-		-	
-							_	l	-	
-	23.5				Silt (ML)		_	Ш	Driller's Remark: Lost 40% circulation	
-		1.5	SS-5	4-21-29	23.5-25.0' - grayi	ish orange, (10YR 7/4), dilatancy, moderate H0	moist, hard, -		-	
25_	25.0			(50)	5% very fine grai	ined sand-sized, carbon	ate material		-	
17.4	25.0									
-							-		-	
-							-		-	
_							_		_	
							_			
							_		_	
_	28.5						_	<u> </u>	_	
_				8-12-11	Silt (ML) 28.5-29.5' - Sam	e as 23.5-25.0' except 1	15-20% fine to -		_	
-		1.0	SS-6	(23)	coarse sand-size			Ш	-	
30 <u> </u>	30.0				-					
-							-	1	-	
-							-		-	
-							_		-	
-							-		-	
-							_		-	
-	33.5						-		-	
					Silt With Sand (I	ML) brown to pale yellowish	brown (5VD	\prod	Set 4" HW casing to 35.0'	
		1.0	SS-7	21-18-21 (39)	5/2 to 10YR 6/2),	, dry to moist, hard, non	plastic, rapid	Ш		
35	35.0			(/		CI reaction, 20-25% fine fine gravel-sized	e to coarse			
7.4					3.252, 1.466	- 5			Stopped at 12:45 PM after setting casing to 35.0'	
_							=		Leave casing in at 35.0' until next shift Start drilling 02/20/2007, continue with 3-7/8"	
_							-	-	tri-cone from 35.0' below ground surface -	
-							-		4" HW casing at 35.0' below ground surface	
-							-		-	
-	20 5						-		-	
-	38.5							Ш	-	
-		1.4	SS-8	20-23-19			=	1	-	
40	40.0			(42)			_	Ш	-	
	7				1					



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	E-08	SHEET	3	OF	10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722897.6 N, 458228.0 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten, T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

DRILLIN	G METH	OD AND	EQUIPMI	ENT : CME 550X	S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 4.41 ft l	ogs on 3/0	06/07	START: 2/15/2007 END: 2/23/2007 LOGGER: R. Gomez, R. Bitely, T. Stewart
>				STANDARD	SOIL DESCRIPTION COMMENTS
BELOV CE AND TON (ft)	SAMPLE	RECOVE		PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SOMMENTO DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY
2.4				()	Silt With Sand (ML)
-					\ 38.5-39.9' - moderate yellowish brown, (10YR 5/4), moist, hard, nonplastic, rapid dilatancy, mild HCI reaction, 15-20% fine to coarse sand-sized, carbonate
-					material -
- -					<u> </u>
_	43:5	0.0	\ SS-9 /	50/1.5	No Recovery 43.5-43.6' Driller's Remark: Slow drilling through dense
-				(50/1.5")	zone, light chatter
45 -2.6 -					Driller's Remark: Softer drilling, quick drilling, little to no chatter
-					
-					<u> </u>
-	48.5				-
- 50	49.9	1.2	SS-10	30-48-50/5 (98/11")	Silt (ML) 48.5-49.7' - pale brown, (5YR 5/2), moist to wet, hard, nonplastic, rapid dilatancy, mild to moderate HCl reaction, 10-15% fine to medium sand-sized,
-7.6 -					\carbonate material
_]
-					
_	53.5				
- 		1.2	SS-11	18-12-36 (48)	Silt With Sand And Limestone (ML) 53.5-54.7' - Same as 48.5-49.7' except 20-25% fine to coarse sand-sized, 4-8 interbeds of limestone up to 1/2" thick
55 <u> </u>	55.0				
- -					<u> </u>
-					1
-	58.5				Sandy Silt (ML)
- -		1.2	SS-12	25-35-41 (76)	58.5-59.7' - Same as 48.5-49.7' except 25-30% fine to coarse sand-sized, 2-4 limestone interbeds up to 1/2"
60	60.0				шил



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	F-08	SHEET	4	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722897.6 N, 458228.0 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten, T. Williams

DRILLING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 4.41 ft k	ogs on 3/0	06/07 S	START : 2/15/2007 END : 2/23/2007 LOGG	ER:	: R.	Gomez, R. Bitely, T. Stewart
				STANDARD	SOIL DESCRIPTION		G	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COIL NAME LICOS OPOLID OVARDOL COLOD	1	SYMBOLIC LOG	DEDTIL OF CACING DOULING DATE
H BE ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	30LI	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND	
EVEN EVEN			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		SYM	INSTRUMENTATION
-17.6				(,		╅		Light chatter to 61.0'
-	-					1		-
-						1		-
-						1		_
]		Driller's Remark: Rapid advancement, no chatter, few cemented silt grains (coarse to
-						4		fine gravel size) in cuttings
_	63.5				County Cill And Limeatons (ML)	_	П	-
-	-		00.40	28-33-21	Sandy Silt And Limestone (ML) 63.5-64.8' - Same as 58.5-59.7' except 35-40% of	4		-
		1.3	SS-13	(54)	sample is limestone fragments	\exists		-
65 <u> </u>	65.0					十		Driller's Remark: Light to moderate chatter
-						Ⅎ		Steady advancement, cemented silt to limestone fragments in cuttings
-	-					1		Slow advancement from 66.0'-68.0'
-	-					1		-
]		Driller's Remark: Light to no chatter
_						1		_
-	68.5 68.6	0.0	\SS-14 <i>)</i>	50/1	No Recovery 68.5-68.6'	4		Moderate chatter
-	00.0	0.0	(00 14)	(50/1")	Begin Rock Coring at 68.5 ft bgs	′ ┨		Switch to NQ tooling at 68.5' 16:20 PM begin cleaning boring with NQ
-					See the next sheet for the rock core log	4		tooling
70 <u> </u>						\dashv		
-						┨		-
-						Ⅎ		-
-						1		-
						1		
]		_
-						4		-
-						4		-
	-					+		-
75 <u> </u>						\dashv		
-						1		-
-	-					1		-
1 -	1					1		-
-]					1		-
]		
-						1		
-						4		-
-						4		-
80						\dashv		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-08

SHEET 5 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722897.6 N, 458228.0 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten, T. Williams

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, NQ tools, HW casing

2311110	I WIL I HOD AI	ND L	ZUIFIV	ENT : CME 550X S/N 340253, mud rotary, NQ tools, HV	v casin	y	ORIENTATION : Vertical
WATER	LEVELS: 4.4	1 ft b	gs on 3	3/06/07 START : 2/15/2007 END : 2/	23/200	7 LOGGER: R. Gomez, R. Bitely, ⁷	Γ. Stewart
				DISCONTINUITIES	(0	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOCK TYPE COLOR	
H H H	N. A.Y.	(9)	FRACTURES PER FOOT	DECORAL FIOR	윽	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
FAC	S T S	(%) _Q	달입	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOI	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SYP	K A A	S.	ERA PER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	68.5	ш.	ш. ш.	1 11,11 1 1, 1	0)		
l _	R1-NQ		4	68.75' - Mechanical break, 10 deg, smooth,	Н	Limestone 68.5-69.2' - light olive gray, (5Y 5/2),	68-70' advancement slow
	1.5 ft	0		undulating	Ш	very fine grained, mild HCl reaction,	with heavy chatter 68.5-69',
70	70.0 47%		NR	68.85, 69.0, 69.1, 69.2' - Mechanical break	Н	weak to medium strong (R2 to R3),	little to no chatter 69.0-
-27.6				(4), 10 deg, smooth, undulating	口	fossiliferous, trace 15% organics No Recovery 69.2-70.0'	70.0' — R1: No time recorded
-			>10	70.55- 70.8' - Fracture zone, rough, stepped,	╀	Limestone	171. No time recorded
-				no visible orientation	毌	70.0-73.3' - light olive gray, (5Y 5/2),	-
_			5	70.8-71.15' - Mechanical break, vertical,	╌	very fine grained, mild HCl reaction,	_
				smooth, undulating		very weak to weak (R1 to R2), fossiliferous, voids up to 3/16" cover	
	R2-NQ			71.15' - Mechanical break, 25 deg, rough, undulating	ш	50% of surface	
-	5 ft 66%	38	1	71.3-71.45' - Mechanical break, vertical,	丗		1
-	00 /0		1	smooth, undulating	╁┼		
-			\square	71.5' - Mechanical break 71.75' - Mechanical break, <10 deg, rough,	╆	No Recovery 73.3-75.0'	-
_				undulating	Щ		DO: C mainsut
			NR	72.5' - Fracture, 50 deg, smooth, undulating	Ш		R2: 6 minutes
75	75.0				\Box		2/20/07 Stop drilling for the
-32.6				75.1' - Mechanical break, <10 deg, smooth,	╚	Limestone	day — Resume drilling 2/21/07 at
-			1	undulating	口	75.0-78.3' - light olive gray, (5Y 5/2),	08:13
-				-	╂┼┼	very fine grained, mild to moderate HCl reaction, weak to medium strong	SC-1 collected at 76.3-
_			1	76.35' - Fracture, 20 deg, smooth, undulating	\Box	(R2 to R3), bedding plane	77.4' -
_				-	╨	laminations, some with organics	_
	R3-NQ	57	1		Ш	(black laminations), voids up to 3/16" cover 25-50% of the surface	
	5 ft 66%	57	'	77.4' - Fracture, 20 deg, smooth, undulating	Н	Cover 23-30 % of the surface	
-			3	78.05' - Mechanical break, 30 deg, smooth,	Ħ		1
-				undulating	╁	No Recovery 78.3-80.0'	-
-			NR	78.15' - Bedding plane, 10 deg, smooth, undulating, intersecting a vertical fracture	毌		R3: 6 minutes
_			' ' '	78.35' - Bedding plane, <10 deg, smooth,	╀┼		- To: 0 minutes
	80.0			undulating	口	_	
-37.6			5	80.1' - Mechanical break, 80 deg, rough,	Ш	Limestone	
1 7			"	undulating	Ш	80.0-82.8' - light olive gray, (5Y 5/2), very fine grained, mild to moderate	
-				80.3' - Bedding plane, <10 deg, smooth, undulating	╁	HCl reaction, very weak to medium	1
-			1	80.55' - Bedding plane, <10 deg, smooth,	⇈	strong (R1 to R3), moderately	
-	R4-NQ		\vdash	undulating	╁┼┼	competent at 80.0-80.55' and 81.2-82.8', voids up to 3/16" over	Driller's Remark: Lost up to
_	5 ft	38	2	80.9-81.0 - Fracture zone, <10 deg, rough, undulating, multiple fractures	毋	50% of surface, fossiliferous, trace	80% circulation at 82.0'
	56%	-	\vdash	81.2' - Fracture, 15 deg, smooth, undulating	H	bedding plane laminations, very	
				82.5' - Mechanical break, <45 deg, rough,	口	weak rock (R1) with very fine granular surface at 80.55-81.2'	
1 7			NR	undulating 82.7' - Fracture, 65 deg, smooth, undulating	H	No Recovery 82.8-85.0']
-			INE	oz.r - i racture, oo deg, sinootti, undulating	世		R4: 6 minutes
				-	╁		
85 <u> </u>	85.0		$\vdash\vdash$	85.0-85.45' - Fracture zone, rough,	╚	Limestone	-
-			>10	undulating, multiple fractures, multiple angles	₩	85.0-88.8' - dark yellowish brown to	
				85.45' - Mechanical break, 20 deg, rough,	Ш	light olive gray, (10YR 4/2 to 5Y 5/2),	
				undulating	H	very fine grained, mild to moderate	
1 7			>10	85.75' - Fracture, 60 deg, smooth, undulating 86.0' - Mechanical break, 25 deg, rough,	世	HCl reaction, very weak to medium strong (R1 to R3), voids up to 1/2"]
-	- R5-NQ			undulating	口	cover 20-30% of the surface, small	1
-	5 ft	43	2	86.0-86.3 - Fracture zone, <20->70 deg,	╁	voids (<3/16") cover 60-80% of	
-	76%		$\vdash\vdash$	multiple fractures, rock fragments	冊	surface, fossiliferous (molds/casts)	-
			\sqcup		H		
					$\perp \perp$		



PROJECT NUMBER:

33884.FL

BORING NUMBER:

E-08

SHEET 6 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722897.6 N, 458228.0 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten, T. Williams

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, NQ tools, HW casing

CORING	I WETHOD AI	ND EC	JUIPIV	ENT : CME 550X S/N 340253, mud rotary, NQ tools, HV	v casii	1 <u>g</u>	ORIENTATION : Vertical
WATER	LEVELS: 4.4	1 ft b	gs on 3		23/200		
> 0 00	(9)			DISCONTINUITIES	ڻ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
90	90.0		2 NR	86.75, 87.25, 87.55, 88.0, 88.8' - Bedding plane or fracture (5), <10-15 deg, smooth, undulating		- No Recovery 88.8-90.0'	SC-2 collected at 88.1- 88.8' R5: 5 minutes
-47.6 _	00.0		1	— 90.65' - Fracture, 15 deg, rough, undulating		Limestone 90.0-95.0' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 6/1), very	
-			4	91.15, 91.4, 91.55, 91.8' - Bedding plane (4), <10 deg, smooth, undulating		fine grained, moderate HCl reaction, extremely weak to medium strong (R0 to R3), fossiliferous	
_	R6-NQ 5 ft 100%	45	8	92.05, 92.15, 92.25' - Mechanical break (3) 92.4, 92.8' - Bedding plane, <10 deg, smooth, undulating		(casts/molds), trace organics throughout and in thin laminations at 91.0-94.55', voids up to 1/2" from	
-			2	92.7' - Fracture, 75 deg, smooth, undulating 92.9' - Fracture, 75 deg, smooth, undulating, mirror of fracture at 92.7		90.65 to 91.8', voids up to 3/16" - cover 50-75% of surface at 90.0-91.8' and 92.8-95.0' (decreasing	
95	95.0		4	93.0' - Mechanical break, 10 deg, rough, undulating 93.25' - Mechanical break, 50 deg, rough,		w/depth), extremely weak (R0) rock zone at 91.8-92.8', friable along bedding plane laminations	R6: 3 minutes
-52. 6 -			1	undulating 93.55, 94.25, 94.45' - Mechanical break (3), <10 deg and 50 deg, rough, undulating		Limestone 95.0-97.0' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very	
-			4	94.55' - Bedding plane, smooth, undulating, organics 95.75' - Fracture, 20 deg, rough, undulating,	H	fine grained, moderate HCl reaction, weak (R2), voids up to 3/16" cover 30-40% of the surface, voids	
- -	R7-NQ - 5 ft - 40%		low angle 96.25, 96.45, 96.65, 96.75' - Fracture (4), <10 - deg, smooth, undulating			increase with depth, fossiliferous with few macrofossils, trace bioturbation indications, trace organics No Recovery 97.0-100.0'	
100	100.0			-		- -	R7: 7 minutes
-57.6	100.0		0			Limestone 100.0-102.9' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), very	Driller's Remark: Lost 100% circulation at 100.0'
-			1	100.85' - Mechanical break		fine grained, mild to moderate HCl reaction, weak (R2), voids (3/16") cover 30% of the surface decreasing	SC-3 collected at 100.85- 101.9'
-	R8-NQ 5 ft 72%	47	3	101.9, 102.15, 102.65, 102.9' - Fracture or bedding plane (4), <10 deg, smooth, undulating		w/depth to no voids, less than 5% voids from 102.15-102.9', fossiliferous with few small	
-			>10	102.9-103.6' - Fracture zone, rough, stepped, multiple intersecting fractures		macrofossil molds, trace bioturbation and trace organics 102.9-103.6' - yellowish gray to light	
105	105.0		NR			olive gray, (5Y 7/2 to 5Y 5/2), moderate HCl reaction, extremely weak (R0), silt to very fine	R8: 11 minutes
-62. 6 -			5			sand-sized grains, bioturbation No Recovery 103.6-105.0'	
-	_		>10	undulating 105.85-106.1' - Fracture zone, multiple intersecting fractures		- -	
-	R9-NQ - 5 ft 74%	ft 28	>10	106.35' - Fracture, 50 deg, rough, undulating 106.55' - Mechanical break 106.8' - Fracture, 75 deg, smooth, undulating		- -	-
			6	3	Ш		



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	F-08	SHEET	7	OF	10	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722897.6 N, 458228.0 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten, T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, NQ tools, HW casing

				PIENT : CIVIE 330X 3/N 340233, HILL TOTALLY, NQ 1001S, HV			
WATER	LEVELS: 4.4	11 ft b	gs on	3/06/07 START : 2/15/2007 END : 2/	23/20	D7 LOGGER: R. Gomez, R. Bitely, 1	Г. Stewart
	_			DISCONTINUITIES	m	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOCK TYPE COLOR	
ÄÄ ON 4	N. S. Y.		R F	BECOM HOW	으	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
ATI	E E	(%) Q	ĮΖŬ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FR EV	NG NG S	οD	AC R F	PLANARITY, INFILLING MATERIAL AND	Ĭ,	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
SE	SHR	ď	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	BROLO, TEOLINEOGETO, ETO.
				106.9-107.4' - Fracture zone, rough, stepped,		Limestone	
-				multiple intersecting fractures	╁	 105.0-108.7' - yellowish gray to light 	DO: 5 minutes
l _			NR	107.4, 107.7' - Fractures, 60 deg and 70 deg,	\vdash	olive gray, (5Y 7/2 to 5Y 3/2), very	R9: 5 minutes
110	110.0			rough, undulating	Н	fine grained, moderate HCI reaction,	
-67.6	110.0			107.7-108.0' - Fracture zone, rough, stepped, —		— extremely weak to weak (R0 to R2),	_
			7	gravel-sized rock fragments 108.35-108.7' - Fracture zone, rough,	╨	rock strength varies along length of	-
				stepped	\vdash	core, voids up to 3/16" cover 30-60% of the surface, cavities up to 1/4"	
-				110.0-110.65' - Fracture zone, smooth.	┰	rare, fossiliferous, few macrofossil	1
-			3	undulating, bedding plane and other	仜	casts and molds, trace bioturbation	-
l _				intersecting fractures	_	- and organics	_
	R10-NQ		1	111.25' - Fracture, 60 deg, smooth,	\vdash	No Recovery 108.7-110.0'	
-	5 ft	20		undulating	$\dagger \top$	Limestone	-
-	48%			111.5' - Fracture, 60 deg, smooth, undulating	亡	 110.0-112.4' - yellowish gray to light 	-
				111.75' - Bedding plane, <10 deg, smooth,	\coprod	olive gray, (5Y 7/2 to 5Y 3/2), very	
I -			NR	undulating	\vdash	fine grained, moderate HCl reaction,]
-				112.0' - Fracture, 70 deg, smooth, undulating		extremely weak to weak (R0 to R2),	R10: 5 minutes
-					\blacksquare	rock strength variable with depth, voids up to 1/2" rare, decreasing with	- 11.0.011
115	115.0				\vdash	depth, voids up to 3/16" over 80% of	
-72.6					1—	surface, fossiliferous with few	-
-			5	(4), <10 deg, smooth, stepped	+	macrofossils (casts/molds), trace	-
				(4), 110 deg, sinootii, stepped		organics	
				116.0' - Fracture, 50 deg, smooth, stepped	\vdash	No Recovery 112.4-115.0'	
-			3	116.3, 116.45, 116.9, 117.05' - Bedding plane	╁	Limestone	-
-				(4), <10 deg, smooth, undulating	╀	_ 115.0-118.7' - yellowish gray to light	-
	R11-NQ		4	117.2' - Mechanical break, 20 deg, rough,		olive gray, (5Y 7/2 to 5Y 3/2), very	
	5 ft 74%	38	4	stepped, open 1"	1—	fine grained, mild HCl reaction, very	1
-	7-70			117.3, 117.55' - Mechanical break (2), <10	╀╌	weak to weak (R1 to R2), voids up to 1/2" is rare, voids up to 3/16" cover	-
-			2	deg, smooth, undulating	┸	70% of surface, fossiliferous with	_
				118.1, 118.4' - Fracture (2), 40 deg and 70	\vdash	minor macro fossils (casts/molds),	
-			ND	deg, smooth, undulating, trace staining on	╨	variable competence with rock	R11: 8 minutes
-			NR	fracture at 118.4'	╂┰	 weakness at breaks/ discontinuities 	-
120_	120.0			_		No Recovery 118.7-120.0'	
-77.6				120.0-120.35' - Fracture zone, multiple	\vdash	Limestone	
-			8	intersecting fractures including a 60 deg	1	- 120.0-121.2' - yellowish gray to light	-
-			1	fracture with trace staining	┸	olive gray, (5Y 7/2 to 5Y 3/2), very	-
			1	120.65, 120.75, 121.05' - Mechanical break (3), 0-20 deg, rough, undulating	\Box	fine grained, mild HCl reaction, very weak to weak (R1 to R2), cavities up	
I [(0), 0-20 deg, rough, undulating	\vdash	to 1/2", voids up to 3/16" cover]
-	R12-NQ				╁┼	30-80% of surface, fossiliferous, with	-
-	5 ft	0			\perp	macrofossils prevalent at	-
	24%					120.35-121.2 ⁱ	
			NR		╨	No Recovery 121.2-125.0'] 1
-					+	-	-
_						_]
					μ		R12: 5 minutes
1 405					1-	-	-
125_ -82.6	125.0			105 0 105 01 Fracture	╂	Limestana	-
-02.0			>10	125.0-125.2' - Fracture zone, rough, undulating, multiple intersecting fractures	\Box	Limestone - 125.0-126.1' - yellowish gray to light	
I [1 10	125.6' - Mechanical break, horizontal, rough.	\vdash	olive gray, (5Y 7/2 to 5Y 3/2), very]
-			0 /	undulating	╁┷	fine grained, mild HCl reaction, weak	-
-			ات ا	125.8' - Fracture or mechanical break, 40	\bot	- to medium strong (R2 to R3), cavities	-
				dea rough undulating		up to 1" cover 10-15% of surface,	
-	R13-NQ			125.95' - Mechanical break, horizontal,	11	voids up to 3/16" cover 60-90% of	1
-	5 ft	7		rough, undulating	+	 surface, macrofossils (molds/casts) 	-
_	22%		NR			No Recovery 126.1-130.0']
			INK		Ш		
					\top		
							I .



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-08

SHEET 8 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722897.6 N, 458228.0 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten, T. Williams

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, NQ tools, HW casing

CORING	I WE I HOD AI	ND EC	JUIPIV	IENT : CME 550X S/N 340253, mud rotary, NQ tools, HV	v casii	<u>ıg</u>	ORIENTATION : Vertical
WATER	LEVELS: 4.4	11 ft b	gs on 3		23/200		
200	(9)			DISCONTINUITIES	၂ ပ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		SI.	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
불병은	RUN H, 4 ÆR	(%) Q	FRACTURES PER FOOT	DEDTH TYPE OPICATION POLICINICS	1 ∺ [MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
ATA YFA	RE I) Q	ACT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	MBC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SUF	COI	A Q	PEF	THICKNESS, SURFACE STAINING, AND TIGHTNESS	l X	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
			Н		╫		
-					П	-	R13: 9 minutes
-					₽₩	_	_
130	130.0			_	Щ		14:00-15:00 PM HW casing unscrewed at 10.0', —
-87.6				130.05' - Fracture, rough, undulating, open	Н	Limestone	removed NQ to retrieve
-			4	130.4' - Fracture, smooth, undulating, open	ш	- 130.0-131.5' - light olive gray, (5Y 5/2), very fine grained, mild HCl	HW
-			1	130.75' - Fracture or mechanical break, 20 deg, smooth, undulating	╫	reaction, weak to medium strong (R2	15:00-16:30 PM Advanced -
-			<u> </u>	131.0' - Fracture or mechanical break, <10	╂┰┨	- to R3), voids up to 3/16" cover 50%	HW casing from 35.0'-70.0' 17:30-18:30 PM NQ tooling
_				deg, smooth, undulating	\square	of surface, few cavities up to 1/4"	locked in slough at 100'
	R14-NQ 5 ft	18		131.3' - Fracture, rough, undulating, open	Н	diameter, few macrofossil molds, potential gaps from fines washing out	below ground surface,
	30%	10			Ш	at 130.05', 130.4', and 131.3', 3/4"	back hammering to retrieve
			NR	-	\Box	iron cemented sand (no HCl reaction,	18:00-18:30 PM little to no – movement, stop for the day
-			``		口	 very fine grained, medium strong [R3]) at 130.0-130.05' 	2/21/07 Stop drilling for the
-					╀╫	No Recovery 131.5-135.0'	day -
-					Ш	-	2/22/07, 07:00-12:30 PM Retrieved tooling and
135	135.0				Н		cleaned out boring from
-92.6				135.0, 135.2' - Fracture (2), <10 deg, smooth,	口	Limestone	85.0-130.0'
-				undulating	₽₽	 135.0-135.2' - pale yellowish brown to olive gray, (10YR 6/2 to 5Y 4/1), 	Advanced HW casing to
-					Ш	very fine grained, mild HCl reaction,	85.0' _ R14: 10 minutes
-			NR		╁┼	weak to medium strong (R2 to R3),	Very fine sand-sized grains
-				-	H	voids up to 1/16" cover 30% of	in drilling mud (identified by
I _	R15-NQ 5 ft	0			Ш	surface, possible worm burrows at 135.0-135.2'	grit between fingers), black
	24%	0			Н	No Recovery 135.2-138.0'	grains (possibly heavy minerals) present in grit
			0	138.15, 138.25' - Mechanical break, variable	П	Limestone	only, not sample
-			U	angles, variably open	╂┴╂	 138.0-138.8' - light olive gray to olive gray, (5Y 6/1 to 5Y 4/1), fine grained, 	Continuous slow
-				138.25-138.65 - Fracture zone, coarse	Ш	moderate HCl reaction, weak to	advancement through _ interval, no void
-			NR	gravel-size rock fragments, visible signs of mechanical wear	╂┼┼	 medium strong (R2 to R3), crystalline 	R15: 13 minutes
140	140.0				П	surfaces visible to naked eye,	15:15 PM 0.8'-long section
-97.6			>10	140.0-140.25' - Fracture zone, rough, stepped, infilling	┟┼┤	macrofossil molds up to 3/4"x1/4" (spiral gastropod), voids up to 3/16"	of core retrieved from cutting shoe of core barrel,
				140.45' - Bedding plane, horizontal, rough,	Ш	variable 0-30% over surface, bedding	logged as R15 core from
1 1				undulating, 1/4" open	1 + 1	plane laminations rare, trace	138.0-138.8'
-			10	140.9-141.6' - Fractures or bedding plane,	口	organics No Recovery 138.8-140.0'	2/22/07 Stop drilling for the
-	R16-NQ		$\vdash\vdash$	70-90 deg, rough, undulating 141.9' - Mechanical break, 10 deg, rough,	╂┴┨	Limestone	day at 140.0' Begin drilling 2/27/07 at
-	5 ft	23	6	undulating	団	- 140.0-140.45' - dark yellowish brown	08:45 –
_	74%			141.95-142.1' - Fracture zone, 50-70 deg,	H	to light olive gray, (10YR 4/2 to 5Y	
			3	smooth, undulating 142.2' - Bedding plane, horizontal, smooth,	世	5/2), fine to medium grained, moderate to strong HCl reaction,	
1 7			\vdash	undulating	Ш	extremely weak (R0), poorly]
-				142.4' - Fracture, 70 deg, rough, undulating	Ш	competent with some silty sand and	R16: 10 minutes
			NR	142.6, 143.0, 143.2, 143.55' - Fractures (4),	\square	gravel, angular grains up to gravel size, trace bedding plane laminations	-
145 -102.6	145.0			rough, stepped, variably open (<1/8")		and organics	_
-102.0			>10	145.0-145.45' - Fracture zone or mechanical break, rough, undulating	Д	-	_
				145.8, 146.1, 146.26, 146.35, 146.5, 146.6,	Ы	_	
			[146.7' - Bedding plane (7), <10 deg, smooth,			
			8	undulating	1	-]
-	R17-NQ		\vdash	146.7-148.0' - Fracture, 70-90 deg, smooth to	団	-	-
-	5 ft	13	>10	rough, undulating to stepped, with multiple intersecting bedding plane and subhorizontal	╂┯┨	-	-
-	70%		$\vdash \vdash$	fractures	口	-	_
			5	148.1' - Fracture, 50 deg, smooth, undulating	Ш		
					[]		
				-			



PROJECT NUMBER:

33884.FL BORING NUMBER:

E-08 SHEET 9 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722897.6 N, 458228.0 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten, T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, NQ tools, HW casing

OOMING	WETTODA	IND E	JUII IV	IENT: CME 550X S/N 340253, mud rotary, NQ tools, HV	Casii	ng .	ORIENTATION: Vertical
WATER	LEVELS: 4.4	11 ft b	gs on :	3/06/07 START : 2/15/2007 END : 2/2	23/200	D7 LOGGER: R. Gomez, R. Bitely,	C. Stewart
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	L06	DOOK TYPE, OOLOD	
EL E A ON	Z Z Z	<u></u>	RE	DESCRI TION	$\overline{\circ}$	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
AACH	문트등	Q D (%)	Į₽ŏ	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
F 유 공	88.00 80.00	a D	AC R F	PLANARITY, INFILLING MATERIAL AND	Ĭ,	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
필요리	용필문	ř	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Š	CHARACTERISTICS	BROFG, FEOT REGGETG, ETG.
				148.3' - Bedding plane, <10 deg, smooth,		140.45-143.7' - dark yellowish brown	
-			l	undulating to stepped, <1/4" open -	Ш	 to grayish olive with light gray 	D17: 17 minutos
I _			NR	_	Н	mottling, (10YR 4/2 to 10Y 4/2 with	R17: 17 minutes
150	150.0				Н	N7), very fine grained, moderate HCl	
-107.6	100.0					— reaction, weak to medium strong (R2	
-			6	150.15' - Bedding plane, <10 deg, rough,	₽₽	to R3), voids over 30-40% of surface and vesicles over 60-80% of the	-
				undulating 150.3, 150.55, 150.6' - Bedding plane (3),	Н	- surface, unfilled voids/cavities up to	
1 7				<10 deg, rough, undulating	Н	1"x1/2" especially at 143.5-143.7',	
-			5	150.7' - Mechanical break, 50-90 deg, rough,	Ш	heavy bioturbation and secondary	-
I -				stepped -	Н	- infill of voids	-
	R18-NC			151.05, 151.25, 151.5, 151.8, 152.05' -	Н	No Recovery 143.7-145.0'	
	5 ft 84%	30	8	Bedding plane (5), rough, undulating	Ш	Limestone	· -
-	04 70			151.95' - Mechanical break, vertical, rough,	П	_ 145.0-145.45' - Same as	-
1 _			5	stepped	НН	140.45-143.7'	
				152.05-152.25' - Fracture, vertical, smooth,	Н	145.45-146.7' - light olive gray, (5Y	
-			1	undulating, with 3 horizontal intersecting - fractures		 5/2), very fine grained, moderate to strong HCl reaction, weak to medium 	R18: 9 minutes
-			NR	152.5' - Fracture, 40 deg and 60 deg, rough,	Ш	strong RC reaction, weak to medium strong (R2 to R3), voids up to 3/16"	-
155	155.0	L	LINE	stepped	Н	cover 20% of the surface, few macro	
-112.6				152.85' - Fracture, 10-70 deg, smooth,	Н	fossils, laminated subhorizontal	
-			5	undulating	ш	bedding with organics, minor	155-156' Slow
-				152.95' - Fracture, 75 deg, smooth,	\vdash	 bioturbation decreasing with depth 	advancement -
			_	undulating	Н	146.7-148.5' - Same as	
1 -			3	153.1' - Mechanical break	Ш	145.45-146.7' except rare	<u>-</u>
-	D40 NO	ļ		153.4-153.65' - Fractures (4), 20-70 deg,		_ laminations, no to trace organics	156-158' Slightly faster
I _	R19-NG 5 ft	23	5	smooth, undulating 154.0' - Bedding plane, rough, undulating,	ш	No Recovery 148.5-150.0 Limestone	advancement -
	72%	20		134.0 - Bedding plane, rough, undulating, <1/4" open	Н	150.0-152.05' - dark yellowish brown	davancement
-				155.15, 155.45, 155.5' - Bedding plane (3),		to light olive gray, (10YR 4/2 to 5Y	-
-			2	<10 deg, smooth to rough, undulating	ш	- 5/2), very fine to fine grained, mild to	-
				156.0' - Mechanical break, 20 deg, rough,	Н	moderate HCl reaction, weak to	_
			NR	undulating	Н	medium strong (R2 to R3), voids	R19: 7 minutes
400				156.15, 156.4' - Bedding plane, <10 deg,	Ш	- (<1/16") over 80-100% of surface,	158-160' Slow
160_	160.0			smooth, undulating	\vdash	cavities up to 1/8" present	advancement —
-117.6			4	157.0' - Fracture, 75 deg, rough, undulating	Н	152.05-154.2' - very light gray to light olive gray, (N8 to 5Y 6/1), very fine	Lost circulation at 160.0'
			+	157.2, 157.4, 157.6, 157.8, 157.9, 158.0' - Bedding plane (6), <10 deg, smooth,	Ш	grained, moderate to strong HCl	l -
-				undulating	Щ	reaction, weak to medium strong (R2	-
-			8	158.15, 158.3' - Bedding plane (2), smooth,	₽₩	- to R3), voids cover 0-30% of the	-
				undulating	Н	surface increasing with depth,	
1 7	R20-NG		0	160.35' - Fracture, 20 deg, rough, undulating		fossiliferous, bioturbation and	· ·
-	5 ft	7		160.65' - Bedding plane, horizontal, smooth,	Ш	 secondary infill, iron staining rare 	Very slow, continuous
-	44%			undulating	H	No Recovery 154.2-155.0'	advancement -
				160.85' - Fracture, 65 deg, rough, undulating	Ш	Limestone	
			NR	161.0' - Fracture, 15 deg, rough, undulating - 161.25' - Mechanical break, 45 deg, rough,	Ш	 155.0-155.5' - dark yellowish brown to light olive gray, (10YR 4/2 to 5Y 	·
-				undulating	\vdash	5/2), very fine to fine grained, weak	R20: 20 minutes
_				161.25-161.5' - Fracture zone, rough,	╟╢	(R2), 10-20% organic laminations on	1\20. 20 Hilliutes
165	165.0			undulating, multiple intersecting fractures	Ш	bedding plane, fractures in poorly	
-122.6	. 50.0			161.7' - Fracture, 15 deg, smooth, undulating		competent seams and laminae	SC-4 collected at 165.2-
-			5	161.95' - Fracture, 65 deg, smooth,	₽₩	_ 155.5-158.0' - dark yellowish brown	165.75'
				undulating	Ы	to light olive gray, (10YR 4/2 to 5Y	_
				165.0-165.2' - Fracture zone, rough, stepped	口	5/2), very fine grained, mild to	· ·
1 -			>10	to undulating 165.75-165.95' - Bedding plane, horizontal,	Ш	moderate HCl reaction, weak (R2), voids cover 10-40% of the surface	·
I -				smooth, undulating	$\vdash\vdash\vdash$	volus cover 10-40% of the sufface	-
	R21-NC		3	165.95-166.65' - Fracture zone, smooth to	Ш		
1 7	5 ft 48%	12		rough, undulating	Ш]
-	70 /0			166.85' - Fracture or mechanical break, 60	H	-	-
				deg, rough, stepped	H		
		L			L ∣		
	_	_			_		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

E-08

SHEET 10 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722897.6 N, 458228.0 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten, T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, NQ tools, HW casing

			<u> </u>	IENT: CME 550X S/N 340253, mud rotary, NQ tools, HV	• 0001	9	ORIENTATION : Vertical
WATER	LEVELS: 4.4	1 ft b	gs on :	3/06/07 START : 2/15/2007 END : 2/	23/20	D7 LOGGER: R. Gomez, R. Bitely,	T. Stewart
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	LOG	DOCK TYPE COLOR	
HH H	N. F.	(%)	FRACTURES PER FOOT	52001.III 11011	윽	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
I ∃∀¥	ER OVE	(%) Q	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
P.S.A.	SNIN	ø	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ОΩШ	074	α.			Ś		
			NR	166.95' - Fracture, horizontal, rough,	\vdash	158.0-158.6' - very light gray to	
1 7				undulating	1	 yellowish gray, (N8 to 5Y 8/1), moderate HCl reaction, weak to 	R21: 7 minutes
-				167.1' - Fracture, vertical, rough, undulating 167.3' - Bedding plane, horizontal, smooth,		medium strong (R2 to R3), minor to	-
	170.0			undulating —	┵	— trace voids, minor iron staining on	
-127.6				170.1' - Bedding plane, horizontal, smooth,	\vdash	surface	
1 7			4	undulating, 1/2" open		No Recovery 158.6-160.0'	
-				170.6' - Fracture, 60 deg, rough, undulating	╁┷	- Limestone	-
_			2	170.7' - Bedding plane, horizontal, rough, undulating	┦	160.0-162.2' - very light gray to light brownish gray, (N7 to 5YR 6/1), very	_
				171.0, 171.3, 171.85' - Fractures (3), 40 deg		- fine grained, moderate to strong HCl	
	R22-NQ			and 30 deg, rough, undulating, <1/4" open	ш	reaction, weak to medium strong (R2	
-	5 ft	38	8	172.15' - Bedding plane, horizontal, rough,	+	to R3), voids cover 0-80% of surface,	-
-	96%			undulating	-	no voids at 160.4-160.65'	_
1 _			>10	172.35-172.7' - Fracture zone, rough,	┵	No Recovery 162.2-165.0'	_
			10	undulating, intersecting fractures at varying angles	Н	Limestone 165.0-167.4' - very light gray to light	
1 7				173.05' - Fracture, 20 deg, rough, undulating		olive gray, (N8 to 5Y 6/1), very fine	R22: 8 minutes
1 -			2	173.15-173.3' - Fracture zone, intersecting	╂┷	grained, moderate HCl reaction,	-
	175.0		NR	fractures at varying angles	╁┰	weak to medium strong (R2 to R3),	
-132.6				173.55, 173.75, 173.95, 174.3, 174.6' -		voids cover 30-60% of surface	
1 7			4	Bedding plane or fracture (5), <10 deg, rough	╨	No Recovery 167.4-170.0'	
-				to smooth, undulating, <1/2" open 175.1' - Fracture, 70 deg, smooth, undulating	+	Limestone 170.0-170.1' - Same as 165.0-167.4'	-
-			5	175.1 - Fracture, 70 deg, shidoth, undulating 175.2, 175.5, 175.9, 176.05, 176.25, 176.35,	-	except few voids on surface	_
				176.6, 176.8, 177.4, 177.65, 177.8' - Bedding	\vdash	170.1-170.6' - moderate vellowish	
	R23-NQ		2	plane (11), <10 deg, smooth, undulating,	\top	brown, (10YR 5/4), very fine to	
1 7	5 ft 56%	22	-	<1/8" open to tight		medium grained, mild to moderate	
-	30%				╂┷	HCl reaction, weak to medium strong	-
1 -						(R2 to R3), trace laminated bedding with few infill features	_
			NR		\vdash	170.6-174.8' - very light gray to light	
1 7			' ' ' '		1-	olive gray, (N8 to 5Y 6/1), very fine to	R23: 8 minutes
I					世	 medium grained, moderate HCl 	Core not retained in
	180.0			_	+	reaction, weak to medium strong (R2	sample barrel; NQ tooling —
-137.6			10	180.1, 180.25, 180.6, 180.7, 180.85, 180.9' -	ᅪᆣ	to R3), voids cover 50-80% surface, cavities and dissolution features up	removed to retreive sample
			10	Bedding plane (6), <10 deg, rough,		to 1/4" cover 20% surface from	from core barrel
1 -				undulating to stepped	1—	170.9-171.8', bedding plane	2.5' of slough or sand in
-					╀	 laminations at 178.6-178.9', contacts 	borehole from apparent flow zone at 177.5'; hole
					\blacksquare	from very fine to medium grained	cleaned out to 180.0'
	R24-NQ				\vdash	lithologies at 170.1', 170.6', and - 172.15-172.2'	
1 1	5 ft 20%	7			1	No Recovery 174.8-175.0']
-	20 /0		NR		口	Limestone	-
-					╀	 175.0-177.8' - very light gray to light 	
					ᆣ	olive gray, (N8 to 5Y 6/1), very fine to	
1 7					Ш	medium grained, moderate HCl	R24: 6 minutes
105	405.0				1-	 reaction, weak to medium strong (R2 to R3), voids cover 10-30% of 	Drill stem sand-locked at
185 -142.6	185.0				⊭	surface, voids up to 1/2" rare	185.0'; back hammered 3 hours to free tooling
142.0					_	No Recovery 177.8-180.0'	Sand flow zone likely at
						Limestone	180.0-183.0'
1 1					1	180.0-181.0' - light olive gray, (5Y	
-					-	_ 6/1), very fine to fine grained, moderate HCl reaction, weak to	
					4	moderate HCI reaction, weak to medium strong (R2 to R3), voids	_
						cover 30% of surface, bedding plane	
1 1					1	laminations, trace fossils	1
1 -					1	No Recovery 181.0-185.0'	
					+-	D. (
						Bottom of Boring at 185.0 ft bgs on 2/23/2007	
						212012001	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-01	SHEET	1	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724390.3 N, 457810.6 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-3/4" tri-cone bit

DRILLIN	G METH	DD AND	<u>EQUIPM</u>	ENT : CME 550 S	/N 186073, mud rotary, cathead, NW rods, 4-3/4" tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 4.5 ft bo	s on 4/5	/2007 S	START : 4/4/2007 END : 4/5/2007 LOGGER : T. Stewart
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY
BEL JGF/J		RECOVE	RY (ft)	, reor neodero	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTH EVA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
SU ELE				(N)	
43.1	0.0				Topsoil
		1.3	SS-1	2-2-2 (4)	\fine to coarse rootlets
	1.5			(.,	Poorly Graded Sand With Organics (SP)
					\ 0.3-1.3' - very light gray, (N8), moist, very loose, very -
-					∖organics, decreasing with depth, silica sand / ■ 140-lb hammer
-					- NW rod 5.0' sections - 4.75" tricone roller bit
-					Added 1/8 52-lb bag QuikGel bentonite to full
-					- mud vat -
-					
5	5.0				-
38.1	5.0				Poorly Graded Sand With Silt (SP-SM) ISS-2 collected at 09:07
-		0.9	SS-2	2-3-3	5.0-5.9' - very pale orange, (10YR 8/2), wet, loose,
-		0.9	33-2	(6)	very fine to fine silica sand, 10-15% nonplastic fines, trace very fine black particles, clayey sand in last 0.2'
-	6.5				of sample bgs -
-					
-					
_					
-					
_					
_					
10	10.0				
33.1				707	Poorly Graded Sand (SP) 10.0-11.0' - very pale orange, (10YR 8/2), wet,
_		1.0	SS-3	7-8-7 (15)	medium dense, fine silica sand, 5% nonplastic fines,
	11.5			(- /	trace very fine black particles
					1
					11
-					1
					1
15	15.0				
28.1	13.0				Silty Sand (SM) SS-4 collected at 09:23
-		0.9	SS-4	5-8-12	15.0-15.9' - pale yellowish brown, (10YR 6/2), wet, medium dense, fine silica sand, 20% nonplastic fines,
-	10.5	0.0	55 -	(20)	trace very fine black particles
-	16.5				
-					
-					
-					
-					
-					
-					
20					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-01	SHEET	2	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724390.3 N, 457810.6 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

WATER	LEVELS	: 4.5 ft bo	gs on 4/5/	/2007 S	START : 4/4/2007 END : 4/5/2007 LOG	GER:	т.	Stewart
				STANDARD	SOIL DESCRIPTION		9	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS			SYMBOLIC LOG	
L BEL		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		OLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
THE A			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		/MB	INSTRUMENTATION
23.1	200			(N)	Cilty Cand (CM)	-	Ś	CC 5 collected at 00:22
23.1	20.0			11-19-24	Silty Sand (SM) 20.0-21.0' - Same as 15.0-15.9' except dense			SS-5 collected at 09:32
-		1.0	SS-5	(43)				_
	21.5					4		_
-						4		_
-						4		_
-						4		_
	_					4		_
						4		_
-								_
25	25.0				014 0 1 (014)			
18.1				20-35-50	Silty Sand (SM) 25.0-26.1' - Same as 20.0-21.0' except very dense			SS-6 collected at 09:47
-		1.1	SS-6	(85)				_
l -	26.5					丁		_
l .								<u>_</u>
l -						4		_
l -						4		_
l -								_
l .								_
l .								
30	30.0							
13.1				23-48-50/4	Silty Sand (SM)			SS-7 collected at 10:08
l .		1.3	SS-7	(98/10")	30.0-31.3' - pale yellowish orange, (10YR 6/2), wet, very dense, fine silica sand, 20% nonplastic fines,			
	31.3				trace very fine black particles, 5% medium to coarse sand-sized concretions in the upper 0.3' of sample			
					Sand-sized concretions in the upper 0.5 of sample	~]		
]		
Ι ΄]]
]		
35	35.0					_]]
8.1				04.40.50	Silty Sand (SM) 35.0-36.3' - pale yellowish orange, (10YR 6/2), wet,			SS-8 collected at 10:22
		1.3	SS-8	24-43-50 (93)	very dense, fine silica sand, 20% nonplastic fines,]]
	36.5			(-0)	5-10% very fine black particles, trace medium grain-sized concretions, trace organics		Щ]
					yran-sized condetions, trace organics	-∕]]
]]
						7]
						7]
]
						1]
40]		
I		1				- 1		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-01	SHEET	3	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724390.3 N, 457810.6 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-3/4" tri-cone bit

						END: 4/5/2007) . T	ORIENTATION : VEILICAL	_
WATER	LEVELS	: 4.5 ft bo	ıs on 4/5/		START : 4/4/2007	END: 4/5/2007 SOIL DESCRIPTION	LOGGE	₹ : 1. 	Stewart COMMENTS	\neg
≷Ç€	CANADI	INTERVA	I (A)	STANDARD PENETRATION		JOIL DESCRIF HON		8	GOIVIIVILINIG	\dashv
ELC ON (SAMPLE		. ,	TEST RESULTS	SOIL NAM	ME, USCS GROUP SYMBO	OL. COLOR.	10	DEPTH OF CASING, DRILLING RATE,	
H B		RECOVE			MOISTURI	E CONTENT, RELATIVE D	DENSITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND	
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	CONSISTEN	NCY, SOIL STRUCTURE, I	MINERALOGY	SYMBOLIC LOG	INSTRUMENTATION	
3.1	40.0				Silty Sand (SI	M)			SS-9 collected at 10:38	\dashv
-		1.0	SS-9	30-50/6 (80/12")	40.0-41.0' - pa	ale yellowish brown, (10)	'R 5/4), wet,	111		Ⅎ
-	41.0			()	very dense, fir	ne silica sand, 15-20% n e black particles	onplastic fines,	11:1	-	\dashv
-					(s static partitions		┨		Ⅎ
-								-		-4
-								-		-1
-								1		4
-								1		4
_								1		4
_								1		4
45	45.0									┙
-1.9		0.9	SS-10	34-50/4.5	Silty Sand (SI 45 0-45 9' - Sa	M) ame as 40.0-41.0' excep	t verv pale		SS-10 collected at 10:57	_]
_	45.9			(84/10.5")	¬ orange, (10YF)	R 5/4), wet, very dense, o	dark vellowish _	Ш		
_					orange (10YR	t 6/6) mottling in upper pole grades to pale yellowi	ortion of sh brown (10YP).	1		
					6/2) from 45.5	i-46.1', fine silica sand, 1	5-20%		Driller's Remark: 11:05 added 1/2 50-lb bag of QuikGel bentonite after removing sand	J
						es, trace very fine to med e medium sand-sized co			cuttings from tub and refilling with clean	
					similar to abov		noretions,	1	water; maintained circulation since start	1
					,			1		1
-							•	1		-1
-								1		-1
50	50.0							1		1
-6.9	00.0				Silty Sand (SI			П	SS-11 collected at 11:35	╛
-		1.2	SS-11	28-44-50		jht olive gray, (5Y 5/2), w d, 20-25% nonplastic find		111		1
-	51.5			(94)	fine black part					-1
-	01.0							1		-1
-								1		-1
-								1		-1
-								1		-1
-								1		\dashv
-								1		\dashv
	·							1		\dashv
55 <u> </u>	55.0				Silty Sand (SI	M)		hn	SS-12 collected at 13:54	\dashv
-		1.2	SS-12	22-34-44	55.0-56.2' - Sa	ame as 50.0-51.2' excep	t trace coarse	111		4
-		1.2	33-12	(78)	sand-sized co	ncretions over first 0.1' (siough)			4
-	56.5						-	1		\dashv
-								1		4
-								1		4
-								1		4
-								1		4
-								1		4
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60								╙		_



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-01	SHEET	4	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724390.3 N, 457810.6 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

WATER	LEVELS	: 4.5 ft b	gs on 4/5/	2007 S	START : 4/4/2007 END : 4/5/2007 LOGGE	R : T	. Stewart
				STANDARD	SOIL DESCRIPTION	Т	COMMENTS
A PND	SAMPLE	INTERVA	AL (ft)	PENETRATION TEST RESULTS		٦٥	
4 BE		RECOVI	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	Į S	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	INSTRUMENTATION
-16.9	60.0			(14)	Silty Sand (SM)	11	SS-13 collected at 14:13
-		1.2	SS-13	25-43-50	60.0-61.2' - Same as 55.0-56.2' except no concretions and color changes from yellowish gray (5Y 7/2) in	111	-
-	61.5		00.0	(93)	upper 0.25' to light olive gray (5Y 5/2) from	111	-
-	01.5				\60.25-61.2'	1	-
-						1	1
-						1	1
-						1	1
]	
_ ا						1	
65	65.0					1	
-21.9 -		0.9	SS-14	32-50/4.5 (82/10.5")	Silty Sand (SM) 65.0-65.9' - light olive gray, (5Y 5/2), wet, very dense,	411	SS-14 collected at 14:39
-	65.9			(02/10.5)	fine silica sand, 15-20% nonplastic fines, trace very fine black particles	111	<u> </u>
-					Time black particles	-	-
-						1	-
-						┨	-
-						┨	-
-						1	-
-						1	-
70	70.0					1	1
-26.9		0.0	SS-15	35-50/6	Silty Sand (SM)	T	SS-15 collected at 15:00
	71.0	0.9	55-15	(85/12")	70.0-70.9' - yellowish gray, (5Y 7/2), wet, very dense, fine silica sand, 15-20% nonplastic fines, trace very	Ш	
_					\fine black particles]	Added water and 1/4 bag QuikGel bentonite
-						1	
-						1	_
-						-	_
-						-	-
-						-	-
						┨	-
75 <u> </u>	75.0			33-50/5	Silty Sand (SM)	111	SS-16 collected at 15:25
-	75.9	0.8	SS-16	(83/11")	75.0-75.8' - Same as 70.0-70.9'	111	-
-						1	-
-						1	1
-]	1
]	
-						1	
-						-	_
80						+	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	GSC-01	SHEET	5	OF	6

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724390.3 N, 457810.6 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLIN	G METH	OD AND	<u>EQUIPM</u>	ENT : CME 550 S	S/N 186073, mud rotary, cathead, NW rods, 4-3/4" tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 4.5 ft b	gs on 4/5/	/2007	START : 4/4/2007 END : 4/5/2007 LOGGER : T. Stewart
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
BEL ION		RECOVI	RY (ft)	IEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,
TH VAT				C!! C!! C!!	MOISTURE CONTENT, RELATIVE DENSITY OR ONSISTENCY, SOIL STRUCTURE, MINERALOGY SINSTRUMENTATION
SUPP			#TYPE	6"-6"-6" (N)	Solvential () and the contract of the contrac
-36.9	80.0				Silty Sand (SM) SS-17 collected at 15:50
-		1.4	SS-17	18-32-44	80.0-81.4' - yellówish gray, (5Y 7/2), wet, very dense, grayish blue (5PB 5/2) mottling/staining of sand from
-	04.5			(76)	80.7-81.0', medium light gray (N6) staining from Added 1/4 50-lb bag of QuikGel bentonite
-	81.5				81.0-81.4', fine silica sand, 20-25% nonplastic fines,
-					\trace very fine black particles \ \ _
-					-
-					-
-					
_					
_]] .
85	85.0				00/6-0
-41.9 _				15-12-12	Silty Sand (SM) 85.0-86.1' - Same as 80.0-81.4' except medium
_		1.1	SS-18	(24)	dense, 1" thick grayish blue seam near the top and
_	86.5			. ,	very bottom of sample, 25-30% nonplastic fines
]
					1
-					1
-					
-					
90	90.0				
-46.9	90.0				Silty Sand (SM) SS-19 collected at 16:39
-		1.3	SS-19	11-11-10	90.0-91.3' - grayish yellow, (5Y 8/4), wet, medium
-		1.0	00 10	(21)	dense, very fine to fine silica sand, 20-25% nonplastic fines, trace very fine sand-sized black particles, 1/2"
-	91.5				│ \ thick seam of medium dark gray to dark gray (N4 to │ │ │
_					\N3) sand at 90.3' with 1/4"-3\(\begin{align*} 8 \text{Subrounded} \\ \text{gravel-sized sand concretions, possible pyrite} \end{align*}
-					
-					
-					
_] -]
-]
95	95.0				016-01 (010)
-51.9				6-7-8	Silty Sand (SM) 95.0-95.7' - pale yellowish brown, (10YR 6/2), wet,
_		0.7	SS-20	(15)	medium dense, fine silica sand, 30% nonplastic fines,
	96.5				trace fine sand-sized angular black particles, 1" / ¬
]
]
]
					1
					1
100					1
100					++



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-01	SHEET	6	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724390.3 N, 457810.6 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-3/4" tri-cone bit

						tary, catrieau, invv rous, 4-5			ORIENTATION : VEItical
WATER	LEVELS	: 4.5 ft bo	ıs on 4/5/	∠∪0/ S	START : 4/4/2007	END : 4/5/2007	LOGGEF	<u>(: I.</u>	
200				STANDARD		SOIL DESCRIPTION		g	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	60"	4E 11000 00010 0\# 150		SYMBOLIC LOG	DEDTIL OF CACING POULTING PATE
T BE		RECOVE	RY (ft)		MOISTURI	ME, USCS GROUP SYMBO E CONTENT, RELATIVE D	L, COLOK, ENSITY OR	O L	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTF PTF EVA			#TYPE	6"-6"-6"	CONSISTEN	NCY, SOIL STRUCTURE, M	IINERALOGY	MB	INSTRUMENTATION
SU				(N)				Š	
-56.9	100.0				Silty Sand (SI	M)	mtmd		SS-21 collected at 17:39
-		1.5	SS-21	10-24-49	100.0-101.5 -	Same as 90.0-91.2' exce ce angular dark gray (N3)	pt very dense, -		18:03 Driller tape measures hole
-	101 5			(73)	no scams, trac	oc angular dank gray (140)	_	1	Total depth at 97.0' – Water level at 4.5' below ground surface
-	101.5				Bottom of Bori	ing at 101.5 ft bgs on 4/5/	2007		4/05/07 07:36
-							-	ł	Water level at 3.5' bos
-							-	1	Grouted to surface with three 92 lb bags of Holcim brand Portland cement and two 47-lb
I _							_	1	bags of Quikrete brand Portland cement
							_		sage of game ote stand for the first
								1]
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105							-	1	-
-61.9							_	1	-
-							-	1	-
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110							-	1	1
-66.9							_	ı	-
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115							-	1	1
-71.9								1	
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120							-	1	1



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-01A SHEET 1 OF 6

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724368.5 N, 457807.6 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

						FND: 4/6/2007			
WATER	LEVELS	: 3.0 ft b	yo UII 4/0/		START : 4/5/2007	END: 4/6/2007 SOIL DESCRIPTION	LUGGE	Т	Stewart COMMENTS
≥ 9€	CAMPIE	INTERVA	1 (#)	STANDARD PENETRATION		JOIL DEGOTAL TION		98	CONTRICTO
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE			TEST RESULTS	SOIL NAN	ME, USCS GROUP SYMBOL	., COLOR,	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H B		RECOVE			MOISTUR	E CONTENT, RELATIVE DE	NSITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND
SUR!			#TYPE	6"-6"-6" (N)	CONSISTER	NCY, SOIL STRUCTURE, MI	INERALOGY	S≺M	INSTRUMENTATION
42.9	0.0			(,	Poorly Grade	ed Sand With Organics (S	P)		SS-1 collected at 10:12
-		1.5	SS-1	1-2-2	0.0-1.0' - very	light gray, (N8), moist, ver ained silica sand, trace nor	ry loose, very	1	-
-		1.0	00 1	(4)	15% organics		ipiastic lines,	\Rightarrow	Glen Davis is cathead operator
-	1.5				Sandy Organ			-	140-lb hammer
-					1.0-1.5' - brow	vnish black and medium br , moist, soft, low plasticity,	rown, (5YR /	-	24" split spoon (SS)
-					fine silica san	d, roots	00 40 70 VCI y	-	5.0' sections of NW rod
-								-	4.75" tricone roller drill bit
-								-	1/2 50-lb bag QuikGel bentonite added to
-								4	mud vat
-								4	
5	5.0				Clauser Care I	(60)		ļ,,,	CC 2 collected at 10:20
37.9				3-6-8	Clayey Sand ((SC) owish gray, (5Y 7/2), wet, n	nedium dense.	_///	SS-2 collected at 10:39
_		0.9	SS-2	(14)	_∖ no HCl reactio	on, very fine to fine silica sa	and, 30% low /		_
_	6.5				Poorly Grade	10-15% rootlets	———//	_	_
_					\5.5-5.9' - very	pale orangé, (6YR 8/2), w	et, medium	_	_
_					dense, fine sil	lica sand, trace nonplastic	fines		
								1	
								1]
-								1	1
10	10.0							1	1
32.9	10.0				Silty Sand (Sl				SS-3 collected at 10:46
-		1.3	SS-3	6-7-9	10.0-11.3' - lig	ght olive gray, (5Y 6/1), we lica sand, 30-35% nonplas	t, medium		1
-	11.5			(16)	very fine black		nuo mico, macc		_
-	11.5							1	-
-								1	
-								1	-
-								1	-
-								1	-
-								-	-
-								-	-
15 27.9	15.0				Silty Sand (SI	M)		100	SS-4 collected at 10:52
				8-10-13	15.0-16.1' - Sa	ame as 10.0-11.3' except \	very pale	-111	OO-4 collected at 10.02
-		1.1	SS-4	(23)	orange, (10YF	R 8/2), 25% nonplastic fine	es ·	411	_
-	16.5							4	
-								-	
_								1	
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_								1	
_								1	
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20								1]
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	GSC-01A	SHEET	2	OF	6

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724368.5 N, 457807.6 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

						END: 4/0/2007			
WATER	LEVELS	. J.U π D	ys 011 4/6/		START : 4/5/2007	END : 4/6/2007 SOIL DESCRIPTION	LOGGER	. 1.	Stewart COMMENTS
	044451	INITED	I (A)	STANDARD PENETRATION	——	JOIL DEGUNIF HON		90	CONTINUENTO
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		TEST RESULTS	SOIL NAM	ME, USCS GROUP SYMBOL	., COLOR.	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
TH B		RECOVE			MOISTURI	E CONTENT, RELATIVE DE	NSITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND
SURF I.E.V			#TYPE	6"-6"-6" (N)	CONSISTEN	NCY, SOIL STRUCTURE, MI	NEKALUGY	SYM	INSTRUMENTATION
22.9	20.0			(11)	Silty Sand (SI	M)		TIT	SS-5 collected at 11:00
-		1.1	SS-5	16-22-31	20.0-21.1' - Sa	ame as 15.0-16.1' except \	ery dense, -		-
-		'.'	33-3	(53)	slight nue cha	inge at bottom 4" toward pa 6/2), 20-25% nonplastic fir	aie yellowish nes		-
-	21.5				(3.3 (1.3.1.1	<u> </u>		-	-
-							-		-
-							_		-
_							_		_
_							_		_
_							_		
							_		
25	25.0]
17.9					Silty Sand (SI	M)	.em. nolo		SS-6 collected at 11:07
-		1.2	SS-6	20-38-55 (93)	25.0-26.2 - Sa orange to pale	ame as 15.0-16.1' except ve yellowish brown, (10YR 8	ery pale		1
-	26.5			(93)	6/2), 20% high	n plasticity fines		Ш	- T
-	20.0						-	1	1
-							-	1	-
-							-		-
-							-	1	-
-							-	-	-
-							-	-	-
-							-		-
30	30.0				0:15 - 0 1 (01	BA)		7.17	00.7
12.9				21-31-41	Silty Sand (SI 30.0-31.2' - Sa	м) ame as 25.0-26.2' except t	race very fine -		SS-7 collected at 11:17
_		1.2	SS-7	(72)	sand-sized pa	ile yellowish orange (10ŸR	8/6)		_
_	31.5				particles, trace	e coarse sand-sized concr	etions		_
_							_		
-							_	1	_
							-	1	1
-							-	1	
35	35.0						-	1	1
7.9	35.0				Silty Sand (SI	M)			SS-8 collected at 11:26
-		1.5	SS-8	12-18-20	35.0-36.5' - pa	ale yellowish brown, (10YR	8 6/2), wet, -		-
-	00 =	'	55-5	(38)	(N1) mottling (ica sand, 30-35% nonplas of sands in a 1/4" thick sea	am at 35.75'.		-
-	36.5				similar to abov	ve (30.0-31.2')			-
-							-		Driller's Remark: 12:50 empty mud vat,
-							-		remove sandy cuttings, refill, add 1/4 50-lb
-							-		bag of QuikGel bentonite 13:15 Resume drilling to 40.0'
-							_		13. 15 Resume drilling to 40.0
-							_		_
_							_]
40									



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-01A	SHEET	3	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724368.5 N, 457807.6 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

WATER LEVELS: 3.0 ft bgs on 4/6/07 START: 4/5/2007 END: 4/6/2007 LOGGER: T. Stewart										
WATER	LEVELS	. 3. 0 π b	45 011 4/b/		DIAKT . 4/5/200/	SOIL DESCRIPTION	LUGGER	П	Stewart COMMENTS	
≥3£	CAMPIE	: INTERVA	.I /#\	STANDARD PENETRATION		JOIL DECORN TION		SYMBOLIC LOG	GOWINIENTO	
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE			TEST RESULTS	SOIL NAN	ME, USCS GROUP SYMBOL	., COLOR,	IC L	DEPTH OF CASING, DRILLING RATE,	
ATI	RECOVERY (ft)		MOISTUR	RE CONTENT, RELATIVE DE	NSITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND			
			#TYPE	6"-6"-6" (N)	CONSISTER	NCY, SOIL STRUCTURE, MI	NERALOGY	SYM	INSTRUMENTATION	
2.9	40.0			(14)	Silty Sand (SI	M)			SS-9 collected at 13:24	
-	-	1.2	SS-9	16-21-19		ame as 35.0-36.5' except r			-	
-	-	1.2	33-9	(40)	mottling of a g	grayish black to black sand	in 1/8"-1/4"	Ш	-	
-	41.5				<u> </u>			-	-	
-							-	-	_	
-							_		_	
-							-		_	
l -							_		_	
l _							_			
1							_]	
45	45.0			l			-]	
-2.1	<u> </u>				Silty Sand (SI			Ш	SS-10 collected at 13:36	
1 -	1	1.2	SS-10	15-18-19	45.0-46.2' - pa	ale yellowish brown, (10YR lica sand, 30% low plasticit	(6/2), wet, -	1]	
-	46.5			(37)	mottling, samp	ple relatively homogenous	.y 111103, 110	Ш	-	
-	40.5							1	Driller's Remark: Change out rope on	
-	-						-	ł	hammer after noticing a weakened/frayed -	
-	-						-	ł	zone in it	
-	-						-	-	-	
-							-		_	
-							_		_	
l -							_		_	
50	50.0							L.	_	
-7.1					Fat Clay (CH)) redominantly dusky yellow	groop (ECV -		SS-11 collected at 14:00	
		1.5	SS-11	5-6-9 (15)	5/2), moist, sti	iff, high plasticity, no dilata	ncy, mottled			
	51.5			()	with dusky blu	ue and very pale orange (5)	PB 3/2, 10YR			
-					flat, rounded of	clasts throughout sample in coarse sand to fine gravel-	sized clasts,]	
-	1				5% concretion	ns near bottom of sample,	trace medium -	1	_	
-	1				sand-sized an	ngular shaped black particle is to 1/8", low to mild HCl re	es, trace	1	-	
-	1				very pale oran	nge clasts	-	1	=	
-	-							1	-	
-	1			l			-	1	-	
-	-						-	-	-	
55 <u> </u>	55.0				Sandy Fat Cla	av (CH)			SS-12 collected at 14:22	
-12.1				4-5-5	55.0-56.5' - pr	redominantly yellowish gray	y, (5Y 7/2),		50-12 COIIECTEN AT 14.22	
-		1.5	SS-12	(10)	moist, stiff, hig	gh plasticity, no dilatancy, r	mottled with		_	
-	56.5				dark gray and 25-30% verv f	grayish green (N3 and 10 grayish green (N3 and 10 grayish green)	GY 5/2), lenses. trace –			
I -					∖ to 5% fine car	rbonate sand, mild HCl rea	ction in /			
					∖carbonate par	rticles				
1]	
1 -							-]	
1 -	1						-	1]	
-	1						-	1]	
60	1						-	1		
								\vdash		
								L		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-01A SHEET 4 OF 6

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724368.5 N, 457807.6 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

WATER LEVELS: 3.0 ft bgs on 4/6/07 START: 4/5/2007 END: 4/6/2007 LOGGER: T. Stewart										
WATER	LEVELS	: 3.0 π bg	gs on 4/6/		START : 4/5/2007	END: 4/6/2007 SOIL DESCRIPTION	LOGO	jΕΚ	: 1.8	COMMENTS
≥⊕€	044:5:		1 (0)	STANDARD PENETRATION		JOIL DESCRIPTION		\dashv	9	CONVINIENTO
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		TEST RESULTS	SOIL NAN	ME_USCS GROUP SYMB	OL COLOR		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H BI		RECOVERY (ft)	ERY (ft)		MOISTUR	OIL NAME, USCS GROUP SYMBOL, COLO DISTURE CONTENT, RELATIVE DENSITY (DENSITY OR		30L	DRILLING FLUID LOSS, TESTS, AND
무유의			#TYPE	6"-6"-6"	CONSISTEN	NCY, SOIL STRUCTURE,	MINERALOGY		Σ	INSTRUMENTATION
-17.1	60.0	-		(N)	Fat Clay With	Sand (CH)		\dashv	"	SS-13 collected at 14:53
	00.0		00.40	3-5-5	60.0-61.5' - Sa	ame as 55.0-56.5' excep		-		To concepted at 14.00
-		1.5	SS-13	(10)	mottling, 10%	very fine silica sand and -sized very pale orange	10-15%	-		
-	61.5				carbonate par	rticles throughout, mild F	(101R 6/2) ICI reaction in	\mathcal{A}		
l -					\carbonates			$/ \bot$		
l _										
l _										
-								٦		
65	65.0							٦		
-22.1	55.0				Fat Clay (CH))				SS-14 collected at 15:25
-		1.5	SS-14	3-5-7		rayish green, (10GY 5/2) , no dilatancy, no HCl re		-		
-	00.5		00	(12)		wish green (10GY 7/2) t		-		
-	66.5				1/2"-3/4" pock	ket of a white fat clay with -sized particles	n 5-10% fine to	\mathcal{A}	74	Driller's Remark: Will switch to a 3-7/8" drag
-					\medium sand-	-sized particles		-/ -		bit to help drilling rate through clay
-								-		Driller's Remark: NW rod (5 sections)
-								-		
-								-		
-								-		
-								4		
70 <u> </u>	70.0				E (0) (0)			_		00.45 1.1.40.40
-27.1				5-8-10	Fat Clay (CH) 70.0-71.5' - pa) ale blue, (5B 6/2), moist,	verv stiff, high	_		SS-15 collected at 16:10
_		1.5	SS-15	(18)	plasticity, no d	dilatancy, no HCl reaction	n, trace mottling			
l _	71.5					gray (5Y 8/1), trace yelled				
l _					∖ at 70.2', silty s	sand (SM) seam in botto				
					\sample]		
-								٦		
-								٦		
-								-		
75	75.0							-		
-32.1	10.0				Silty Sand (SI	M)		\dashv		SS-16 collected at 16:37
-		1.4	SS-16	19-21-23	75.0-76.4' - pa	ale yellowish brown, (10)	/R 6/2), wet,	-		
-		1	00-10	(44)		I reaction, fine silica san es, trace very fine sand-s		-		
-	76.5				particles			/=	1111	
-								-		
-								-		
-								4		
-								4		
-										
I -										
80										



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-01A SHEET 5 OF 6

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724368.5 N, 457807.6 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-3/4" tri-cone and 3-7/8" drag bit WATER LEVELS: 3.0 ft bgs on 4/6/07 START: 4/5/2007 END: 4/6/2007 LOGGER: T. Stewart										
WATER	LEVELS	. 3.0 π bc	JS ON 4/6/		START : 4/5/2007	END: 4/6/2007 SOIL DESCRIPTION	LOGG	Т	П	COMMENTS
	SAMPLE	INTERVA	I (ft)	STANDARD PENETRATION	TRATION RESULTS SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DI		\dashv	ဗို	552.110	
DEPTH BELOW SURFACE AND ELEVATION (#)	O/ WII LL	RECOVE		TEST RESULTS			DEPTH OF CASING, DRILLING RATE,			
TH E		RECOVE	#TYPE	6"-6"-6"		E CONTENT, RELATIVE D ICY, SOIL STRUCTURE, N		9		DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
SUF			#ITPE	(N)	00110101211	,		Š	SYI	ee
-37.1	80.0			04.44.50	Silty Sand (SN	//) edium dark gray, (N4), w	et very dense		Ш	SS-17 collected at 17:01
_		1.2	SS-17	24-41-50 (91)	fine silica sand	ds, trace very fine black r	articles, 20%			
_	81.5			. ,	nonplastic fine	s, first 4-13/16" of sampl and (SM) from 75.0-76.4	e is irregularly	/#	Н	
_					remaining 9-5/	8" sand is as described	above /	/]	١	_
_								1	١	_
_								1	١	_
-								4	١	4
-								4	١	-
-								4		
85 <u> </u>	85.0				Silty Sand (SN	M)		+	\blacksquare	SS-18 collected at 17:28
'-''-		1.2	SS-18	26-48-50/5.5	85.0-86.2' - pa	le yellowish brown, (10Y				
-		1.2	33-10	(98/11.5")	very dense, me	edium dark gray (N4) sta -30% nonplastic fines, tra	iining, fine ace medium	4	Ш	-
-	86.5				sand-sized cor		/	/	١	Driller's Remark: 04/05/07 Stop drilling for
-								1	١	the day at 17:34
-								1	١	1
-								1	١	1
-								1	١	1
-								1	١	1
90	90.0							1		
-47.1				44.0.0	Silty Sand (SN	//) le yellowish brown, (10Y	R 6/2) wet			SS-19 taken at 09:24
_		1.5	SS-19	14-9-9 (18)	medium dense	e, fine silica sand, 30-409	% low plastic			_
_	91.5					7-10% very fine sand-size medium dark gray (N4)			Щ	
-					angular fine gr	avel-sized pyrite at top o	f sample	/ -	١	Driller's Remark: Glen Davis is cathead operator on 04/06/07
-					((possibly sloug	J11)	/	4	١	N-rod (5.0' sections NW) 3-7/8" drag bit
-								+		140-lb cathead hammer
-								+		50-lb bags of QuikGel brand bentonite in use
-								+		08:15 water level at 3.0' below ground
95	95.0							+		surface - 08:50 pump not circulating
-52.1	50.0				Silty Sand (SN	M)		1	П	(Rods/pump?) Clogged with sand
-		1.5	SS-20	15-8-7 (15)	95.0-96.5' - pa medium dense	ıle yellowish brown, (10Y e, fine silica sand, 25% lo	R 6/2), wet, w plastic fines.		$\ \ $	Rods broke out, cleared, re-assembled
	96.5			(10)	trace very fine	sand-sized black particle	es	1	$\ \ $	Mud vat mixed 1/2 bag bentonite for drilling
]	\dashv	1
]]
								1]
-								1		Driller's Remark: 09:35 sand clogs rods again during installation into borehole
-								4		
-								4		4
100								+	4	
$\overline{}$								_	_	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	GSC-01A	SHEET	6	OF	6

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724368.5 N, 457807.6 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

WATER	VATER LEVELS: 3.0 ft bgs on 4/6/07										
				STANDARD	SOIL DESCRIPTION	_O	COMMENTS				
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	OOL NAME HOOG OPEN DOWNERS OF ST	SYMBOLIC LOG	DEDTIL OF CACING SOUL WAS DATE				
A BE		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	S L	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND				
EPTI URF, LEV/			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	X WE	INSTRUMENTATION				
<u>-57.1</u>	100.0			(11)	Silty Sand (SM)		SS-21 collected at 10:46				
-		1.2	SS-21	3-4-3	100.0-101.2' - pale yellowish brown, (10YR 6/2), wet, very loose, fine silica sand, 20% nonplastic fines,		Driller's Remark: Circulation has been				
-	101.5			(7)	trace fine to coarse gravel-sized pyrite	Ш	maintained at all times during drilling, No casing was installed				
-	101.0				Bottom of Boring at 101.5 ft bgs on 4/6/2007	1	10:46 End of drilling for GSC-01A (20.0)				
-					-	1	offset for sand delineation from GSC-01)				
					_	1					
					_						
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105_ -62.1					- -	-	-				
-02.1					-	-	-				
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-01B	SHEET	1	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724347.3 N, 457805.5 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION: Vertical WATER LEVELS: 3.0 ft bas on 03/10/07 START: 4/6/2007 END: 4/9/2007 LOGGER: T. Stewart													
WATER	WATER LEVELS : 3.0 ft bgs on 03/10/07												
				STANDARD	SOIL DESCRIPTION COMMENTS								
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION								
BEL CE.		RECOVE	ERY (ft)	120111200210	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND								
PTH EVA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY								
SU ELE				(N)									
42.8	0.0			400	Poorly Graded Sand (SP) 0.0-1.3' - very light gray, (N8), moist, very loose, very								
		1.3	SS-1	1-2-2 (4)	fine to fine silica sand, 5% nonplastic fines, trace very								
	1.5			(1)	fine sand-sized black particles, trace organics and 24" split spoon (SS)								
-	-				brown mottling 50-lb bags of QuikGel brand bentonite Added 1/4 bag bentonite to full mud vat								
					1 1								
-					11								
-					1 								
-					1 								
-					Water level at 3.0' below ground surface at								
5	5.0				- 15:35 based on moist SS-1, wet SS-2 samples								
37.8	5.0				Poorly Graded Sand (SP) SS-2 taken at 15:49								
-		0.9	SS-2	7-9-8	5.0-5.9' - yellowish gray, (5Y 8/1), wet, medium dense,								
-		0.0	00-2	(17)	fine grained, silica sand, trace nonplastic fines including trace sand-sized black particles								
-	6.5				4 1								
-													
-													
-					-								
-					-								
-													
-													
10 <u> </u>	10.0				Silty Sand (SM) SS-3 taken at 15:54								
32.0				8-11-12	10.0-11.3' - very light gray to yellowish gray, (N8 to 5Y 8/1), wet, medium dense, fine grained, low plasticity,								
-		1.3	SS-3	(23)	8/1), wet, medium dense, fine grained, low plasticity,								
-	11.5				silica sand, 25-35% low plastic fines including trace very fine sand-sized black particles, trace fine								
-					gravel-sized concretions								
_													
_					.								
_													
_					」								
_]]								
15	15.0												
27.8				40.45.40	Silty Sand (SM) 15.0-16.2' - very light gray to yellowish gray, (N8 to 5Y -								
		1.2	SS-4	12-15-13 (28)	8/1), wet, medium dense, fine grained, nonplastic,								
	16.5			(==0)	silica sand, 20-25% nonplastic fines, trace very fine grain black particles								
					Grain plack barroles								
1 7					11								
1 1					1								
					11								
					11								
-					11								
20					1 								



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-01B

SHEET 2 OF 6

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724347.3 N, 457805.5 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

						ary, cathead, NW rods, 3-7		D . T	ORIENTATION : Vertical		
WATER	LEVELS	. 3.U π bo	gs on 03/1		START : 4/6/2007	END: 4/9/2007 SOIL DESCRIPTION	LUGGE	Т	Stewart COMMENTS		
중무 <i>章</i> [CAMPIE	INTERVA	I (#)	STANDARD PENETRATION		JOIL DEGUNIF HON		8	GOIVIIVILINIG		
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAIVIPLE		. ,	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,				DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND		
H B		RECOVE			MOISTURE	CONTENT, RELATIVE D	ENSITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION		
SUR!			#TYPE	6"-6"-6" (N)	CONSISTENC	CY, SOIL STRUCTURE, M	IINERALOGY	SYMBOLIC LOG	INSTRUMENTATION		
22.8	20.0			()	Silty Sand (SM))		III	SS-5 taken at 16:04		
-		1.1	SS-5	12-15-14	20.0-21.1' - San	ne as 15.0-16.2'		1	1 1		
-	21.5			(29)				╁┈	1 1		
-	21.0							1	1		
-								1	1		
-								1	1		
-								1	1		
-								1	1		
-								1	1		
25	25.0							1	1		
17.8	20.0				Silty Sand (SM))	_	111	1		
-		1.0	SS-6	12-75-72	25.0-26.0' - San	ne as 20.0-21.1'		111	1 1		
-	26.5			(147)				╁┈	1 1		
-	20.0							1	1		
-								1	1		
-								1	1		
-								1	1		
-								1	1		
-								1	1		
30	30.0							1	1		
12.8					Fat Clay (CH)	1011 1 1 1 1 1			SS-7 taken at 16:21		
		1.5	SS-7	5-7-6 (13)	and pockets, 30	ked CH materials in irreg 0.0-30.4' is grayish gree	n (10GY 5/2),		1		
	31.5			(10)	with medium gra	ay to dark gray mottling	(N3 to N4),		1		
					is grayish green	ry pale orange (10YR 8/ n (10GY 5/2) with very p	ale orange	Τ]		
						8/2), moist to wet (30.4- no HCl reaction, trace m]			
					sand-sized very	pale orange (10YR 8/2) and dark gray]]		
_					(N1) clasts						
]		
_								1	Driller's Remark: change to tricone roller bit 3-7/8" at 34.0', hit hard rock		
35	35.0							<u> </u>			
7.8				15-13-13		one Gravel With Sand (lowish gray with light oliv			SS-8 taken at 16:44		
_		0.8	SS-8	(26)	staining, (5Y 8/	1 with 5Y 5/6), wet, med	dium dense,	+ <i>*//</i>]		
_	36.5				\20-25% fine to 0	ction, angular gravel-size coarse sand-sized, 20%	ea limestone, / medium to	1			
_					high plastic fine	es, carbonate materials		1			
-								1			
_								1			
_								1			
-								1			
-								1			
40								\bot			



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-01B SHEET 3 OF 6

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724347.3 N, 457805.5 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLIN	DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION: Vertical											
WATER	WATER LEVELS : 3.0 ft bgs on 03/10/07											
				STANDARD	SOIL DESCRIPTION COMMENTS							
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION							
BEL CE /		RECOVE	RY (ft)	.2011/200210	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND							
TH SYFA!	#TYPE 6"-6"-6"				MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLOID LOSS, TESTS, AND CONSISTENCY, SOIL STRUCTURE, MINERALOGY S INSTRUMENTATION							
SUI			#111 L	(N)	δ							
2.8	40.0				Clayey Sand (SC) SS-9 taken at 16:54							
		0.4	SS-9	11-8-9 (17)	40.0-40.4' - white to yellowish gray, (N9 to 5Y 8/1), moist, medium dense, fine to medium grained, low to	1						
-	41.5			(17)	\medium plasticity, very strong HCl reaction, 25% low	- 1						
-	71.0				to medium plastic fines, carbonate materials -	- 1						
-					Driller's Remark: 17:02 43.5' hard drilling,	-						
-					loss of circulation (LOC) up to 100%	-						
-					- 1	-						
-					-	-						
-						_						
_					_	_						
45	45.0											
-2.2				7.00	Clayey Sand With Limestone Fragments (SC) 45.0-46.0' - Same as 40.0-40.4' except 25% fine to SS-10 taken at 17:06 Installed 40.0' HW casing	اِ						
		1.0	SS-10	7-9-8 (17)	coarse gravel-sized limestone fragments, fossiliferous	1						
	46.5			(11)		1						
-					1 1 1	1						
-					1 1	- 1						
-					- 1	-						
-					- 1	-						
-					- 1	-						
-						-						
-					_	_						
50	50.0				777							
-7.2				00.44.44	Clayey Sand With Limestone Fragments (SC) 50.0-51.5' - Same as 45.0-46.0' except staining over							
		1.5	SS-11	20-14-11 (25)	upper most 4.0', 40% fine to coarse gravel-sized							
	51.5			(=0)	limestone, trace moderate brown to dusky brown							
-					(5YR 3/4 to 5YR 2/2) concretions	1						
-					8:22 water level at 18.0' below ground	- 1						
-					- surface on 4/7/07	-						
-					N-rod (5.0' sections) 45.0' HW casing in hole	-						
-					- 1/8 50-lb bag of QuikGel brand bentonite	-						
-					added to mud vat 3-7/8" tricone roller drill bit	4						
-					- SS-11 taken at 09:42	4						
55	55.0					_						
-12.2				22.45.44	Clayey Gravel With Sand (GC) 55.0-56.2' - Same as 50.0-51.5' except 60% fine to 100% circulation loss; refill vat, add 1/2 bag bentonite							
1		1.2	SS-12	22-15-14 (29)	coarse gravel-sized, 20-25% sand-sized, highly							
	56.5			(=0)	fossiliferous 11:02 Driller's Remark: hard at 53.0', light to							
					moderate chatter, soft from 54.0'-55.0', hole collapse at bottom so that split spoon resting	, 1						
1 -					on 1.5' of cave-in material	" -						
-					- 11:15 N-rod pulled out to install NW casing	-						
-					with advancer and tricone roller drill bit wireline accessory (Serial Number: 83963-	\dashv						
-					- CN)	-						
-					Refill mud vat, add 1/4 bag bentonite SS-12 taken at 13:55	4						
_					- 33-12 taken at 13.33	4						
60												



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-01B

SHEET 4 OF 6

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724347.3 N, 457805.5 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

DRILLIN	G METH	OD AND	EQUIPM	<u>ENT : CME 550 S</u>	N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit		ORIENTATION : Vertical
WATER	LEVELS	: 3.0 ft b	gs on 03/1	10/07	START : 4/6/2007 END : 4/9/2007 LOGGEF	R : T.	Stewart
				STANDARD	SOIL DESCRIPTION	/D	COMMENTS
§8€	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		SYMBOLIC LOG	
BEL SE A		RECOVI	RY (ft)	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,	l S	DEPTH OF CASING, DRILLING RATE,
TH VAT			#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	ABC	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
DEPTH BELOW SURFACE AND ELEVATION (ft)			#IYPE	(N)	Control of the contro	S	INTO THE INT
-17.2	60.0				Silty Limestone Gravel With Sand (GM)	•	Driller's Remark: 14:05 switch to N-rod (5.0'
-		1.0	SS-13	30-22-23	60.0-61.0' - Same as 55.0-56.2' except low plasticity fines, 50% fine to coarse gravel-sized, 35% fine to	111	sections) - 2-7/8" tricone roller bit due to continued
-	04.5			(45)	coarse sand-sized, 15% fines, highly fossiliferous		down-hole cave-in
-	61.5					┨	SS-13 taken at 14:32 -
-						ł	Switch back to NW casing advancer tricone
-					-	1	roller drill bit, maintaining some circulation -
-					-	-	through HW set to 45.0' below ground _ surface
_						1	Surface -
_						1	_
_						1	
65	65.0					ļ	_
-22.2				40.40.40	Clayey Sand With Limestone Fragments (SC) 65.0-66.2' - Same as 60.0-61.0' except white to very		SS-14 taken at 16:02
]		1.2	SS-14	19-16-10 (26)	light gray, (N9 to N8), low plasticity, medium light gray		Ī
	66.5			(20)	(N6) staining over bottom half of sample, fine to	1///	Last run of 4/7/07
-					\ \coarse sand-sized, 35% fine to coarse gravel, 20-25% \ \ \ \fines, highly fossiliferous	1]
-					(miss, mg.m) (seemis: see	1	1
-					·	1	<u> </u>
-					-	1	-
-					-	┨	-
-						┨	-
-						1	-
70 <u> </u>	70.0				Sandy Fat Clay (CH)	 	09:25 water level at 2.0! below ground
-21.2				6-7-8	70.0-71.5' - pale green with pale olive gray sands, (6G		08:35 water level at 3.0' below ground surface on 4/8/07 –
_		1.5	SS-15	(15)	6/2 with 5Y 5/2), moist, stiff, high plasticity, no		
_	71.5				dilatancy, trace dusky blue (5PB 3/2) mottling, 30% very fine to fine silica sand, 5% carbonate sand in 万元		65.0' NW installed Using NW casing advancer with wireline -
_					irregular pockets, carbonate clasts with mild HCl /		tricone drill bit accessory
					reaction		N-rod (5.0' sections) 140-lb hammer via cathead
						1	170-15 Hallillet via Cauleau
						1	SS-15 taken at 09:02
						1]
-					•	1	5.0' NW casing added to advance boring
75	75.0					1	1
-32.2	13.0				Clayey Sand With Limestone Fragments (SC)	///	Driller's Remark: 09:20 he'll have to switch
-		1.5	SS-16	12-17-15	75.0-76.5' - white to bluish white, (N9 to 5B 9/1), wet,		back to 2-7/8" tricone drag bit to get through
-	70-		55 15	(32)	dense, fine to coarse grained, very strong HCl reaction, trace dark gray (N3) mottling or staining,	///	clay - will no longer be advancing NW casing
-	76.5				\sim 25-30% low to medium plastic fines, 15-20% fine	<i>Y//</i>	Driller's Remark: 09:40 good circulation -
-					\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	1	through NW casing Two irregular blows in SS-16 SPT
-					(S) South, highly toodinorous	1	Two inegular blows in 30-10 or 1
-						1	SS 16 taken at 00:59
-						1	SS-16 taken at 09:58
_						1	
						1	Driller's Remark: adding another 5.0' section of NW casing, losing depth to cave-in
80							or rave casing, rosing deput to cave-in
1						1	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-01B SHEET 5 OF 6

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724347.3 N, 457805.5 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND FOLIPMENT: CMF 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION: Vertical												
WATER	WATER LEVELS : 3.0 ft bgs on 03/10/07											
				STANDARD	SOIL DESCRIPTION COMMENTS							
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SOMMENTO DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION							
H SE		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND							
PTF PTF EVA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY							
SUS				(N)								
-37.2	80.0			4-6-11	Clayey Sand With Limestone Gravel (SC) 80.0-81.5' - Same as 75.0-76.5' except white to bluish							
_		1.5	SS-17	(17)	white, (N9 to 5B 9/1), wet, medium dense, fine to							
-	81.5				coarse grained, strong HCl reaction, low to medium plastic fines, trace medium dark gray (N4) staining,							
_					35-40% plastic fines, 15% fine gravel-sized limestone, /							
_					all carbonate							
_					<u> </u>							
_					<u> </u>							
_]							
] [
85	85.0				11							
-42.2					Interbedded Sands And Clays, Silty Sand (SM) 85.0-85.2' - yellowish gray, (5Y 7/2), wet, medium							
		1.5	SS-18	4-5-12 (17)	dense, nonplastic, mild HCl reaction, silica sand, trace							
	86.5			(17)	fine carbonate sand, 25% nonplastic fines, mild HCl Driller's Remark: 75% circulation loss at							
-					reaction in carbonate sand Fat Clay (CH) 85.0'							
-					85.2-85.3' - grayish green, (5Y 5/2), moist, stiff, high							
-					plasticity, no dilatancy, no HCl reaction, trace dusky blue (5PB 5/2) mottling lense of yellowish gray (5Y							
-					8/1) silt/clay, trace white (N9) fine sand-sized							
-					particles, trace flat subrounded pyrite 1/8"-1/4"							
-					Clayey Sand (SC)							
90	90.0				85.3-86.5' - moderate yellowish brown, (10YR 5/4),							
-47.2	90.0				moist, medium dense, fine silica sand, trace fine carbonate sand, 40-45% medium plastic fines, mild SS-19 taken at 11:27							
-		1.5	SS-19	5-14-22	HCI reaction in carbonate grains							
-	91.5		00 .0	(36)	Interbedded Silty Sand And Fat Clay, And Clayey Sand (SM)							
-	91.5				90.0-91.5' - Same as 85.0-86.5'							
-					†							
-												
-					-							
-					-							
-					-							
-					-							
95 <u> </u>	95.0				Fat Clay (CH) SS-20 taken at 11:55							
- 52.2			00.00	5-12-15	95.0-95.9' - Same as 85.0-86.5' except no yellowish							
-		1.4	SS-20	(27)	gray lens, white fine sand-sized particles in pockets							
-	96.5				Clayey Sand (SC) \(\) 95.9-96.4' - Same as 85.0-86.5' except 35-40% low to \(\)							
-					medium plastic fines / _							
-					4 1							
-					11							
_					1							
]]							
_]							
100												



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-01B SHEET 6 OF 6

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724347.3 N, 457805.5 E (NAD83)

ELEVATION: 42.8 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

						tary, cathead, NVV 100S, 3-7/6			ORIENTATION : Vertical	
WATER	LEVELS	. 3.U π bg	us on 03/		START : 4/6/2007	END: 4/9/2007 SOIL DESCRIPTION	LOGG		. Stewart COMMENTS	
STANDARD PENETRATION TEST RESULTS RECOVERY (ft) RECOVERY (ft) #TYPE 6"-6"-6" (N)						JOIL DEJURIT HUN	—	CONNINCTATO		
N E LO	SAMPLE			TEST RESULTS	SOIL NAM	ME, USCS GROUP SYMBOL	SYMBOLICI OG	DEPTH OF CASING, DRILLING RATE,		
H B ATI(RECOVERY (ft) #TYPE 6"-6"-6"			MOISTURI	E CONTENT, RELATIVE DE	Š	DRILLING FLUID LOSS, TESTS, AND			
THE N			#TYPE	6"-6"-6"	CONSISTEN	NCY, SOIL STRUCTURE, MII	NERALOGY	\ \{\bar{2}}	INSTRUMENTATION	
_ითш -57.2	100.0	<u> </u>	<u> </u>	(N)	Silty Sand (SI	M)		11	SS-21 taken at 12:22	
- 07.2	100.0			7-8-8	100.0-101.5' -	yellowish gray, (5Y 7/2), w	et, medium	-	SS-21 (100.0-101.5') is the last sample for	
-		1.5	SS-21	(16)	dense, fine gra	ained, no HCl reaction, silic astic fines, trace very fine	ca sand,	411	GSC-01B, end of drilling	
-	101.5				black particles black particles	s, trace black staining near	bottom of	711	Hole abandoned on 4/9/07 with 50-55	
_					\sample		,	/]	gallons of grout mix, 12 bags of 47-lb each of Quick Portland cement Type I/II	
l _					Bottom of Bori	ing at 101.5 ft bgs on 4/9/2	007	1		
								J		
								1		
1 7								1	1	
105								1	1	
-62.2								7		
-								1	1	
-								1	1	
-								1	-	
-								1	-	
-								+	-	
-								+	-	
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110 -67.2								-	-	
-07.2								4	-	
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115]]	
-72.2								7]	
-								1	1	
								1	1	
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-								1	1	
-								1	1	
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-								+	-	
-								+	-	
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120								+	-	
		L							1	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-02

SHEET 1 OF 8

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724300.1 N, 457447.2 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND FOUIPMENT: Dietrich D-50 S/N 232 mud rotary cathead NW.I rods 6" tri-cone bit

DRILLIN	DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6" tri-cone bit ORIENTATION: Vertical											
WATER	WATER LEVELS : 1.4 ft bgs on 5/16/07											
				STANDARD	SOIL DESCRIPTION COMMENTS							
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION							
BEL CE /		RECOVE	ERY (ft)	TEST RESOLTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE,							
YFA(#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SINSTRUMENTATION							
SUF			#1117	(N)	$\left \begin{array}{c} \overleftarrow{\delta} \end{array}\right $							
40.4	0.0				Topsoil (OL)							
-		1.1	SS-1	1-2-3	\ 0.0-0.3' - brownish black, (5YR 2/1), moist, very soft, 60% organic no fines, <40% roots/vegetative detritus							
-	1.5			(5)	Poorly Graded Sand With Some Limestone							
-	1.5				Fragments (SP)							
-					\ 0.3-1.1' - very pale beige, (10YR 8/2), moist, very _ loose, very fine to fine grained, nonplastic, trace							
-					nonplastic fines, 10-15% organics, silica sand							
-												
-					-							
-					_							
_					_							
5	5.0											
35.4				5 40 40	Sandy Clay And Organic Wood Debris (SC) Driller's Remark: Wood from 5.0-8.5' below surface,							
		0.4	SS-2	5-18-10 (28)	\ moist, very stiff, medium plasticity, no to mild HCl \ several scoops of wood chips removed from							
	6.5				reaction, <30% very fine to medium grained mud pit mud pit							
					carbonate sarius, 30 /0 or sarripte is wood debits							
					Driller's Remark: Smooth, easy drilling, light							
-					chatter at 7.0' and 9.5'							
-					1							
-					-							
-					-							
					-							
10 30.4	10.0 10.3	0.3	SS-3	50/4	Silt (ML)							
30.4	10.5	0.5	33-3	(50/4")	\ 10.0-10.3' - grayish yellow, (5Y 8/4), moist to wet,							
-					│ \ hard, nonplastic, rapid dilatancy, mild HCl reaction, │ │							
_					\\ 5-10% very fine sand, 5-10% limestone fragments \\ \langle 1/4" diameter, carbonate materials							
_												
_					<u> </u>							
1 7					1							
					1							
15	15.0				1							
25.4	10.0				Silt (ML)							
-		0.5	SS-4	13-3-8	15.0-15.5' - grayish yellow with moderate yellow							
-	46 -	0.0	00-4	(11)	lenses, (5Y 8/4 with 5Y 7/6), moist to wet, stiff, nonplastic, rapid dilatancy, moderate HCI reaction,							
-	16.5				∖10-15% very fine to medium sand, carbonate							
-					\materials							
-												
_												
_]							
20					1							



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-02

SHEET 2 OF 8

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724300.1 N, 457447.2 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND FOUIPMENT: Dietrich D-50 S/N 232 mud rotary cathead NW.I rods 6" tri-cone bit

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6" tri-cone bit ORIENTATION OF THE PROPERTY OF THE PROPE												
WATER	WATER LEVELS : 1.4 ft bgs on 5/16/07											
				STANDARD				COMMENTS				
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA					SYMBOLIC LOG					
JOE TO	RECOVERY (ft)			SOIL NAME, USCS GROUP SYMBOL, COLOR,		- 1	2	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND				
PTH EVA		#TYPE 6"-6" CONSISTENCY, SOIL STRUCTURE, MINERALOGY						INSTRUMENTATION				
ESE ESE		(N) 20.0 0.2 SS-5 50/5 Sandy Silt (ML)					S					
20.4	20.4	0.2	SS-5	50/5 (50/5") /	Sandy Silt (ML) 20.0-20.2' - grayish yellow, (5Y 8/4), moist to wet,	巾	ш	_				
_					hard, nonplastic, rapid dilatancy, moderate HCl	/4		_				
_					reaction, 30-35% fine to coarse sand-sized limestone fragments, lenses <1/4" thick, carbonate materials			_				
_					(-5	`		_				
_						4		_				
_						4		_				
_						4		_				
_						4		_				
_						4		_				
25	25.0				County Cité Mide Line et au Laure (MI)	_		_				
15.4				35-40-35	Sandy Silt With Limestone Lenses (ML) 25.0-26.2' - grayish yellow, (5Y 8/4), moist to wet,	4		_				
_		1.2	SS-6	(75)	hard, nonplastic, rapid dilatancy, moderate HCl	4		_				
_	26.5				reaction, 25% fine to medium sand, <30% limestone lenses <1/4" thick, carbonate materials	/‡		<u>-</u>				
-						´-		_				
-						4		_				
-						4		_				
-						4		-				
_						4		-				
-						4		=				
30 <u> </u>	30.0				Silt With Limestone Lenses (ML)	4	ш	Stop drilling for the day at 17:30,				
10.4		4.0	00.7	15-15-40	30.0-31.0' - Same as 25.0-26.2' except dark vellowish	4		resume drilling 5/16/07 08:00,				
-		1.0	SS-7	(55)	orange, (10YR 6/6)	-	Щ	water level at 1.4' below ground surface				
-	31.5					\dashv		-				
-						\exists		-				
-						\exists		-				
-						\exists		-				
-						\exists		-				
-						\exists		-				
	05.0					+		-				
35 5.4	35.0		00.0	35-50/2	Silty Sand (SM)	\dashv	П	Driller's Remark: Moderate to light chatter				
-	35.7	0.5	SS-8	(85/8")	→ 35.0-35.5' - vellowish grav. (5Y 7/2), moist, very	/		from 35.0-39.0'				
-					\dense, moderate HCl reaction, fine to coarse sand, \30% nonplastic fines, carbonate materials	/1		-				
-						` 		-				
-						\exists		-				
-						\exists		-				
-						+		-				
-						+		-				
-						\exists		Driller's Remark: 39.0-40.0' rapid smooth				
40						+		drilling -				
40_						\dashv	\dashv	-				



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-02

SHEET 3 OF 8

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724300.1 N, 457447.2 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 6" tri-cone bit

						ary, carriead, NVVJ 100S, 6			ORIENTATION : VEItical		
WATER	LEVELS	. 1.4 π bo	gs on 5/16		START : 5/15/2007	END: 5/17/2007 SOIL DESCRIPTION	LUGG	EK : I	R. Bitely, D. Whitaker COMMENTS		
ŞQ⊋I	044:5:			STANDARD PENETRATION		JUIL DESURIPTION		- 5	CONINIENTS		
ON (C	SAMPLE INTERVAL (ft) SAMPLE INTERVAL (ft) PENETRATION TEST RESULTS RECOVERY (ft) #TYPE 6"-6"-6" (N)				SOIL NAM	E, USCS GROUP SYMBO	2	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION			
H B		RECOVE	ERY (ft)		MOISTURE	CONTENT, RELATIVE D	ENSITY OR	3	DRILLING FLUID LOSS, TESTS, AND		
EPT CLEV			#TYPE	6"-6"-6" (N)	CONSISTEN	CY, SOIL STRUCTURE, N	MINERALOGY	3	INSTRUMENTATION		
<u>о.4</u>	40.6	0.3	SS-9	50/3.5	Silty Sand And	d Limestone Fragments	s (SM)				
-				(50/3.5")	\ 40.0-40.3' - Sa	me as 35.0-35.5' except	35-40% fine	Æ	moderate to fast movement, intermittent light -		
-					\gravei-sized lin	nestone fragments		′ ┨	chatter _		
-								+	-		
-								-	-		
-								-	-		
-								-	-		
-								-	-		
-								-	-		
-								4	-		
45	45.0				0			- -	- -		
-4.6				18-20-35	45.0-46.3' - Sa	d Limestone Lenses/fra me as 40.0-40.3' except	igments (ML) : 25%	-41	-		
-		1.3	SS-10	(55)	nonplastic fine	s, 35% fine gravel-sized		4			
_	46.5				fragments in le	nses		╬	<u> </u>		
_								1	_		
_								1			
_									_		
_											
_											
								1	1		
50	50.0							1	1		
-9.6		0.8	SS-11	50-50/5	Limestone An		C00/ fine to	F	7		
	50.9	0.0	00-11	(100/11")		me as 45.0-46.3' except sized limestone fragmer	nts, 30-35% fine	/] 1		
					\to coarse sand	l, 15-20% of nonplastic f	ines				
					See the next s	oring at 51.0 ft bgs heet for the rock core lo	n	1	1		
-							9	1	1		
-								1	1		
-								1	1		
-								1	1		
-								1	1		
55								1	1		
-14.6								1	1		
-								1	1		
-								1	1		
-								1	1		
-								1	1		
-								1	1		
-								1	1		
-								+			
-								+	-		
60 -								+	-		
60								+	+		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-02

SHEET 4 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724300.1 N, 457447.2 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

				MENT . Dietrich D-50 5/N 252, mud rotary, NQ tools, HW			ORIENTATION . Vertical
WATER	LEVELS: 1.4	ft bg	s on 5	/16/07 START : 5/15/2007 END : 5/	17/20	D7 LOGGER: R. Bitely, D. Whitaker	•
				DISCONTINUITIES	П	LITHOLOGY	COMMENTS
≥9 €	(% %			 	SYMBOLIC LOG	232001	55
N S S	ZAX ZZX	_	T KES	DESCRIPTION]	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
교하는	S F, Ä	(%) 🛭	158	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	[j	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FF.	#S S S S	۵	AC.	PLANARITY, INFILLING MATERIAL AND	₩	AND ROCK MASS	SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	A Q	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	51.0				+	Limestone	Establish rock contact at
_	· 1.0		2	51.2' - Bedding plane, horizontal, smooth,		- 51.0-55.45' - pale yellow brown,	51.0' below ground –
			-	undulating, open <1/4"	ш	(10YR 6/2), fine to medium grained,	surface,
-				51.7' - Fracture or mechanical break, 30 deg,	1	moderate to high HCl reaction,	set HW casing to 51.0'
-			0	rough, undulating, open <1/4"	╀┤	 extremely weak to weak (R0 to R2), 	below ground surface
				52.35' - Mechanical break	Ш	voids <1/16" diameter over 50% of	Begin rock coring using
]	R1-NQ			53.05' - Fracture or mechanical break, 30		surface, trace fossil molds <1/2"	NQ wireline tooling
-	5 ft	58	6	deg, rough, undulating, open <1/4"	ш	- diameter, trace cavities <1/2"	from 51.0' below ground –
l -	89%			53.25, 53.6, 53.85' - Bedding plane or	H	diameter, trace crystallized limestone	surface
			,	mechanical break (3), horizontal, smooth,		infill	
55			3	undulating, open <1/4"-1/2"	Щ		R1:2 minutes
-14.6			1	53.5' - Mechanical break	+	-	-
'7.5_			1	and 40 deg, rough, undulating, open <1/4"	Н	No December 55 45 50 61]
	56.0		NR	54.3' - Bedding plane or mechanical break,	Ш	No Recovery 55.45-56.0'	
]				horizontal, smooth, undulating, open	1	Limestone	1 1
-			2	<1/4"-1/2"	╂╫	56.0-61.0' - pale yellowish brown,	1 -
_				54.5' - Fracture or mechanical break, 20 deg	Ш	(10YR 6/2), fine to medium grained,]
				and 40 deg, rough, undulating, open <1/4"	H	high HCl reaction, very weak to weak	
-			2	54.6, 54.7' - Mechanical break (2)	14	- (R1 to R2), voids (<1/16") over] -
-	DO NO		<u> </u>	54.75' - Fracture or mechanical break, 20 deg and 40 deg, rough, undulating, open	H	40-50% of surface, trace fossil molds	-
	R2-NQ 5 ft	92	1	deg and 40 deg, rough, undulating, open		_	
	100%	32		55.15, 55.4' - Bedding plane or mechanical	Ш		1
-	,			break (2), horizontal, smooth, undulating,	H	-	1 -
-			1	open <1/4"-1/2"		=	-
60				56.4, 56.8, 57.1, 57.7, 58.7, 59.2' - Bedding	Ш		
-19.6				plane or mechanical break (6), <10 deg,	\mathbb{H}		R2:3 minutes
-			1	rough, undulating, open <1/4"	┲╜	-	-
-	61.0			60.1' - Fracture or mechanical break, 65 deg, smooth, undulating, tight to open <1/4"	口	C4 0 04 51	-
			3	Smooth, undulating, tight to open < 1/4	Н	61.0-64.5' - pale yellowish brown to	
			ا	61.5' - Bedding plane or mechanical break,	Н	 light gray, (10YR 6/2 to N7), very fine to medium grained, strong HCl 	1
-				<10 deg, smooth to rough, undulating, open	ш	reaction, 61.0-62.0' and 62.45-63.0'	-
-			2	<1/2"-1/4"	\square	 very weak to weak (R1 to R2) rock, 	-
				61.7' - Mechanical break or fractures, 20 deg,	Н	62.0-62.45' extremely weak (R0)	
1 7	R3-NQ			rough, undulating, tight to open <1/2" 62.0' - Bedding plane or mechanical break,	М	rock, 63.0-64.5' medium strong to	1
-	5 ft	44	2	<10 deg, smooth to rough, undulating, open	口	- strong (R3 to R4) rock, voids	R3:3 minutes
-	70%			<1/2"-1/4"	ш	(<1/16") over 30-50% surface except	T.O.O ITIII IULGO
			2	62.7' - Mechanical break or fractures, 20 deg,	H	trace voids from 62.0-62.45', trace fossil molds <1/2"diameter, trace	
65				rough, undulating, tight to open <1/2"		cavities <1/2 diameter, trace	1 1
65 <u> </u>			ND	62.95' - Bedding plane or mechanical break, —	Ш	61.0-62.0', trace organics	⊢
			NR	<10 deg, smooth to rough, undulating, open <1/2-1/4"	H	No Recovery 64.5-66.0']
	66.0			l _2"T_"		· ·	
				63.15' - Mechanical break or fractures, 50 deg, rough, undulating, tight to open <1/2"	Ш	Limestone	1 1
-			1	63.35' - Mechanical break or fractures, 10	+	- 66.0-70.9' - pale yellow brown to	1
				deg, rough, undulating, tight to open <1/2"	Н	moderate yellowish brown, (10YR 6/2]
				63.5' - Mechanical break	Ш	to 10YR 5/4), very fine to fine	
-			3	64.25' - Bedding plane or mechanical break,	\square	- grained, strong HCl reaction, very	1 1
-	D4 NO			<10 deg, smooth to rough, undulating, open	Н	weak to weak (R1 to R2), except 67.5-67.9' that is extremely weak	-
_	R4-NQ 5 ft	88	0	<1/2-1/4" 64.41 Manhaninal break or frontures. FO doc.	Ш	- (R0) to very weak (R1) rock, voids	l J
	98%	00		64.4' - Mechanical break or fractures, 50 deg, rough, undulating, tight to open <1/2"	H	(<1/16") over 30-50% of surface,	
-				66.5, 67.45' - Fractures or mechanical break	14	10-20% fossil molds <1/4" diameter,	1 1
-			1	(2), 20 deg and 30 deg, rough, undulating,	HH	trace cavities <3/4" by 1/2", trace	-
70				open <1/4"		organics	
-29.6				67.7, 68.85' - Bedding plane or mechanical	Щ		R4:5 minutes
-			2	break (2), <10 deg, rough, undulating, open	Н]
	71.0			<1/2"	H		

APPENDIX 2BB-874 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-02

SHEET 5 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724300.1 N, 457447.2 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

00	- WIETHIOD 7 II	VD L	ZOII IV	/IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	Casing		ORIENTATION : Vertical
WATER	LEVELS: 1.4	ft bgs	s on 5	/16/07 START : 5/15/2007 END : 5/	17/200	7 LOGGER: R. Bitely, D. Whitaker	
	_			DISCONTINUITIES	(7)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		Ś	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표 등 등	Y A A	(%	FRACTURES PER FOOT		일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H A A	RE F GTF SOV	Q D (%)	CTI FO	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	l g	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	H H H H	S.	-RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	<u>%</u>	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	014		NR/	69.1, 70.1, 70.5' - Bedding plane or	97	No Recovery 70.9-71.0'	
-			2	mechanical break (3), <10 deg, smooth to		- Limestone	-
I _				rough, undulating, open <1/4"	Н	71.0-76.0' - pale yellowish brown to	
				71.5, 71.55, 73.6, 73.65, 73.9, 74.25' -		light gray, (10YR 6/2 to N7), very fine	
			0	Bedding plane or mechanical break (6), <10 deg, smooth to rough, undulating, tight to	H	 to medium grained, strong HCl reaction, weak to medium strong (R2 	1
-	R5-NQ			open <1/2"		to R3), grain size increases with	1
-	5 ft	84	3		┦┦	depth, except 73.5-74.7' extremely	-
-	100%			-	╀┼	weak to very weak (R0 to R1) rock,	-
I _			2	_	口	voids (<1/16") over <20-50% of surface-variable, no cavities, few	
75			_	74.65' - Fracture or mechanical break, 30	Н	fossil molds <1/4" diameter, stong	
-34.6				deg, rough, undulating, open <1/4"	Ш	rock zone from 72.4-72.85'	R5:4 minutes
-	70.0		2		╁┼	-	1 1
-	76.0			75.7, 75.8' - Bedding plane or mechanical break (2), <10 deg, smooth to rough,	丗	76.0-79.65' - pale yellowish brown to	1
-			3	undulating, open <1/2"	₽₽	light gray, (10YR 6/2 to N7), very fine	-
_				76.1, 76.3 - Fractures or mechanical break	Ш	to medium grained, strong HCI]
			- 10	(2), <10 deg, rough, undulating, tight to open	Н	reaction, 76.0-77.8' and 78.7-78.9'	
			>10	<3/4" 76.9' - Fracture or mechanical break, 40 deg,	Ш	 very weak (R1) to weak (R2) rock, 77.8-78.7' and 78.9-79.65' medium 	1
-	R6-NQ			rough, undulating, open <1/2"	ш	strong (R3) to strong (R4) rock, voids	1
-	5 ft	18	>10	77.3' - Fracture or mechanical break, <10	+ + +	- (<1/16") over 20-30% of surface,	-
_	73%			deg, rough, undulating, tight to open <3/4"		trace fossil molds <1/4" diameter, about 10-20% cavities <1/2"	-
_			3	77.5-78.8' - Fracture zone, rough, undulating, gravel-sized fragment, <2" diameter	╀┤	diameter especially from 77.8-78.7'	
80				79.0, 79.15' - Fractures (2), rough,	Ш	. ,	
-39.6			NR	undulating, intersecting fractures at 90, 60,	Н	No Recovery 79.65-81.0'	R6:8 minutes
_	81.0			and 80 degrees, tight to open <1/4" 79.25' - Fracture or mechanical break, <10	Ħ	-	1
-	01.0			deg, rough, undulating, tight to open <3/4"	╂┴╂	Limestone	Stop drilling for the day at
-			>10	81.0-81.6' - Fracture zone, smooth to rough,	╆	81.0-85.9' - pale yellowish brown to	18:00
-				undulating, gravel-sized fragments <1"-1/2" diameter	╀┼	light olive gray, (10YR 6/2 to 5YR	l
_			3	81.6' - Bedding plane, <10 deg, smooth,		5/2), very fine to medium grained, moderate to strong HCl reaction,	Resume drilling 5/17/07 07:30, water level at 3.0'
			3	undulating, unknown open thickness,	ш	weak to strong (R2 to R4), voids	below ground surface
_	R7-NQ			adjacent to fragments above	\Box	(<1/16") over 40-60% of surface,	1
-	5 ft	60	0	82.1, 82.3, 82.4' - Fractures or mechanical break (3), rough, undulating, 3 intersecting		- moderately fossiliferous, many fossil	-
-	98%			fractures at 60, 60, and 50 degrees	ᡛᡃᡰ	molds/casts up to 2" diameter, trace cavities <1" diameter possible void	1
-			1	respectively, open <3/4"	冏	 space/cavity in fracture zone at 	-
85				83.5' - Mechanical break	igspace	81.0-81.5', crystal infill, trace over	l
-44.6			>10	85.0-85.2' - Fracture zone, rough, undulating,	口	surface except 82.0-82.5' over 50% of surface, trace organic lamintations	R7:5 minutes
]	86.0			gravel-sized fragments <1" diameter 85.5, 85.6' - Fractures (2), 30 deg and 40	Щ	especially at 81.8'	1
-			NR.	deg, rough, undulating, 2 intersecting	口	No Recovery 85.9-86.0'	1 1
-			2	fractures, tight to open <3/4"	╂┼┼	 Limestone 86.0-89.5' - moderate yellowish 	
-				86.7, 86.8' - Fractures or mechanical break	口	brown, (10YR 5/4), very fine to fine	1
			1	(2), 80 deg and 40 deg, rough, undulating, 2 intersecting fractures or mechanical breaks,	₽₩	grained, moderate to stong HCI]
				tight to open <1/2"	Ш	reaction, weak to medium strong (R2]
]	R8-NQ			87.25' - Fracture or mechanical break, 50	H	to R3), voids (<1/16") over 20-40% of surface, highly fossiliferous with	1
-	5 ft 70%	56	0	deg, rough, undulating, tight 87.45, 87.9, 88.2, 88.45, 88.65' - Mechanical	Ш	fossil molds/casts <1/2" diameter,	1 1
-	1070		>10	break (5)	╙	trace cavities <1" diameter	1 - 1
-			- 10	89.0-89.5' - Fracture zone, rough, undulating,	╆╃	No Recovery 89.5-91.0'	Driller's Remark: Light
90				gravel-sized fragments <1"-1/2" diameter	口		chatter (89.5-91.0')
-49.6			NR		Н	_	R8:7 minutes
	91.0				Ш]
	-				\Box		
				-			

APPENDIX 2BB-875 Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-02	SHEET	6	OF	8	

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724300.1 N, 457447.2 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

			<u> </u>	1ENT : Diether D-50 5/14 252, mad rotary, 140 tools, 1144	00.0		ORIENTATION: Vertical			
WATER	LEVELS: 1.4	ft bg	s on 5		17/20					
≥0₽	- (%			DISCONTINUITIES	၂ ပွ	LITHOLOGY	COMMENTS			
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEDTH OF CASING			
불병은	JA H.	(%) Q	J. L	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	1 👸	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND			
FRY FY	NGN COO	OΩ	AC1 R F	PLANARITY, INFILLING MATERIAL AND	MB(WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD			
SS	응필분	R	FR	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SΥ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.			
					ш	Limestone				
-	1		0		╁	 91.0-95.5' - pale yellowish brown to moderate yellowish brown 	1			
-	-			02.1.01.65.02.45! Bodding plans or	匚	transitioning to yellowish gray beyond	1 -			
-			2	92.1, 91.65, 93.45' - Bedding plane or mechanical break (3), <10 deg, rough,	╀	 94.0', (10YR 6/2 to 10YR 5/4 to 5Y 	-			
-				undulating, open <1/4"	\perp	8/1), fine to very fine grained, grain	-			
l -	R9-NQ 5 ft	64	>10	00.45.00.051.5	┢	size fining with depth, weak to medium strong (R2 to R3) rock to	_			
	90%	04	10	93.45-93.85' - Fracture zone, rough, undulating, organic zone, gravel-sized		94.3', 93.46-93.05' and 94.3-94.7'				
-				fragments <1" diameter	╨	extremely weak (R0) rock with red	1			
95	1		>10	94.1-94.7' - Fracture zone, smooth to rough,	ш	 organic soils, 94.7-95.5' very weak to weak (R0 to R2) rock, 93.45-93.85' 	1			
-54.6			0	undulating, silt horizon, gravel-sized — fragments <2" diameter	╁	fracture zone with interbedded	R9:8 minutes			
-	-			nagments 12 diameter	匚	organic silts up to 3/4" in the beds,	I			
-	96.0		NR		世	93.45-93.85' fracture zone with poorly competent silts to no	-			
			0		\perp	competent elastic silts (MH) up to 2"	_			
l _			Ů		\vdash	thick as beds, 91.0-93.45' voids				
							97.05' - Mechanical break or bedding plane,		(<1/16") over 50-60% of surface,highly fossiliferous with molds/casts	
-	1				1	horizontal and 70 deg, rough, undulating,	╀┴	<1" diameter, few cavities <3/4"	1	
-	R10-NG)		tight	仜	diameter, moderate to stong HCl	1			
-	5 ft 100%	92	0		╁┼	reaction, 93.45-93.85' fragments with organics interbedded, 93.85-94.3' no	-			
-				00.0.00.15! Fractures (2) undulating	F	voids, no cavities, very fine grained	l -			
-			3	99.0, 99.15' - Fractures (2), undulating, intersecting fractures, tight to open <1/4"	╀	_ medium strong (R3) rock; 94.3-94.7'	1 -			
100_				99.5' - Mechanical break	ш	fragments with silt/elastic silt				
-59.6			,	99.7' - Mechanical break or bedding plane,	Н	interbedded; 94.7-95.5' voids (<1/16") over 10-50% of surface, few	R10:3 minutes			
-	101.0		1	horizontal, rough, undulating, tight	\Box	cavities <1/4" diameter, poorly	1			
-	10110	5		100.85' - Mechanical break or bedding plane,	世	fossiliferous No Recovery 95.5-96.0'				
-			5 horizontal, smooth, undulating, open <1/4" 101.0, 101.1, 100.3, 101.6, 102.0' - Bedding	5	╨	Limestone	1			
-	-			plane or mechanical break (5), smooth,	仜	96.0-101.0' - pale yellowish brown to	-			
-	-		0	undulating, open <1/4"	╁	yellowish brown, (10YR 6/2 to 5YR 5/2), very fine to fine grained, strong	l -			
-						HCl reaction, very weak to weak (R1)	1 -			
l _	R11-NC 5 ft) I 73	10	103.0' - Fractures (>5), smooth, undulating, 5 plus intersecting fractures from one main	╨	to R2), voids (<1/16") over <20-50%	_			
	99%	10	10	fracture, 70 degrees with 0 degree minor,		of surface (variable), trace organics, trace infill, trace laminated bedding,				
-				open <1/4"	\vdash	moderately fossiliferous with fossil]			
105	1		0	103.6, 105.75' - Bedding plane or mechanical break (2), smooth, undulating, open <1/4"	1	molds/casts <1" diameter, trace	1			
-64.6	1				╨	— cavities	R11:5 minutes			
-	1		1		仜	101.0-105.95' - yellowish gray, (5Y 7/2), very fine to fine grained, strong	-			
-	106.0		NR/		╁┼	 HCl reaction, weak (R2), voids 	-			
-			3	106.3, 106.6, 106.9, 107.1, 107.5, 107.9,	\vdash	(<1/16") over 30% of surface,	-			
_				108.25, 108.7, 109.05' - Bedding plane or	╨	moderately fossiliferous with molds/casts <1/2" diameter, trace				
			3	mechanical break (9), 40 deg, smooth to rough, undulating, tight to open <1/4"	Щ	organics				
-]		3	rough, unumating, tight to open > 1/4	\vdash	No Recovery 105.95-106.0' Limestone	1			
-	R12-NG				T	timestone 106.0-111.1' - yellowish gray, (5Y	1			
-	5 ft	70	2		╨	7/2), very fine to fine grained, strong	-			
-	100%				圧	HCl reaction, weak (R2), voids (<1/16") over <20% of surface,	-			
-	-		2	109.5' - Mechanical break	╁╴	(<1/16°) over <20% of surface, moderately fossiliferous with	-			
110				109.3 - Medianida bieak —	\Box	molds/casts <1/2" diameter	D40.4 minutes			
-69.6			4		Ľ	<u>-</u>	R12:4 minutes			
	111.0	4	\mathbb{H}							
1	i									



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-02 SHEET 7 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724300.1 N, 457447.2 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

WATER	LEVELS: 1.4	ft bgs	on 5/	16/07 START : 5/15/2007 END : 5/	17/20	07 LOGGER : R. Bitely, D. Whitaker												
≥ D ≎	(%)			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS											
ELO,	AND 37 (%)		ZES T	DESCRIPTION	100	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,											
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.											
-			>10	109.55, 110.05, 110.65, 110.85, 111.0' - Bedding plane or mechanical break (5), 40 - deg, smooth to rough, undulating, tight to open <1/4"		111.0-115.9' - yellowish gray, (5Y - 7/2), very fine to fine grained, strong HCl reaction, weak (R2), voids (<1/16") over <10% of surface,	-											
-	R13-NQ		80 1	111.0-111.8' - Bedding plane (>10), horizontal, smooth, undulating, tight to open <1/4"	smooth, undulating, tight to open	poorly fossiliferous, laminated bedding from 111.0-111.3'	-											
	5 ft 98%	80	2	113.0' - Bedding plane, horizontal, smooth, undulating, tight to open <1/4" 113.5' - Mechanical break 114.3' - Fracture or mechanical break, 80		- - -												
115 -74.6 -				0	deg, rough, undulating, tight to open <1/4"	Ė	-	R13:7 minutes										
-	116.0		NR) 2	- 116.4, 116.8, 117.55, 117.65, 117.7, 117.8, 118.2' - Bedding plane or mechanical break		No Recovery 115.9-116.0' Limestone 116.0-120.95' - yellowish gray, (5Y	-											
			4	(7), rough, undulating, tight to open <1/4"	Ė	7/2), very fine to medium grained, strong HCI reaction, weak (R2), voids (<1/16") over 30% of surface increasing with depth, grain size and												
-	R14-NQ 5 ft 99%	70	3	118.6' - Mechanical break 118.85, 119.1, 119.2, 119.3, 119.4, 119.5, 119.6' - Bedding plane or mechanical break		recrystallized texture increasing with depth, moderately fossiliferous with molds/casts <1/2" diameter, trace laminated organics, 10-20% cavities <1/2" diameter	- - -											
-79.6 -	121.0		1 (NR)	(7), rough, undulating, tight to open <1/4" 120.2' - Mechanical break 120.5' - Bedding plane or mechanical break, rough, undulating, tight to open <1/4"		No Recovery 120.95-121.0'	R14:3 minutes											
- - -			0	122.15, 122.25, 122.6' - Bedding plane or mechanical break (3), smooth to rough,		Limestone 121.0-125.85' - yellowish gray, (5Y 7/2), fine to medium grained, strong HCl reaction, very weak to medium strong (R1 to R3), rock strength	- - -											
-	R15-NQ 5 ft 97%													0	undulating, tight to open <1/2" 123.1, 123.6, 123.8' - Mechanical break		increasing with depth, highly fossiliferous from 122.8-125.7' with molds/casts and shells <1" diameter otherwise moderately fossiliferous,	- - -
- 125 -84.6			2	124.4, 124.55, 124.7, 124.9, 125.1, 125.4' - Bedding plane or mechanical break (6), smooth to rough, undulating, tight to open <1/2"		voids (<1/16") variable over surface from <10-20%, trace cavities <1/2" diameter	R15:3 minutes											
-	126.0		NR) 0	-		No Recovery 125.85-126.0' Limestone 126.0-131.0' - yellowish gray to moderate yellowish brown, (5Y 7/2 to	-											
-	R16-NQ		0	127.3, 128.5, 129.6, 130.8' - Mechanical break (4)		10YR 5/4), very fine to medium grained, strong HCl reaction, very weak to weak (R1 to R2), voids	-											
-	5 ft 100%	100	0	- -	Ħ	(<1/16") over 30-50% of surface, few cavities <1" diameter, moderately fossiliferous with molds/casts <3/4" in diameter	-											
130_ -89.6_	121.0		0	_		-	R16:3 minutes											
	131.0																	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-02 SHEET 8 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724300.1 N, 457447.2 E (NAD83)

ELEVATION: 40.4 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

CORING	IVIE I HOD AI	ND E	אורוטג	IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	casing		ORIENTATION : Vertical
WATER	LEVELS : 1.4	ft bg	s on 5	/16/07 START : 5/15/2007 END : 5/	17/200	7 LOGGER: R. Bitely, D. Whitaker	
				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOCK TYPE COLOR	
HE HE	Z Z Z	(%	FRACTURES PER FOOT	2200.111.11011	음	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
FACE	E STE	Q D (%)	FS	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOI	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
P.S.E.	SEN	RO	RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ЦОШ	0716	IL.	шп		0)		
_			3	_	Н	Limestone - 131.0-136.0' - yellowish gray to	_
			"	131.5, 131.7, 131.9, 132.1' - Bedding plane	Ш	medium light gray, (5Y 7/2 to N6),	
1 1				or mechanical break (4), <10 deg and horizontal, smooth to rough, undulating, tight	\mathbb{H}	very fine to medium grained, strong	1 1
-			1	to open <1/4"	世	- HCl reaction, weak to medium strong	-
-	D47.NO				Ш	(R2 to R3), rock strength increasing with depth, voids <1/16" over 0-30%	-
	R17-NQ 5 ft	66	1		Н	of surface, variable, <20% of core	_
	100%	00	l '	133.5' - Mechanical break	Ш	with laminated bedding, poorly	
1 7				134.0, 134.25, 134.3, 134.4, 134.45, 135.05' -	╢	fossiliferous with few fossil	1 1
l			5	Bedding plane or mechanical break (6), <10	ш	molds/casts <1/2" diameter, trace	-
135 <u> </u>				deg and horizontal, smooth to rough,		cavities <1/4" diameter	
-94.0			1	undulating, tight to open <1/4"	╁┼┤	_	R17:4 minutes
	136.0				囯		
					11	136.0-140.65' - pale yellowish brown] 1
-			2	136.3, 136.45, 137.1, 137.35, 138.1' -		to yellowish gray, (10YR 6/2, 5Y 7/2),	-
-				Bedding plane or mechanical break (5), <10 deg, smooth to rough, undulating, tight to	Ш	very fine to medium grained, strong	-
1 _			2	open <1/4"	H	HCl reaction, very weak (R1) to weak - (R2) rock from 136.0-138.6'.	_
			-		Ш	extremely weak to very weak (R0 to	
1 7	R18-NQ			-	₩	R1) rock from 138.6-139.5', weak to	1 1
-	5 ft	44	3	138.5' - Mechanical break	╁	- strong (R3 to R4) rock from	1 -
-	93%			138.6, 138.95, 139.1, 139.3' - Bedding plane		139.5-140.65', voids <1/16" over <20% of surface to 138.6', trace	-
			>10	or mechanical break (4), <10 deg, smooth to	⊬	- voids 138.6-140.65', moderately	_
140			10	rough, undulating, tight to open <1/4"	Ш	fossiliferous with fossil molds/casts	
-99.6			1	_	Н	<1/2" diameter, trace infill of cavities	R18:4 minutes
-				•		 136.0-138.6', many cavities up to 2" diameter some with infill 	1
-	141.0		NR		Ш	No Recovery 140.65-141.0'	-
-			4	141.1' - Fracture or mechanical break,	\vdash	Limestone	_
				vertical and 0-3 deg, rough, undulating, intersecting fractures, tight to open <1/4"		141.0-145.7' - pale yellowish brown	
				141.8' - Bedding plane, <10 deg, rough,	Н	to yellowish gray, (10YR 6/2, 5Y 7/2),	1
-			>10	undulating, tight to open <1/4"	ш	 very fine to medium grained, strong HCl reaction, medium strong to 	1
-	R19-NQ			142.3, 142.45, 142.55' - Fracture or		strong (R3 to R4), voids <1/16" over	-
_	5 ft	62	>10	mechanical break (3), <10 deg and 70 deg, rough, undulating, variable orientation, open	\vdash	<10-30% of surface, cavities 2"	_
	94%		L	rough, undulating, variable offentation, open <1/2"	Ш	diameter over 20-40% of surface,	
]				142.9-143.2' - Fracture zone, rough,	$\vdash\vdash$	few cavities with infill and subhedral crystal faces, highly fossiliferous with]
			2	undulating, gravel-sized fragments <1"	ᡛ᠊ᡰ	fossil molds/casts to 1" diameter,	1
145 <u> </u>				diameter	口	trace laminated bedding especially	R19:5 minutes
'37.5			0	143.25' - Bedding plane or mechanical break, <10 deg and 10 deg, rough, undulating, open	\vdash	144.45-144.7'	-
	146.0		NR	<1/2"	口	No Recovery 145.7-146.0']
]				143.7-143.9' - Fracture zone, gravel-sized	$\vdash \vdash \vdash$	Limestone	1
-			3	fragments <1" diameter	┢┪	146.0-151.0' - yellowish gray, (5Y	1
-				143.9, 144.5, 144.7' - Bedding plane or mechanical break (3), <10 deg and 10 deg,	口	7/2), very fine to fine grained, strong HCl reaction, weak to medium strong	-
			3	rough, undulating, open <1/2"	₽₩	- (R2 to R3), voids <1/16" over <10%	
				146.35, 146.5, 146.55, 147.2, 147.3, 147.7' -	Ш	of surface, few fossils <1/2"	
]	R20-NQ			Bedding plane or mechanical break (6), <10		diameter, laminated bedding over] 1
-	5 ft	92	0	deg, smooth to rough, undulating, tight to	╂┴╂	<15% of surface, trace infill	Drilling completed 5/17/07
-	100%		<u> </u>	open <1/2" 148.5' - Mechanical break	団	-	12:30 –
			0		\Box	_	
150			"	150.25' - Bedding plane or mechanical break,	Н]
-109.6				<10 deg, smooth to rough, undulating, tight to —	団		R20:4 minutes —
-			1	open <1/2"	╂┼┦	-	-
	151.0				H		
						Bottom of Boring at 151.0 ft bgs on	
						5/17/2007	

APPENDIX 2BB-878 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-03 SHEET 1 OF 10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724068.0 N, 457449.3 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 299205, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

					N 299203, Hidd Totally, auto Hammel, AW3 Tods, 3-7/6 til-colle bit Onientation . Vertical
WATER	LEVELS	: 0.1 ft bo	gs on 6/3/	/U/ S	START: 6/3/2007 END: 6/6/2007 LOGGER: D. Whitaker
STANDARD PENETRATION					SOIL DESCRIPTION COMMENTS
SAMPLE INTERVAL (ft) PENETRATIC TEST RESUL					SOIL NAME LISCS CROLID SYMBOL COLOR
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
F F F F			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
300				(N)	
40.5	0.0			0-1-1	Topsoil (OL) O.0-0.1' - brownish black, (5YR 2/1), wet, very soft, SS-1: first 6" = weight of hammer
l _		0.4	SS-1	(2)	\\60% organic nonplastic fines, 40% roots/vegetative _
	1.5			(-/	detritus
					Poorly Graded Sand (SP) 0.1-0.4' - moderate yellowish brown, (10YR 5/4), wet,
_					very loose, fine silica sand, 15% organics decreasing
-					with depth
-					
-					
-					
_					
5	5.0				
35.5				2-5-5	Poorly Graded Sand (SP) 5.0-6.0' - yellowish gray grades to pale yellowish
I -		1.0	SS-2	(10)	brown, (5Ý 8/1 to 10YŘ 6/2), wet, very fine to fine
l _	6.5			` '	grained, color grades at 5.6', silica sand with trace nonplastic fines increasing to 30% high plastic fines in
					\brown material
_					1
_					1
-					
-					
-					
-					
10 30.5	10.0				Silty Sand (SM) SS-3: first 6" = weight of hammer
- 30.5				0-6-7	10.0-11.8' - grades from grayish orange (10.0-10.5') to
_		1.3	SS-3	(13)	pale yellowish brown (10.5-10.8') to very pale orange
_	11.5				(10.8-11.3'), (10YR 7/4 to 10YR 6/2 to 10YR 8/2), wet, medium dense, very fine to fine grained, iron staining
l _					(orangish red) from 10.0-10.8', silica sand, 30%
					\nonplastic fines
]
-					1
-					1
-					1
,	45.0				
15 <u> </u>	15.0			-	Silty Sand (SM)
		1	00.4	4-6-6	15.0-16.0' - pale yellowish brown, (10YR 6/2), wet, - 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
I -		1.3	SS-4	(12)	medium dense, very fine to fine grained, silica sand with 20% nonplastic fines
-	16.5				Sandy Fat Clay (CH)
_					\ \16.0-16.25' - pale yellowish brown, (10YR 6/2), wet, \ \ _
I -				ĺ	stiff, medium plasticity, no to slow dilatancy, 30-35% very fine silica sand
l _					yery into since send
I -				ĺ]
					1
20					1



PROJECT NUMBER:

33884.FL BORING NUMBER:

GSC-03 SHEET 2 OF 10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724068.0 N, 457449.3 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

DRILLING METHOD AND EQUIPMENT: CME 55 S/N 299205, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit

DRILLIN	G METH	DD AND	EQUIPM	ENT : CME 55 S/N	N 299205, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 0.1 ft bo	START : 6/3/2007 END : 6/6/2007 LOGGER : D. Whitaker		
		STANDARD		STANDARD	SOIL DESCRIPTION 5 COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
HSE		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DEPTH OF CASING, DRILLING FLUID LOSS, TESTS, AND
PTF JRF#			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
SU				(N)	
20.5	20.0			0-2-3	Fat Clay (CH) ☐ 20.0-20.45' - wet, stiff, no dilatancy, pale blue from
_		1.3	SS-5	(5)	│ 20.0-20.2', light olive gray from 20.2-20.45', (5G 6/2, │
_	21.5				5Y 6/1), high plasticity fines, mild HCl reaction possibly from interbedded silt, one limestone fragment
_					or concretion, no HCI reaction
_					Silt (ML) 20.45-20.9' - very pale orange, (10YR 8/2), wet, soft, -
_					nonplastic, rapid dilatancy, mild HCl reaction, 5-10% _
_					very fine to fine sand-sized, carbonate materials Fat Clay (CH)
_					20.9-21.3' - Same as 20.2-20.45'
25	25.0				
15.5				0.5.10	Silt (ML) 25.0-26.5' - grayish yellow, (5Y 8/4), wet, very stiff,
		1.5	SS-6	2-5-13 (18)	nonplastic, rapid dilatancy, moderate HCl reaction,
_	26.5				coarse sand to fine gravel-sized limestone fragments from 26.2-26.5', carbonate materials
_					
_					
_					<u> </u>
_					<u> </u>
_					
_					
30	30.0				
10.5				5-12-13	Silty Sand (SM) 30.0-31.0' - grayish orange to dark yellowish orange,
_		1.0	SS-7	(25)	(10YR 7/4 to 10YR 6/6), moist to wét, medium dense,
_	31.5			` ,	mild HCl reaction, fine to coarse grained sand-sized, 20-25% nonplastic fines, fine gravel-sized limestone
_					fragments, carbonate materials
_					<u> </u>
_					
_					
35	35.0				
5.5		1.0	SS-8	19-50/6	Silty Sand And Limestone Fragments (SM) 35.0-36.0' - light olive gray, (5Y 5/2), wet, very dense,
	36.0	1.0	55-5	(69/12")	moderate HCl reaction, very fine to coarse sand-sized
					grains, 25% nonplastic fines, 50% of sample is fine to coarse gravel-sized limestone fragments, carbonate
					materials
]					
]
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1 7] [
]
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PROJECT NUMBER:	BORING NUMBER:

338884.FL GSC-03 SHEET 3 OF 10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724068.0 N, 457449.3 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

DRILLING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

WATER	LEVELS	: 0.1 ft bo	gs on 6/3/	07 8	START : 6/3/2007 END : 6/6/2007 LOGGER : D. Whitaker		
STANDARD					SOIL DESCRIPTION 5 COMMENTS		
SAMPLE INTERVAL (ft) PENETRATION TEST RESULTS				PENETRATION TEST RESULTS	COIL NAME LICCS CROUD SYMPOL COLOR		
H BE ACE ATIO	E RECOVI		RECOVERY (ft)				SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION		
0.5	40.0	0.7	SS-9	16-50/4	Silty Sand And Limestone Fragments (SM)		
	40.8	0.7		(66/10")	40.0-40.7' - yellowish gray, (5Y 7/2), wet, very dense, ☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐☐		
_					\ of sample is limestone fragments from 40.0-40.2', \ mild HCl reaction from 40.2-40.7' \ \ \ \ -		
_							
-					-		
-					-		
-					-		
-					 		
45	45.0 45.2				-		
-4.5	45.2	0.2	SS-10	50/2.5 (50/2.5")	Limestone Fragments \(\preceq 45.0-45.2' - \text{ yellowish gray, (5Y 7/2), mild HCl} \) \(\frac{1}{7} \)		
				(30/2.3)	reaction, coarse sand to fine gravel-sized material		
_					_		
_					-		
-					-		
-					-		
-					 		
-					† †		
50	50.0				1		
-9.5				0.00	Silty Sand (SM) 50.0-51.4' - yellowish gray, (5Y 7/2), wet, loose, fine to		
_		1.4	SS-11	0-3-2 (5)	coarse grained, mild HCl reaction, 30% nonplastic 【││ │		
_	51.5				fines, all carbonate		
-					-		
-					-		
-					- I		
-					-		
-					-		
55_	55.0				_]		
-14.5	55.3	0.3	SS-12	50/4 (50/4") /	Limestone Fragments 55.0-55.3' - yellowish gray, (5Y 7/2), mild HCI reaction, coarse sand to fine to coarse gravel-sized		
_				(00/1)	reaction, coarse sand to fine to coarse gravel-sized		
-					\fragments \fragmanus		
-					-		
-					-		
-							
-					1 1		
-					1		
60							



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-03	SHEET	4	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724068.0 N, 457449.3 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

DRILLING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, auto hammer, AWJ rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

STANDARD SOIL DESCRIPTION SAMPLE INTERVAL (ft) RECOVERY (ft) RECOVERY (ft) #TYPE 6"-6"-6" (N) STANDARD PENETRATION TEST RESULTS SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY IN	COMMENTS
SAMPLE INTERVAL (ft) PENETRATION TEST RESULTS	
THE STATE OF THE S	CACINO DOLLINO DATE
SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING	F CASING, DRILLING RATE, FLUID LOSS, TESTS, AND
SAMPLE INTERVAL (ft) PENETRATION TEST RESULTS SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY WE SHAPE INTERVAL (ft) FINANCIAL DENSITY OF DEPTH OF D	ISTRUMENTATION
-19.5 60.0 0.9 CS 12 10-50/4 Limestone And Silt Water level 0.	.1 ft below ground surface at
60.8 (60/10) disasticity, rapid dilatancy, mild HCI reaction, coarse	Set casing-HW casing to 60.0', - sing down 30.0', water gushing
sand to fine to coarse gravel-sized limestone out top of casing fragments from 60.0-60.3' and 60.75-61.0', carbonate continue setting	ing above ground surface- ng casing, 10:08 hole caving, -
materials 15:50 only get	t 35.0' HW casing in
	-
	-
	-
	-
65 65.0	=
	npling again at 65.0' at 16:30
\reaction, coarse sand to fine to coarse gravel-sized \	
\fragments \fragments	_
	-
	-
	-
	=
70.0 70.1 0.0 SS-15 50/1 No Recovery 70.0-70.1'	-
70 (50/1")	-
Begin Rock Coring at 70.0 ft bgs See the next sheet for the rock core log	
- Cook the next sheet for the rook core log	=
	-
	-
	=
	-
	-
]
75_	_
-34.5	-
	=
	-
	-
	-
	-
80	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-03 SHEET 5 OF 10

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724068.0 N, 457449.3 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, NW/HW casing

WATER	LEVELS: 0.1	ft bgs	on 6/	/3/07 START: 6/3/2007 END: 6/	6/200	7 LOGGER : D. Whitaker									
≥∩≘	(9)			DISCONTINUITIES	Ğ	LITHOLOGY	COMMENTS								
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		rES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,								
H BE	E RU STH, OVEF,	(%) Q	FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD								
DEP SURF ELEV	COR ELEN		FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS		AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.								
-29.5		α_		70.05, 71.3, 71.8, 72.7' - Bedding plane or		Limestone	08:30 Install 0.0-70.0' NW								
-			1	mechanical break (4), <10 deg, smooth to rough, undulating, open <1/2" with very	╁	 70.0-73.6' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 	casing, 10:46 water level = - 0.2', Depth = 70.0', 12:00								
-	-			fine-sized gravel infill except in fracture at to 10YR	to 10YR 5/4), fine grained, strong	Begin Rock Coring									
-			2	71.3'	┝	 HCl reaction, weak to medium strong (R2 to R3), voids (<1/16") over 40% 	1								
	R1-NQ 5 ft	67	1		F	of surface, trace cavities >1/16", fossil molds	Driller's Remark: 72.0-72.5' and 73.0-74.5' soft								
	72%	07	'	72.4-72.5' - Mechanical break, horizontal and 80 deg, tight	片	_	and 73.0-74.5 Soit								
_						0		H	_						
_												_	H	No Recovery 73.6-75.0'	
_												NR	-	片	-
75 <u> </u>	75.0				\vdash	Limestone	-								
			4	gravel -	\vdash	 75.0-77.2' - pale yellowish brown to 	-								
-				75.2, 76.2, 76.3, 75.35' - Bedding plane or mechanical break (4), <10 deg, rough,	仠	moderate yellowish brown, (10YR 6/2 to 10YR 5/4), strong HCl reaction	Driller's Remark: 76.0-77.0'								
-			>10	undulating, 76.2' smooth and fine angular gravel in fracture (15 deg at 75.35') open	厈	 75.0-76.1' - very fine grained, medium strong (R3), voids (<1/16") 	void -								
-	R2-NQ		>10	<1/2"	ፗ	over 5% of surface	-								
-	5 ft 44%	14		75.3' - Fracture or mechanical break, vertical, smooth, undulating, tight	世	 76.1-77.2' - fine grained, very weak to extremely weak (R1 to R0), voids 	-								
-	, ,			75.5' - Mechanical break	世	(<1/16") over 30% of surface,	-								
-			NR	76.45-77.2' - Fracture zone, smooth to rough, undulating, fine to coarse <2" diameter	世	 cavities throughout from fossil molds up to 1/2", 10% voids have 	1								
				gravel, subangular	Н	recrystallization infill No Recovery 77.2-80.0'	R2: 6 minutes								
80	80.0			_	\vdash										
-39.5			>10	80.1, 80.8, 80.95' - Bedding plane (3), <10	F		Driller's Remark: 80.0-82.0' void, 82.0-83.0' soft, 83.0-								
_				deg, smooth to rough, undulating to stepped, open <1/2", eroded surfaces	F	brown, (10YR 5/4), fine to medium	84.0' rock, 84.0-85.0' void,								
-				80.25-80.4, 80.55-80.7' - Fracture zone (2), very fine to coarse angular to subangular	F	grained, strong HCl reaction, strong (R4), voids (>1/16") over 40% of	at top of 85.0' felt rock (84.9-85.0')								
-	R3-NQ			gravel-sized limestone	片	surface, up to 35% of core is cavity infill, trace cavities up to 1/4", fossil	-								
-	5 ft	0		81.0-81.35' - Fracture zone, very fine to coarse angular to subangular gravel-sized	Ħ	– molds	-								
-	25%		NR	limestone	H	No Recovery 81.25-85.0'									
-				-		-	-								
-					oxdot	-	R3: 4 minutes								
85 85	85.0				尸	-	1								
-44.5			. 40	85.0-85.05' - Fracture zone, very fine angular	仠	Limestone	Driller's Remark: various								
			>10	silt, possible infill	厂	 85.0-85.6' - very pale orange, (10YR 8/2), fine grained, strong HCl 	soft spots throughout, - could be silt or soft rock								
			>10	85.6-85.8' - Fracture zone, angular to subangular rock crush, fine to coarse	厂	reaction, extremely weak (R0), voids (<1/16") over 15-25% of surface, few]								
_	- - R4-NQ - 5 ft		- 10	gravel-sized, trace silt infill	口	cavities up to 3/16" diameter, trace]								
_		22	>10	86.3-86.5' - Fracture zone, fine to coarse-sized subangular to subrounded -	上	fossils up to 1/16"x1/8" - 85.6-88.2' - Same as 80.0-81.25']								
-	64%			fragments 86.8, 87.0, 87.2' - Bedding plane or	\vdash	except very weak (R1) probably due to less recrystallization in voids and	_								
-			<u>>10</u>	mechanical break (3), <10 deg, smooth to	F	 more cavities up to 3/4" 	_								
_			NR	rough, undulating, tight except open <1/2" at 87.0'	厈	No Recovery 88.2-90.0'	R4: 6 minutes								
-					F	_	1.4. U IIIIIIU.GS -								
90	90.0				\vdash		-								



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-03 SHEET 6 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724068.0 N, 457449.3 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, NW/HW casing

CORING	METHOD A	ND E	QUIPN	IENT : CME 55 S/N 299205, mud rotary, NQ tools, NW/F	HW ca	sing	ORIENTATION : Vertical
WATER	LEVELS: 0.1	ft bg	s on 6/	/3/07 START: 6/3/2007 END: 6/	6/200	7 LOGGER : D. Whitaker	
				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
LOW AND	NND YND		S	DESCRIPTION	1 007	ROCK TYPE, COLOR,	OUTE AND DEDTILOT CLOSES
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-49.5 _			8	87.4-87.5, 87.85-88.2' - Fracture zone (2), fine to coarse-sized subangular to subrounded fragments	H	Limestone - 90.0-90.35' - grayish orange, (10YR 7/4), fine grained, strong HCl	Driller's Remark: lost circulation at 90.0-110.0', -94.5-94.8' void
_			3	90.1, 90.2, 90.3, 90.4, 90.55, 90.7, 90.8, 91.0' - Bedding plane or mechanical break (8), <10 deg, smooth, undulating, tight to open <1/2",	片	reaction, extremely weak (R0), voids - (<1/16") over 15% of surface, 25% of rock has infilled molds or black	-
_	R5-NQ 5 ft 79%	46	1	90.3' and 91.0' have fractured gravel-sized fragments in the fractures 91.35-91.45' - Fracture zone		organic material 90.35-91.3' - Same as 85.0-85.6' except 20-30% cavities up to 1-1/4"	-
_			2	91.5, 92.5, 93.8' - Bedding plane or mechanical break (3), <10 deg, smooth, undulating, tight to open <1/2", 91.5' tight		91.3-93.95' - Same as 86.6-88.2' - except cavities up to 1"	-
95	95.0		NR			No Recovery 93.95-95.0'	R5: 5 minutes
-54.5 _			6	95.0-95.1' - Bedding plane, 10 deg, rough, undulating, tight, eroded subrounded gravel fragments		Limestone 95.0-96.3' - grayish orange, (10YR 7/4), very fine to fine grained, strong	Driller's Remark: 95.0-95.5' soft -
			2	95.25, 95.4' - Bedding plane or mechanical break (2), <10 deg, rough, planar to	厈	HCl reaction, weak (R2), voids (<1/16") over 5% of surface, trace	
-	R6-NQ			undulating, tight, open <1/4" with fine gravel at 95.4' 95.6' - Bedding plane, <10 deg, smooth,	F	cavities up to 1/4", light olive gray (5Y 5/2) clay/silty clay infill from	-
_	5 ft 26%	0	NR	planar to undulating, 1" of infill, clay and fine to very fine gravel-sized fragments		95.45-95.65' No Recovery 96.3-100.0'	-
-				95.75, 95.9' - Bedding plane or mechanical break (2), <10 deg, rough, planar to undulating, tight	Ħ	-	R6: 5 minutes
100	100.0			96.1-96.2 ⁱ - Fracture zone	Ħ	=	-
-59.5			>10	100.0-100.1' - Fracture zone, trace black	⇈	Limestone	_
				staining, subangular to subrounded, very fine to coarse-sized gravel		 100.0-100.5' - very pale orange to grayish orange, (10YR 8/2 to 10YR 	
			1 ro la 1	100.25' - Fracture, vertical and 70 deg, rough, undulating, black staining, trace (thin	片	7/4), very fine grained, strong HCI reaction, very weak (R1), voids	
_				layer) silt/clay infill <1/16", tight <1/16"	╨	(<1/16") over 40% of surface, black	
_	R7-NQ 5 ft	0			100.4-100.5' - Fracture zone, trace black staining, very fine to coarse-sized subangular	耳	organic staining, cavities up to 3/16", fossil molds, trace fossils <1/8"
_	10%	9	NR	to subrounded gravel	厂	No Recovery 100.5-105.0'	
_					上	_	
_						_	
_					F	_	R7: 3 minutes
	105.0			_	片		_
-64.5 _			>10	105.1-105.4' - Fracture zone, angular to subangular, very fine to coarse gravel-sized	片	Limestone - 105.0-106.5' - yellowish gray to	-
-				fragments		grayish yellow, (5Y 7/2 to 5Y 8/4),	-
-			>10	105.4-106.5' - Bedding plane, smooth, undulating, open 1/4"-1", tight	世	very fine to fine grained, very strong - HCl reaction, extremely weak (R0),	-
_	DO NO			and and any open in a line and a line and a li	oxdappi	voids (<1/16") over 30-40% of surface, many recrystallized fossil	-
-	R8-NQ 5 ft	0			厂	 casts up to 3/16", few black possibly 	-
-	30%				世	carbon or organic material up to 1/8", fossiliferous	-
-			NR		\pm	- No Recovery 106.5-110.0'	-
-					+	_	R8: 2 minutes
-					+	_	- To. 2 minutes
110	110.0		$\vdash\vdash$		+		_
					_		L



PROJECT NUMBER:

33884.FL BORING NUMBER:

GSC-03 SHEET 7 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724068.0 N, 457449.3 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, NW/HW casing

WATER	LEVELS: 0.1	ft bgs	on 6/	/3/07 START : 6/3/2007 END : 6/	6/2007	7 LOGGER : D. Whitaker	
≥∩ ∵	_ (3)			DISCONTINUITIES	ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	TH.	(%) Q	F.0	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	S L	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
	ORE	ø	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	×ΜΒ	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-69.5	074	ď	шФ		S	Limestone	16:10 core barrel retriever
-03.5			2	110.05' - Bedding plane, <10 deg, smooth, planar, open <1/16"	\Box	- 110.0-112.25' - grayish yellow to	is boud and is pulling -
-				110.2' - Bedding plane, <10 deg, smooth to	Н	yellowish gray, (5Y 8/4 to 5Y7/2),	casing with it, 16:14 got it out but have to pull out all
-			>10	rough, undulating, trace gravel fragments in fracture, open 1/2"-3/4"	₽	very fine to fine grained, strong HCl - reaction, extremely weak (R0),	core barrel - tip is blocked -
	D0.110		3	111.4-111.9' - Fracture zone, medium sand	ш	111.5-111.8' silt and sand-sized material, voids (<1/16") over 50% of	<u> </u>
-	R9-NQ 5 ft	23		to fine gravel-sized fragments, trace wet silt infill	丗	- surface, 5+ cavities up to 9/16", few	_
	45%			112.1' - Bedding plane, <10 deg, rough,	╀┤	fossil molds	-
			NR	undulating, open 3/4" with rock fragments, eroded planes/surfaces	H	_	_
				112.2' - Bedding plane, <10 deg, rough,		-	
				undulating, open <1/4", eroded planes/surfaces	Ш	_	R9: 3 minutes
	115.0				\mathbb{H}	No December 440 05 400 0	When core is sured to
-74. 5					鬥	No Recovery 112.25-120.0'	When core barrel was brought out after a
					ш	_	struggle, there was not any recovery. May have
-					Ш	_	dropped into borehole on –
-	D40 NO				H	_	way up.
-	R10-NQ 5 ft	0	NR		\Box	_	-
-	0%					_	-
-					Ш	_	-
-					₽₩	_	R10: 3 minutes
-					H	_	K 10. 3 minutes
120 -79.5	120.0				田	Limestone	_
-			>10	120.1, 120.2, 120.25, 120.6, 120.4, 120.9, 121.0' - Bedding plane or mechanical break	団	- 120.0-123.0' - very pale orange to	-
-				(6), <10 deg, smooth, planar to undulating,	╆	grayish orange, (10YR 8/2 to 10YR 7/4), fine to medium grained, very	_
-			1	tight to 3/4" at 120.4', sand-sized material to fine gravel-sized in most fractures due to soft	+	 strong HCl reaction, extremely weak 	-
-	R11-NQ			core, breaks easily	\Box	(R0), voids (<1/16") over 25% of surface, trace cavities up to 3/16",	-
-	5 ft	0	>10	122.15-122.5, 122.8-123.0' - Bedding plane (2), <10 deg, smooth, planar to undulating,	H	 5% black organic material up to 1/2", 	-
-	60%		$\vdash\vdash$	tight to 1/4", partings closely spaced	丗	many fossil molds, moderately to highly fossiliferous	-
-				122.5-122.8' - Fracture zone, fine angular to subangular gravel-sized fragments	₩	- 121.1-121.9' - Same as 120.0-123.0'	-
-			NR		円	except loose material, wet, 70% silt, 30% fine to coarse sand	R11: 4 minutes
105	105.0				囯	No Recovery 123.0-125.0'	-
125_ -84.5	1∠5.∪				団	Limestone	Driller's Remark: 125.5-
-			>10		\boxplus	 125.0-125.1' - Same as 120.0-123.0' 125.1-125.8' - light brownish gray, 	126.0' void, 127.5-128.0' - soft, lost circulation at
-				125.3, 125.7, 125.8, 126.1, 126.2' - Bedding	\mathbb{H}	(5YR 6/1), fine to medium grained,	127.0', 08:04 lots of chatter
-			>10	plane (5), horizontal, smooth to rough, planar, tight	口	 strong HCl reaction, very weak (R1), voids (<1/16") over 50% of surface, 	at 128.0' -
	R12-NQ			125.85-126.0' - Fracture zone, fine to	Ħ	cavities up to 3/8", highly	-
	5 ft 66%	16	>10	coarse-sized gravel and coarse sand-sized fragments, angular to subrounded	Ш	 fossiliferous, casts, molds, fossils 125.8-128.3' - Same as 120.0-123.0' 	-
	00 /0		2	126.1, 126.2' - Bedding plane (2), horizontal,	\mathbb{H}	except weak rock (R2)	-
				smooth to rough, planar, tight 126.4-126.5, 126.75-126.95' - Fracture zone,	囯	No Recovery 128.3-130.0'	
			NR	fine to coarse-sized gravel and coarse	囯	_	R12: 5 minutes
130	130.0			sand-sized fragments, angular to subrounded	団	_	-
100					\Box		
1	I						



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-03	SHEET	8	OF	10	

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724068.0 N, 457449.3 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, NW/HW casing

			<u> </u>	12141 . Civic 33 3/14 233203, mad rotary, 14Q (0013, 1444/1)		<u>-</u>	ORIENTATION: Vertical
WATER	LEVELS: 0.1	ft bg	s on 6	/3/07 START: 6/3/2007 END: 6/6	6/200	LOGGER : D. Whitaker	
				DISCONTINUITIES	(5)	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		(0	DESCRIPTION	SYMBOLIC LOG		
D'A'N	Z,A,Z	_	FRACTURES PER FOOT	DESCRIF HON	<u></u>	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
HAE H	SE	(%) Q	128	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	9	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
[문문장	NG NG NG NG NG NG NG NG NG NG NG NG NG N	OΩ	R F	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD
BS급	잉필뜂	R O	H H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SY	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-89.5				126.95-127.75' - Bedding plane, horizontal,		Limestone	
_			4	smooth to rough, planar, tight, partings		- 130.0-133.05' - yellowish gray, (5Y	1 -
				(127.05-127.25'), 127.35-127.75' rock is	ш	8/1), very fine to fine grained, strong	
-				eroded and rounded openings are up to	Ъ	HCl reaction, very weak (R1), voids	1 1
-			>10	<1-1/2" from rock's outer diameter to	╂╧	 (<1/16") over 40% of surface, many 	1 -
l -				adjacent rock		have infill, cavities up to 3/8",	<u> </u>
	R13-NQ			128.2-128.3' - Bedding plane, horizontal and	\vdash	casts/molds, moderately fossiliferous	
I -	5 ft	20	>10	86 deg, smooth, undulating	₩	<u> </u>	1 1
-	64%		1	130.0-130.1' - Bedding plane, horizontal, smooth, undulating, limestone fragments,	╂	- 400.07.400.01.0	-
_			<u> </u>	very fine to coarse gravel-sized from		133.05-133.2' - Same as	
				130.0-130.1'	\vdash	130.0-133.05' except fine to medium grained, more fossiliferous	
-			NR	130.8, 131.0, 131.35' - Bedding plane or	\vdash	No Recovery 133.2-135.0'	R13: 5 minutes
-				mechanical break (3), <10 deg, smooth,		-	-
135_	135.0	L	L_	undulating, tight to open 1/4"	Щ		
-94.5				131.46-131.75' - Bedding plane, <10 deg,	\vdash	Limestone	1
-			>10	smooth, undulating, tight -		- 135.0-135.3' - yellowish gray, (5Y	-
I -				131.75-131.9, 132.1-132.15,132.6-133.05' - Fracture zone (3), angular to subangular	П	8/1), fine grained, strong HCI	-
			.40	gravel-sized limestone fragments	\vdash	reaction, weak (R2), voids over 5%	
-			>10	132.35' - Fracture, 35 deg, smooth,	╁	 of surface, poorly fossiliferous 135.3-135.5' - Same as 135.0-135.3' 	1 1
-	R14-NQ			undulating, limestone fragments in fracture,	仜	except very fine grained	1 -
l -	5 ft	0	>10	open 1/2"-1"		- 135.5-135.8' - Same as 120.0-123.0'	<u> </u>
	54%			135.0-135.2, 135.75-136.05' - Fracture zone	Н	135.8-135.95' - Same as	
_				(2), very fine to coarse angular to	T	130.0-133.05'	1 1
-				subrounded gravel sized limestone fragments		135.95-136.5' - Same as	-
I .			NR	and coarse sand sized material	ш	120.0-127.0'	
				135.35, 135.45, 135.55, 135.7' - Bedding plane or mechanical break (4), <10 deg,	Н	136.5-137.7' - yellowish gray, (5Y	R14: 4 minutes
-				smooth to rough, undulating, tight to 1/4"		 7/2), very fine to fine grained, extremely weak (R0), 50% limestone, 	1 1
140 <u> </u>	140.0			135.9' - Fracture, 75 deg, smooth to rough,	╨	50% silt with sand-sized fragments,	-
-99.5			2	undulating, eroding fracture planes, gravel in	┢	poorly fossiliferous, voids over 0-5%	
			-	fracture		of surface	1
I -				136.0' - Bedding plane or mechanical break,	仜	No Recovery 137.7-140.0'	1
-			8	<10 deg, smooth to rough, undulating, open	-	_ Limestone	-
				1/2" with fine gravel sand in fracture 136.05' - Fracture, 65 deg, smooth to rough,	\vdash	140.0-143.65' - grayish orange,	
	R15-NQ			undulating, eroding fracture planes, gravel in	Ш	(10YR 7/4), fine to medium grained,	1
-	5 ft	38	>10	fracture	1—	strong HCl reaction, weak (R2), voids (<1/16") over 5-10% of surface,	1
-	90%		<u> </u>	136.3, 136.6, 136.75' - Bedding plane or	₽	fossiliferous with several	-
			>10	mechanical break (3), <10 deg, smooth to	Ш	molds/casts, cavities up to 1/2"	
I -			- 10	rough, undulating, tight to open 1/4" except at	\Box	143.65-144.5" - very light gray, (N8),	1
I -			>10	136.6', open 1/2" with fine gravel sand in	╨	very fine grained, strong HCl	R15: 6 minutes
I -			_	fracture	\vdash	reaction, strong (R4), moderately	-
145	145.0	L	NR	136.75-138.3' - rock has fissures/fractures — vertically —	广	fossiliferous, trace small voids, few	
-104.5				137.25' - Fracture, 85 deg, smooth to rough,	Ш	cavities, fossil molds up to 3/4"	-
I -			>10	undulating, eroding fracture planes, gravel in	\Box	No Recovery 144.5-145.0'	-
-				fracture		Limestone	
1			.40	140.45, 140.5, 141.4, 141.6-141.85, 142.06,	ш	145.0-145.2' - Same as 143.0-144.5' - 145.2-147.0' - pale yellowish brown,	
I -			>10	143.5, 143.7' - Bedding plane or mechanical	\vdash	(10YR 6/2), fine to medium grained,	1
-	D16 NO		<u> </u>	break (8), <10 deg, smooth, planar to	╫	weak to medium strong (R2 to R3),	-
I -	R16-NQ 5 ft	45	3	undulating, tight to open 1/4"	Ш	voids (<1/16") over 25% of surface,]
	86%			142.6-142.8' - Bedding plane, <10 deg, smooth, undulating, tight	\Box	60-70% recrystallized surface/voids,	
Ι -				143.5-143.7, 143.8-144.2' - Fracture zone	1—	cavities up to 1"x3/8", trace black	1
-			2	(2), 75 deg, rough, undulating, limestone	\Box	 organic material, poorly fossiliferous 	-
I _				fragments between the two fractures	广]
			1	145.0-145.2, 146.25-146.65' - Fracture zone	\vdash		R16: 9 minutes
	4.500		NR	(2), angular to subrounded fine to	\vdash	-	1
150	150.0			coarse-sized gravel limestone fragments			
			<u> </u>				



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	GSC-03	SHEET	9	OF	10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724068.0 N, 457449.3 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, NW/HW casing

				IENT : CIVIE 33 3/N 299203, Midd Totally, NQ tools, NVV/H			ORIENTATION: Vertical
WATER	LEVELS: 0.1	ft bg	s on 6		3/2007		1
>	ے ا			DISCONTINUITIES	_{(J}	LITHOLOGY	COMMENTS
J S N S	, ND /		S	DESCRIPTION] 2	ROCK TYPE, COLOR,	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%	FRACTURES PER FOOT		SYMBOLIC LOG	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
Y A T	ZE F	(%) O	CT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	B _S	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	H H H H	S.	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	<u>≷</u>	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-109.5				145.35' - Fracture, 30-35 deg, rough,	 	Limestone	Driller's Remark: 153.0-
			5	undulating, open <1/4" with limestone	口	- 147.0-149.0' - very fine grained, very	153.5' void –
1 _				fragments in fracture	ш	strong (R5), black organic lineations,	
				145.75, 145.85, 146.0, 148.5, 148.95, 149.0' -	Н	voids over <5% of surface, 90%	
-			2	Bedding plane (6), <10 deg, rough, undulating to stepped, tight to 1/2", most with	Ш	 recrystallized surfaces, many cavities up to 3/8" 	1
-	R17-NQ			sand to fine gravel-sized limestone fragments	╂╵┨	148.0-149.3' - Same as 125.8-128.3'	-
-	5 ft	60	2	in fractures -	Ш	No Recovery 149.3-150.0'	-
-	96%			146.95, 147.05' - Fractures (2), 25 deg,	H	Limestone	-
			3	rough, undulating, open <1/2" with limestone fragments in fractures	口	150.0-151.8' - pale yellowish brown to moderate yellowish brown, (10YR	
				147.2, 147.5, 148.15' - Mechanical break (3)	Ш	6/2 to 10YR 5/4), fine to medium]
-			_	150.3, 150.4, 150.45, 150.55, 150.85, 151.2,	団	grained, strong HCl reaction, weak	R17: 6 minutes
			1	151.75, 152.35, 152.55, 153.2, 154.4' - Bedding plane or mechanical break (11), <10	╁┼┼	 (R2), highly fossiliferous with molds and casts (3/8"), voids (<1/16") over 	-
155 <u></u> -114.5	155.0		NR	deg, smooth, planar to undulating, tight to	Ш	40% of surface, strong rock (R4)	-
-			7	<1/4"	Ш	_ from 158.5-154.8'	-
-				150.75-150.9, 151.42-151.6, 154.2-154.5' -	Ш	No Recovery 154.8-155.0'	
			>10	Fracture zone (3) 150.85-151.0' - Fracture zone, coarse	Н	Limestone 155.0-159.7' - Same as 150.0-154.8'	
1 -			- 10	gravel-sized	Ш	except 155.0-156.4' strong rock (R4),]
-	R18-NQ			151.1' - Fracture, 60 deg, rough, planar	Ш	157.0-158.2' and 158.2-159.9'	1
-	5 ft	22	2	152.4' - Mechanical break 152.55, 153.0' - Bedding plane or mechanical		extremely weak rock (R0)	-
-	94%			break (2), <10 deg, smooth, planar to	口	_	-
-			>10	undulating, tight to <1/4"	╀┤	_	
				152.9-153.65 - Bedding plane, <10 deg,	Ш	_]
1			>10	smooth to rough, undulating, tight 153.1' - Fracture, 75 deg, smooth, undulating,	Н		R18: 8 minutes
160	160.0		NR	2 bedding plane fractures perpendicular at	口	No Recovery 159.7-160.0'	1
-119.5	. 50.0		111	153.05', rough, planar open <1/4" —	╁┼┼	Limestone	-
-			1	155.25, 153.4, 155.6, 155.75, 155.9, 156.2, 156.28, 156.3, 156.4, 156.42, 156.6, 156.7,	田	160.0-164.8' - Same as 150.0-154.8'	-
-				156.8, 156.85, 156.9, 156.95, 156.97, 157.05,	╂┼┼	and 155.0-159.2' except medium	-
-			8	157.9, 159.2, 159.5' - Bedding plane or	口	strong to strong (R3 to R4), - 160.0-160.3' and other zones of	
				mechanical break (21), <15 deg, smooth to rough, undulating, tight to <1/4"	Н	recrystallized surface voids and	
	R19-NQ		_	160.3, 161.25, 161.5, 161.65, 161.7, 161.8,	回	limestone]
_	5 ft 96%	58	1	161.95, 162.05, 162.2' - Bedding plane or	$\vdash\vdash$	-	1
-	3070			mechanical break (9), <10 deg, smooth to		_	-
-			2	rough, undulating, open up to <1/2", most open <1/4" or tight	╀┼┤	-	-
-				162.25, 162.5' - Mechanical break (2)	Ш	-	P10: 11 minutes
_			2	163.1, 163.6, 164.3, 164.5' - Bedding plane	H	_	R19: 11 minutes
165_	165.0		NR	or mechanical break (4), <10 deg, smooth to rough, undulating, open up to <1/2", most —	口	No Recovery 164.8-165.0']
-124.5			$ igcup_{} $	open <1/4" or tight	Ш	Limestone	
_			3	165.0-165.1, 166.07-166.15, 166.5-166.6,	団	165.0-169.7' - Same as 150.0-165.0'	1
-				166.9-166.95' - Fracture zone (4) 165.75, 165.85, 166.07, 166.15, 166.35,	╂┯╂	 except very fine grained and strong rock (R4) from 166.0-166.5' 	-
-			6	166.5, 166.6, 166.9' - Bedding plane or	世	100k (K4) 110111 100.0-100.5	-
-				mechanical break (8), <10 deg, smooth to	₽₽	-	-
1 -	R20-NQ 5 ft	21	5	rough, planar to undulating, few are partings,	Ш	_]
	94%	۱ ک		tight to open 1/2", sand to fine gravel-sized limestone fragments in fracture	\square		
1 -				innociono nagritorilo in naciare	ᡛ᠊ᡰ	-] 1
-			5	-	囯	-	1
-				-		-	R20: 10 minutes
-			6	-	口	No Recovery 169.7-170.0'	-
170	170.0		NR		H		
					\perp		



PROJECT NUMBER:

338884.FL BORING NUMBER:

GSC-03 SHEET 10 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724068.0 N, 457449.3 E (NAD83)

ELEVATION: 40.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Daytona Beach, FL; Driller: A. Deghetani

CORING METHOD AND EQUIPMENT : CME 55 S/N 299205, mud rotary, NQ tools, NW/HW casing

-				IENT . CIVIE 33 3/N 299203, ITIUU TOLAIY, NQ LOOIS, NW/F			ORIENTATION: Vertical
WATER	LEVELS: 0.1	ft bg	s on 6		6/200		I
≥□₽	(%)			DISCONTINUITIES	၂ ပ္	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	OUTE AND DEDTIL OF GARNING
ᆱᇬ	JY, H	(%) Q	I R P	DEDTIL TYPE OBJECTATION BOLIOUNESS	1	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
F A A	SOV	0	P.F.	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	/BC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	REGE	a Q	FF.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-129.5				166.95, 167.2, 167.4, 167.6, 167.7, 167.85,	1	Limestone	
-			>10		广	- 170.0-172.0' - light olive gray, (5Y	_
l _				169.05, 169.15, 169.17, 169.24, 169.3,	╟	5/2), weak (R2), voids (<1/16") over	_
				169.44' - Bedding plane or mechanical break		25% of surface, few cavities up to	
1 -			>10	(18), <10 deg, smooth to rough, planar to undulating, few are partings, tight to open		 3/8", poorly fossiliferous, secondary infill in voids over 10-20% of surface 	-
-	R21-NQ			1/2", sand to fine gravel-sized limestone	╂┴	No Recovery 172.0-175.0'	-
-	5 ft	0		fragments in fracture	仜	-	-
_	40%			170.0-170.6, 171.0-171.2, 171.55-172.0' -	┢	_	_
			NR	Fracture zone (3), fine to coarse angular to subangular limestone fragments, 2% sand			
			INIX	170.7, 170.95, 171.2, 171.3, 171.4, 171.55' -	\vdash		
-				Bedding plane or mechanical break (6), <10		<u> </u>	R21: 7 minutes
-				deg, smooth, planar to undulating, open	-	-	-
175_	175.0			<1/̄2", sand in fractures 171.35' - Fracture, vertical, rough, planar	╂┷		
-134.5			>10	175.0-175.1, 175.2-175.4, 176.55-176.81,	oxdot	Limestone - 175.0-177.8' - Same as 170.0-172.0'	_
			10	177.1-177.5' - Fracture zone (4), fine to	\vdash	except weak to medium strong rock	
-				coarse angular to subangular gravel-sized		(R2-R3)	-
-			>10	limestone fragments 175.1, 175.2, 175.4, 175.85, 175.9, 175.55,	╁	-	-
-	R22-NQ			176.8, 177.3, 177.5' - Bedding plane (9),	╂┬╴	_	-
_	5 ft	8	>10	rough, undulating, sand/fine gravel in		<u>-</u>	_
	56%			fractures, open up to 1"		- No Recovery 177.8-180.0'	
				176.2, 176.3' - Bedding plane (2), rough, undulating, little sand in fractures, open <1/4"		No Recovery 177.0-100.0	
-				undulating, little sand in fractures, open < 1/4	1	<u> </u>	
-			NR			-	R22: 5 minutes
-					₩	_	
180_	180.0			_	┢		
-139.5				180.0-180.91' - Fracture zone, fine to coarse		Limestone	
-			>10	gravel-sized angular to subrounded gravel	╁	 180.0-181.4' - Same as 170.0-180.0' except from 180.9-181.4' 	
-			0		世	fossiliferous with many molds and	-
-			Ť		+	 casts, voids (<1/16") over 50-60% of 	-
-						surface, many cavities up to 1"x1/2"	-
l _	R23-NQ 5 ft	9			╨	No Recovery 181.4-185.0'	_
	28%	9					
-			NR		1_	=	-
1 -					1	-	-
1 -					仜	_	R23: Runtime not recorded
1 -					1	_	_
	185.0						12:00 Last rock core completed, total depth is
-144.5						Bottom of Boring at 185.0 ft bgs on	185.0' below ground
1 -					1	- 6/6/2007	surface
1 -					1	-	
1 -					-	<u> </u>	-
1 -					4	<u>-</u>	I -
1							
1 -					1		1
1 -					1	-	1
-					-	-	-
1 -					4	-	-
1 _							_
1 -							1
					1	_	
							1
							1



PROJECT NUMBER:	BORING NUMBER:		
338884.FI	GSC-04	SHEET	1 OF 9

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723824.3 N, 457384.0 E (NAD83)

ELEVATION: 40.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

NA/ATED						ary, carriedu, NW 1005, 3-7/			ONIENTATION : Vertical
WATER	LEVELS	: 5.2 It bo	ıs on 5/3		START : 5/31/2007	END: 6/1/2007 SOIL DESCRIPTION	LOGGE	:K:K	. McComb COMMENTS
≥□⊋□	04::-:	IN IT	1 (0)	STANDARD PENETRATION		SOIL DESCRIPTION		– 8	COMMEN 12
NAN (†)	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAM	E, USCS GROUP SYMBOL	COLOR	O LC	DEPTH OF CASING, DRILLING RATE,
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE	RY (ft)		MOISTURE	CONTENT, RELATIVE DE	NSITY OR	SYMBOLIC LOG	DRILLING FLUID LOSS, TESTS, AND
L HEV			#TYPE	6"-6"-6"	CONSISTEN	CY, SOIL STRUCTURE, MI	NERALOGY	Ĭ,	INSTRUMENTATION
40.0	0.0			(N)	Tanasil (OL)			71 1/ O	
40.0	0.0			2-4-5	Topsoil (OL) 0.0-0.6' - dark o	gray to grayish black, (N2	to N3), trace		_
I _		0.6	SS-1	(9)	fine silica sand	l, abundant organic mater	ial	<u> </u>	
	1.5			` ,				11/	:
									1
-								1	1
-								1	1
-								1	1
-								1	-
-								+	-
-								4	-
5 35.0	5.0				Clayou Cand (6	SC)	_	-	,
35.0				6-7-6	Clayey Sand (\$ 5.0-5.9' - mode	erate vellowish brown and	dark	-1//	-
_		0.9	SS-2	(13)	vellowish brown	n. (10YR 5/1 and 10YR 4	moist.		_
_	6.5				medium dense	, very fine to fine grained medium plastic fines, trad	, silica sand, se root		_
					fragments	modium piadao imoo, aa	/	<u> </u>	
								1	
_								1	1
-								1	1
-								1	1
-								1	-
10 30.0	10.0				Silty Sand (SM	/ \		1111	
-			00.0	7-9-12	10.0-11.05' - pa	ale yellowish brown, (10Y	R 6/2), wet,	-]
-		1.1	SS-3	(21)	medium dense fine silica sand	, 20% nonplastic to low p	lastic fines,	411	-
_	11.5				ilile silica sariu			-111	4
_								4	
_									
_									
									1
]								1	1
]								1	1
15	15.0							1	1
25.0	10.0				Silty Sand (SM	N)			∄ ⊣
-		1.4	SS-4	6-8-10	15.0-16.4' - Sai	me as 10.0-11.05'		111	-
-	40.5	'	55.4	(18)				1	-]
-	16.5							-111	4 -
-								+	-
-								-	-
-								1]
								1]
]
									1
20								1	1
							_	\top	



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	GSC-04	SHEET	2	OF	a	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723824.3 N, 457384.0 E (NAD83)

ELEVATION: 40.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

\	. =\ /=\ 0	5001			START 5/04/2007 START 5/04/2007			
WATER	LEVELS	: 5.2 ft bo	gs on 5/3			LUGGER	: K.	McComb COMMENTS
3∩≎				STANDARD PENETRATION	SOIL DESCRIPTION		99	COMMENTS
A A N	SAMPLE	INTERVA	L (ft)	TEST RESULTS	SOIL NAME LISCS GROUP SYMBOL COLOR			DEDTH OF CACING DOWNING DATE
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OF		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
THT.			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOG		MB	INSTRUMENTATION
				(N)			S	
20.0	20.0				Silt Sand (SM) 20.0-21.2' - Same as 15.0-16.4'			
I -		1.2	SS-5	11-12-12 (24)	20.0-21.2 - Same as 15.0-10.4			
I -	21.5			(24)				1
-	21.5					_	141	†
-						-		-
-						-		-
-						_		-
I _						_		_
l _								
25	25.0]
15.0					Silty Sand (SM)		Ш	1
-		0.9	SS-6	5-4-5	25.0-25.9' - Same as 20.0-21.2'	-		1
-	00.5	0.0		(9)		-]
-	26.5						111	-
-						_		-
-						_		-
_						_		_
l _								_
l _								
]
30	30.0					_		1
10.0	00.0				Silty Sand (SM)		Ш	1
-		1.5	SS-7	2-3-2	30.0-31.5' - Same as 25.0-25.9'	-	Ш	1
-	04.5			(5)		-]
-	31.5					_	341	-
-						_		-
-						_		-
-						_		
l _								_
1								
1]
35	35.0					1		1
5.0	22.0				Sandy Lean Clay Or Sandy Organic Soil (CL-OL	L)	\approx	35.0-35.7' appears organic rich
-		1.4	SS-8	5-8-7	35.0-35.7' - dark gray to grayish black, (N3 to N2) moist, stiff, low to medium plasticity, slow dilatance), /	$\stackrel{\sim}{\sim}$	-
-	20.5			(15)	\30% very fine silica sand	~y, / -		
-	36.5				Silty Sand (SM)		Ш	1
-					35.7-36.4' - pale yellowish brown mottled with dar yellowish brown, (10YR 6/2 mottled with 10YR 4/2	rk /-		-
-					wet, medium dense, very fine to fine silica sand,	د), <u>-</u>		-
1 -					30-35% low plastic fines			
-]
_]
]
40						7		1



PROJECT NUMBER:	BORING NUMBER:		
338884.FL	GSC-04	SHEET	3 OF 9

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723824.3 N, 457384.0 E (NAD83)

ELEVATION: 40.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

WATER	LEVELS	: 5.2 ft bo	ıs on 5/31		START : 5/31/2007 END : 6/1/2007 LOGGER : R. McComb
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
HH H		RECOVE	RY (ft)	TEGT NEGGETO	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTH EVA-			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
SU				(N)	
0.0	40.0	0.8	SS-9	3-3-4 (7)	Sandy Organic Soil And Sandy Lean Clay (OL-CL) 40.0-40.8' - Same as 35.0-35.7' except grayish black, (N2), moist, medium stiff, low to medium plasticity, slow dilatancy, 30% very fine to fine silica sand
- - -					- - - - -
45	45.0				1
-5.0 - -	46.5	1.5	SS-10	3-2-4 (6)	Silt And Sandy Organic Soil (ML-OL) 45.0-45.6' - moderate yellowish brown, (10YR 5/4), moist, medium stiff, nonplastic to low plasticity, rapid dilatancy, contact between lithologies abrupt and inclined; 70% ML, 30% OL, trace very fine silica sand,
-					OL is grayish black (N2), moist, medium stiff, low to medium plastic, slow to rapid dilatancy, 20% very fine to fine silica sand Clayey Sand (SC) 45.6-46.5' - grayish black, (N2), wet, loose, very fine to fine grained silica sand, 25-30% low to medium
50_ -10.0	50.0				plastic fines - Silt (ML)
-	51.5	1.2	SS-11	30-40-45 (85)	50.0-51.2' - moderate yellowish brown, (10Y 5/4), wet, hard, low plasticity, rapid dilatancy, mild HCl reaction, trace fine grained sand, carbonate material
- - -					- Driller's Remark: hard drilling at 53.5'
-					-
55 <u> </u>	55.0				Silty Sand With Limestone (SM)
-	56.5	1.1	SS-12	8-5-12 (17)	55.0-56.1' - moderate yellowish brown, (10YR 5/4), wet, medium dense, fine to coarse grained, mild HCl reaction, 20-25% low plastic fines, 25% fine gravel-sized limestone fragments, carbonate
-					materials
-					
-					
60					



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-04	SHEET	4	OF	9	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723824.3 N, 457384.0 E (NAD83)

ELEVATION: 40.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical

\A/ATED			F/O:			n, NVV 1005, 3-7/6 (II-co		. D	M-Ch
WATER	LEVELS	. 5.∠ II DO	ıs on 5/3°			D : 6/1/2007 SCRIPTION	LOGGER	: K.	MCCOMB COMMENTS
≥□⊋			. (6)	STANDARD PENETRATION	SOIL DE	SOMPTION)G	COIVIIVIEN 15
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR			SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
		RECOVE	RY (ft)		MOISTURE CONTENT	. RELATIVE DENSITY	OR	OLI	DRILLING FLUID LOSS, TESTS, AND
HEVA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL S	TRUCTURE, MINERAL	.OGY	чМВ	INSTRUMENTATION
				(N)		(2.5)		Ś	
-20.0	60.0	0.9	SS-13	25-50/5.5	Silty Sand With Limeston 60.0-60.9' - Same as 50.0	ne (SM))-51 2' except 35-40%	fine -		Driller's Remark: Depth to water 5.2' below ground surface
	61.0	0.5	00-10	(75/11.5")	gravel-sized limestone fra	agments	, IIIIe		ground surface
1 7					<u> </u>				1
1 -							-		1
-							-		-
-							-		-
-							-		-
-							-		4
1 _							_		_
65	65.0								
-25.0	65.3	0.1	SS-14	50/3	Limestone Fragments	(40)(D 4(0)	п. Г		_
-				(50/3")	65.0-65.1' - dark yellowish				1
-					planes	organio stanning on b	_		Driller's Remark: soft drilling at 66.67',
-					·				-
-							-		Rig chatter at 67.0' harder drilling
-							-		- Ing orialier at 67.5 Harder drilling
_							_		_
							_		_
70	70.0						_		1
-30.0		0.7	SS-15	26-50/3	Sandy Silt And Limestor	ne Fragments (ML)		Ш	_
-	70.8	0.7	33-13	(76/9")	70.0-70.7' - pale yellowish hard, low plasticity, rapid	ı brown, (10YR 6/2), v dilatancy, mild HCl re	wet, −	Ш	1
-					40% ML and 60% limesto	ne, 25-30% fine to co	action, -		1
-					sand-sized; fine to coarse	gravel-sized limestor	ne / -		-
-					fragments, carbonate mat	teriais			-
-							-		-
-							_		4
_							_		_
]
]									1
75	75.0								1
-35.0	. 5.0				Silty Sand With Limeston	ne (SM)		Ш	
-		0.8	SS-16	50-37-27	75.0-75.75' - moderate ye moist, very dense, fine to	ellowish brown, (10YR	1 5/4), –		
-	70.5	0.0	55 .5	(64)	reaction, 35-40% low plas	stic fines, 15% fine	_		
-	76.5				¬ gravel-sized limestone fra	gments, carbonate	/-	441	
-					materials		/ -		
-							-		-
							-		
	80.0								_
	80.1	0.0_/	SS-17	50/1 (50/1")	No Recovery 80.0-80.1']
				(30/1)]
80									1
					Begin Rock Coring at 80.	0 ft bgs			
					See the next sheet for the	rock core log			



PROJECT NUMBER:

33884.FL

BORING NUMBER:

GSC-04

SHEET 5 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723824.3 N, 457384.0 E (NAD83)

ELEVATION: 40.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing ORIENTATION : Vertical

				TENT . CIVIE 550 5/N 186075, Hidd Totally, NQ tools, NV	000		ORIENTATION : Vertical
WATER	LEVELS: 5.2	2 ft bg	s on 5	/31/2007 START : 5/31/2007 END : 6/	1/2007	LOGGER : R. McComb	
>00				DISCONTINUITIES	၂ ပ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	CIZE AND DEDTH OF CACING
불병은	JA, H.	(%) Q	동	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	1 ቯ [MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
F K S	RE J	0 0	ACT F	PLANARITY, INFILLING MATERIAL AND	₩ W	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SCIE	S HE	R Q	FR/	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-40.0	80.0			00.451 Dadding plans beginned a great	₩	Limestone Fragments	Switching over to NQ
-	00.0		3	80.15' - Bedding plane, horizontal, smooth, open	曰	 80.0-81.35' - light olive gray, (5Y 	coring at 80.0'
-				80.35' - Fracture, 30 deg, rough, stepped,	╀┤┤	_ 5/2), moderate HCl reaction, very	-
			4	black organic film over 15-20%, tight	Ш	weak to weak (R1 to R2), fossiliferous (voids, casts, molds),	
			4	80.6' - Fracture, 50-60 deg, rough,	Н	voids up to 1/16", some cavities	
-	R1-NQ		10	undulating, tight 81.03' - Fracture, 0-80 deg, rough, stepped,		generally <6/16"x6/16"	1 1
-	5 ft	8		tight	╂┷╂	- Limestone	1 -
-	46%			81.35' - Bedding plane, horizontal, smooth,	+	81.35-82.3' - pale greenish yellow, (10Y 8/2), fine to very fine grained,	-
l _				stepped, open	П	strong HCl reaction, weak to medium	<u> </u>
			NR	81.67, 81.8' - Bedding plane, horizontal, smooth, open	Н	strong (R2 to R3), <2% voids and	
				82.2' - Bedding plane, horizontal, smooth,	Ш	cavities, variegated color with contact	R1:7 minutes
05	05.0			open	╂┼┼	at 81.9'No Recovery 82.3-85.0'	1
85 <u> </u>	85.0			-	丗	Limestone	-
'0.5			1		₽₽	 85.0-90.0' - yellowish gray with pale 	-
I -				85.9' - Fracture or mechanical break.	Ш	greenish vellow mottling. (5Y 7/2 with	
			١	horizontal, rough, undulating, tight	田	10Y 8/2), fine grained, mild HCI	Core fell out upon retrieval,
-			1	86.6-87.75' - Fracture zone, vertical, rough,	╁┼	 reaction, very weak to weak (R1 to R2), lithoclasts like fractures at 	had to make multiple trips - to get rock out of outer
-	R2-NQ			undulating, tight	団	86.0-86.4' and 87.0-87.4' (light	barrel
-	5 ft	44	2		╂┼┤	 colored limestone with few voids); 	l
-	100%					fossiliferous (casts and molds), voids	l
l _			3		Н	and cavities up to 3/8"-3/4"x3/8" over 40-50% of surface	No circulation below 80.0'
			"	88.4-88.8' - Fracture zone, 0-<5 deg, rough, undulating, tight to open	Ш	40 00 /0 of ourlase	
-				89.15-89.3' - Fracture zone, 0-90 deg,	Н		R2:5 minutes
			3	Undulating to stepped, tight to open		_	1
90 <u> </u>	90.0			89.6' - Fracture, 0-90 deg, rough, Undulating —	Ш	90.0-90.9' - mottled yellowish gray to	-
-			1	to stepped, open	+	- light olive brown, (5Y 7/2 to 5Y 5/6),	l -
l _				90.7' - Fracture, <5 deg, rough, undulating,		fine to very fine grained, mild to]
				tight	Н	moderate HCl reaction, very weak	
-			0		ш	 (R1), fossiliferous (molds/casts) with very fine grained yellowish gray 	1
-	R3-NQ				╂┼┼╂	possible intraclasts in the structure,	1
-	5 ft	90	0			voids and cavities up to 3/16"-3/8"	1 -
-	100%		<u> </u>		╂┴┨	over 50-60% of surface	-
I -			1	02.4! Rodding plans haring to leave	Ш	90.9-92.0' - very light gray mottled medium gray with dusky yellow to]
				93.4' - Bedding plane, horizontal, rough, undulating, tight	H	moderate olive brown, (N8 mottled	
				aaaidanig, agrit		with N6 with 5Y 6/4 to 5Y 4/4), very	R3:9 minutes
05	05.0		2	94.6' - Fracture, horizontal, rough, undulating,	μ	 fine grained, strong HCl reaction, weak (R2), <2% cavities, voids up to 	-
95 <u> </u>	95.0			tight	╆	3/16" over 15-20% of rock surface	⊢
-			1	94.9' - Fracture, horizontal, rough, undulating,		92.0-93.4' - Same as 90.9-92.0'	-
-				tight	╀	except pale yellowish brown to light]
			0	95.2' - Bedding plane, horizontal, smooth, undulating, open	Ш	olive brown, (10YR 6/2 to 5Y 5/6), mottled, very fine grained, mild to	
			"	and aliability, open	1 + 1	moderate HCl reaction, cavities and	1
1 -	R4-NQ			•		voids more common than above with	1
-	5 ft	74	1	97.5' - Bedding plane, <5 deg, rough,	╂┴╂	some cavity infilling (strong HCI	-
-	90%			undulating, open	団	reaction), cavities and voids up to – 20-25%	-
I -			2			■ 93.4-95.0' - Same as 90.9-92.0']
				98.5' - Bedding plane, horizontal, smooth,	$\vdash \vdash \vdash$	except voids up to 20-25%	
I -			10	undulating, open, organic material 98.8' - Fracture, 20 deg, rough, undulating,	Ш		R4:9 minutes
100	400.0		NR	tight	+	-	-
100	100.0		1417		╒		_
							l .



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-04

SHEET 6 OF 9

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723824.3 N, 457384.0 E (NAD83)

ELEVATION: 40.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

/ATER LEVELS :	5.2 ft bg	s on 5/		1/2007		
© (£0.5)			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
SURFACE AND SURFACE AND ELEVATION (ft) CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AN SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-60.0 - - - - - - - - - - - - - - - - - -	Q	10	99.35' - Fracture zone, 0-90 deg, rough, Undulating to stepped, open 100.0-100.3' - Fracture zone, 0-90 deg, smooth, open 100.7-100.9' - Fracture, 70 deg, rough, undulating, tight 101.2, 101.3' - Bedding plane (2), horizontal,		Limestone 95.0-98.4' - variegated light olive brown to yellowish gray, (5Y 5/6 to 5Y 7/2), fine grained, mild to moderate HCI reaction, very weak to weak (R1 to R2), fossiliferous (mold/casts) with some organic	
5 ft 88%		1 10 NR	smooth, undulating, open, black organic staining over 35% 101.8-102.5' - Fracture zone, 0-90 deg, rough, Stepped to undulating, open to tight 102.65, 102.8, 102.98, 103.17' - Bedding plane (4), 0-<5 deg, rough, undulating, open 104.1-104.4' - Fracture zone, 0-90 deg, open		fossiliferous particles at 95.4-95.7'; becoming interspaced with very fine grained limestone with depth, voids (up to 1/16") and cavities (up to 3/8"-3/4"x3/8") over 20-25% of surface Clay (CL) 98.4-98.45' - dark gray, (N3), strong	R5:6 minutes
65.0 		4	105.12' - Bedding plane, 0-<5 deg, smooth, Planar to stepped, open 105.3-105.95' - Fracture zone, 0-<5 deg, smooth, planar, open, fracture extending total length, extends from one side of contacts to the other side		HCl reaction, platy Limestone 98.45-99.5' - very light gray, (N8), very fine grained, strong HCl reaction, weak (R2), some fossil voids and casts over 10% of surface No Recovery 99.5-100.0'	
5 ft 74%	33	1 10 NR	105.95' - Bedding plane, horizontal, smooth, planar, tight to open 106.5, 106.7, 106.95' - Bedding plane (3), horizontal, smooth, undulating, tight to open 107.85' - Fracture, 0-90 deg, rough, stepped, tight		No Recovery 95.5-100.0 Limestone 100.0-104.4' - yellowish gray, (5Y 8/1), fine to very fine grained, moderate to strong HCl reaction, very weak to weak (R1 to R2), trace fossils as molds and casts, voids 3/8"x3/4" over 10-15% of surface,	R6:6 minutes
110 110.0 70.0	78	0 0 0 1	108.2' - Bedding plane, <5 deg, rough, stepped, open - 113.9' - Bedding plane, horizontal, rough, undulating, open - 113.9-114.1' - Fracture, vertical, rough, undulating, open - 113.9-114.1' - 114.1		cavities <2% less than 3/8"x3/8", chalk-like texture, becoming very soft, extremely weak (R0) at 104.0', thick, laminated from 101.2-101.3' with some black organic material No Recovery 104.4-105.0' Limestone 105.0-108.7' - yellowish gray, (5Y 8/1), very fine grained, strong HCI reaction, very weak to weak (R1 to R2), fossiliferous (molds and casts), transition from trace to 20% increasing with depth, void and cavities ranging from <5% to 15-20% with depth, some original fossil material (echinoids) at 108.4-108.7' No Recovery 108.7-110.0'	R7:7 minutes
-75.0 - - - - - - - - - - - - - - - - - - -	74	2 0 1 3	titulating, open 114.1¹ - Bedding plane, 0-30 deg and 30 deg, rough, undulating, open 114.5¹ - Bedding plane, horizontal, rough, planar, open 114.6-114.9¹ - Fracture zone, horizontal, rough, planar, limestone fragments, open 115.1¹ - Fracture zone, smooth, planar and undulating, limestone fragments 115.25, 117.55, 118.18, 118.53, 118.55, 119.3¹ - Bedding plane (6), smooth, undulating to planar, open		Limestone 110.0-113.3' - yellowish gray, (5Y 8/1 to 5Y 7/2), very fine grained, strong HCl reaction, very weak to weak (R1 to R2), color transition at 112.2', voids (up to 1/16") over 5-10% of surface, fossiliferous casts/molds of original material (echinoids) suspended in matrix 113.3-114.9' - Same as 110.0-113.3' except cavities and voids more common covering 30-40% of surface, echinoids rare to absent No Recovery 114.9-115.0'	R8:8 minutes



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-04

SHEET 7 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723824.3 N, 457384.0 E (NAD83)

ELEVATION: 40.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

WATER	LEVELS: 5.2	ft bgs	on 5/	/31/2007 START : 5/31/2007 END : 6/	1/200	7 LOGGER : R. McComb	
≥ ∩ ∵	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		T T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE	E RU STH, OVEF	(%) _Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30 [MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SURF SURF SILEV	SORE ENG	ROL	FRAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	3×ME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-80.0	014	ш.	ш.п.	120-120.35' - Fracture, vertical, smooth,	10)	Limestone	
-			4	planar -	F	 115.0-119.3' - yellowish gray to very 	-
-				120.35' - Fracture, 40 deg, rough, undulating, tight	Ħ	pale orange, (5Y 8/1 to 10YR 8/2), very fine grained, strong HCl	-
-			2	120.55' - Fracture, 0-60 deg, smooth, planar,	世	 reaction, very weak to weak (R1 to 	-
-	R9-NQ			open 120.75' - Bedding plane, horizontal,	╀	R2), "chalk-like" texture, zones where voids and cavities are nearly	-
-	5 ft	24	7	undulating, open	H	 absent grades to zones/thin beds 	-
-	88%			121.35' - Bedding plane, horizontal, smooth, stepped, tight	仜	with voids up to 1/16" covering 20-30% (e.g. 116.1-116.2') cavities,	-
-			8	121.97, 122.25, 122.37, 122.7, 122.77,	士	- <2% (more abundant near beginning	-
-			4	122.87, 123.0, 123.15, 123.4, 123.5, 123.55, 123.63, 123.7, 123.82, 123.88, 123.9, 140.1,	╁╴	of run, up to 3/8"x3/8"); fossil void to rate, becoming slightly more	R9:5 minutes
			NR	140.2, 140.3, 140.45' - Bedding plane (20),	F	common at base of run	-
125 <u> </u>	125.0			horizontal, rough, undulating to stepped, open	Ħ	No Recovery 119.3-120.0' Limestone	-
-			6	125.3, 125.47, 125.57, 125.67, 125.82,	L	120.0-122.7' - Same as 115.0-119.3' 122.7-124.4' - Same as 120.0-122.7'	-
-				125.96, 126.05, 126.12, 126.27, 126.32, 126.51, 126.65, 126.72, 126.90, 127.15,	╨	except more voids/cavities up to	-
-			8	127.25, 127.35, 127.48, 127.7, 127.78,	抂	75-80% of surface covered with voids 1/16", cavities up to	-
-	R10-NQ			127.92, 128.0, 128.07' - Bedding plane or mechanical break (23), horizontal, rough,	世	3/8"-3/4"x3/8"-3/4", fossiliferous	-
-	5 ft	25	8	undulating to stepped, open	\vdash	(molds/casts) No Recovery 124.4-125.0'	-
-	90%			-	╁	Limestone ´	-
-			1	-	H	L 125.0-129.3' - Same as 122.7-124.4' except some thin laminations at base	-
-				-	Ħ	of interval	R10:7 minutes
400	100.0		2 NR	129.3' - Bedding plane, 10-15 deg, smooth,	世	 129.3-129.5' - yellowish gray, (5Y 7/2), fine grained, strong HCl 	-
130 <u> </u>	130.0		INIX	planar, tight	╀	reaction, medium strong (R3),	-
-			3	stepped, open 130.25, 130.58, 130.9, 131.2, 131.28, 131.5,	匚	laminated bedding, thick, laminae incline 10-15 deg, 1 cavity	-
-				131.55, 131.64, 131.78, 131.97, 132.13,	世	3/8"x3-7/8", voids less than 1/16"	-
-			7	132.35, 132.42, 132.47, 132.68, 132.92, 132.97, 133.05' - Bedding plane (18),		over 10-15% of surface, dense limestone	-
-	R11-NQ			horizontal, smooth, undulating to planar,	╁	No Recovery 129.5-130.0'	-
-	5 ft 70%	8	7	open -	F	Limestone 130.0-133.5' - yellowish gray, (5Y	-
-	7070		2	-	Ħ	8/1), strong HCl reaction, weak to	1
-				-	Ħ	very weak (R2 to R1), voids up to 1/16" or less over 5-10% of surface.	
-			NR	-	L	rare cavities (3/16"x3/16"), trace	R11:7 minutes
135	135.0			-	尸	fossil molds/casts; thin lamination in upper 0.1-0.2' of section	-
-95.0	100.0			— 135.1, 135.2' - Bedding plane (2), horizontal,	口	No Recovery 133.5-135.0'	-
-			5	smooth, undulating, open	口	Limestone 135.0-139.5' - Same as 130.0-133.5'	
-				135.3' - Bedding plane or fracture, 0-60 deg, rough, stepped to undulating, open	┢	except cavities and voids more frequent becoming fine to medium	1
-			7	135.5-136.65' - Fracture zone, 0-90 deg,	厂	grained at 166.67' with some fossils,	1
-	R12-NQ			smooth, undulating, gravel 136.72,136.82, 136.92, 137.05, 137.27,	Ħ	cavities becoming common with depth up to 3/8"-3/4"x3/8", some	1
-	5 ft 90%	0	5	137.5' - Bedding plane (6), horizontal, rough, undulating, open	#	mottling (coating of limestone matrix)	1
-	00,0			137.6' - Bedding plane or fracture, 0-50 deg,	世	becoming extremely weak rock (R0) at 138.4' to 139.0', thick laminated	1
-			>10	smooth, undulating, open 138.04, 138.25, 138.4' - Bedding plane (3),	厂	from 138.0-139.5', few voids	1
-			2	horizontal, rough, undulating, open	厂	<u> </u>	R12:7 minutes
140	140.0		NR	138.4-139.0' - Fracture zone, 0-90 deg, smooth to rough, undulating to stepped, open	口	No Recovery 139.5-140.0'	
				sssar to reagn, arradiating to stopped, upon	1		
					<u> </u>		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-04 SHEET 8 OF 9

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723824.3 N, 457384.0 E (NAD83)

ELEVATION: 40.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

ORIENTATION : Vertical

WATER	LEVELS : 5.2	2 ft bgs	s on 5/	31/2007 START : 5/31/2007 END : 6/	1/200	7 LOGGER : R. McComb	
≥∩ ∵	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE	E RU STH, OVEF	(%) Q	F.S.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30 [MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
EPT SURF	SORE	RQD	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	¥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-100.0	0114	Ľ.	шп	139.25' - Bedding plane, horizontal, rough,	S	Limestone	
-			5	stepped to undulating, open	Ħ	 140.0-144.2' - variegated yellowish 	1 -
-				140.3, 140.42, 140.6, 140.75, 140.95' - Bedding plane or mechanical break (5),	世	gray with gray laminae, (5Y 8/1 to 5Y 9/2), very fine to fine grained, strong	1 -
-			6	horizontal, smooth, planar to undulating	₽	 HCl reaction, weak to very weak (R2 	1 -
-	D40 NO			141.18, 141.28, 141.33, 141.39, 141.5, 141.8' - Bedding plane or mechanical break (6),		to R1), voids and cavities, 3-5% becoming 10-15% with depth,	1 -
-	R13-NQ 5 ft	10	6	horizontal, smooth, planar to undulating	上	 fossiliferous with trace echinoids in 	1 -
_	84%			142.0, 142.08, 142.18, 142.46, 142.75, 142.9' - Bedding plane or mechanical break (6),	╁╴	top portion, molds and casts increase with depth (5-10%), thick laminated	
-			6	horizontal, smooth, planar to undulating	F	133.9-134.0'	1
_				143.05, 143.13, 143.65, 143.88, 143.95, 143.98' - Bedding plane or mechanical break	片	 -	I
_			L2 NR	(6), horizontal, rough, planar to undulating	世	No Recovery 144.2-145.0'	R13:6 minutes
145_	145.0		.,,,	144.08, 144.18' - Bedding plane or mechanical break (2), horizontal, rough,	尸	L ,	
-105.0			>10	planar to undulating	厂	Limestone - 145.0-147.1' - light gray to medium]
-				145.0-147.25' - Fracture zone, 0-90 deg, limestone gravel, stepped, undulating,	口	gray, (N7 to N6), very fine grained,]
_			>10	smooth to rough, open	┢	strong HCl reaction, medium strong (R3), fossiliferous (molds and casts)	_
_					F	over 3-5%, voids up to 1/16" over]
_	R14-NQ 5 ft	10	10	147.25' - Bedding plane, horizontal, rough,	Ë	3-5% of surface - 147.1-149.2' - yellowish gray grading	<u> </u>
_	84%			undulating, open		to medium gray with depth, (5Y 7/2 to	<u> </u>
I _			7	147.3, 147.45, 147.52, 147.92, 148.0, 148.05, 148.24, 148.65' - Bedding plane (8), 0-<5	₽	N5), fine grained, mild to moderate HCl reaction, thinly laminated in	<u> </u>
_			·	deg, undulating to planar, rough to smooth,	Д	upper 0.5', trace fossil molds/casts, 1	
_			NR	some organic black coating over 70-80% of surfaces		cavity 3/8"x2", voids up to 1/16" over 15-20% of surface, some dissolution	R14:6 minutes
150	150.0		INIX	148.65-148.90' - Fracture zone		features (cavities) at 148.2' as	
-110.0			1	_	H	discontinuous bedding plane voids No Recovery 149.2-150.0'	
_			·	150.9' - Bedding plane, horizontal, rough,	F	Limestone 150.0-150.9' - yellowish gray to	<u> </u>
_			0	undulating	Ľ	dusky yellow, (5Y 7/2 to 5Y 6/4), fine	<u> </u>
_			Ľ	_	L	grained, moderate to mild HCI reaction, medium strong (R3),	_
_	R15-NQ 5 ft	90	1	_	₽	becomes thinly laminated with depth,	<u> </u>
_	100%			152.55' - Bedding plane, horizontal, rough, undulating, tight	П	voids up to 1/16" over 30-40% of surface with trace thin laminae of	
_			14	153.25-153.4' - Fracture zone, 0-90 deg,	口	very fine limestone with few voids]
				rough 153.5' - Bedding plane or fracture, horizontal,	\vdash	150.9-151.8' - variegated yellowish gray, dusky yellow to light olive]
_			1	rough, planar, open	\vdash	brown, (5Y 7/2, 5Y 6/4 to 5Y 5/6),	R15:6 minutes
155_	155.0			153.5-153.85' - Fracture, 80-90 deg, rough, undulating, tight	片	coarse grained, strong HCl reaction, weak (R2), abundant possible]
-115.0 -			0	andulating, tigrit	H	lithoclasts (possible conglomeratic)]
			لنّـــا			Limestone - 151.8-153.3' - dusky yellow to]
_			1	156.4, 157.15, 157.25, 157.33, 157.52, 157.65, 157.73, 157.96' - Bedding plane (8),	尸	_ yellowish gray, (5Y 6/4 to 5Y 7/2),]
_				0-<5 deg, rough, undulating, open to tight	口	medium grained, weak (R2) - 153.3-155.0' - Same as 150.0-150.9']
_	R16-NQ 5 ft	76	7	_	Ħ	except thinly laminated, voids up to]
_	98%	, 0			\vdash	1/16" over 5-10%, mild to strong HCl reaction with depth, some early]
_			3	158.0, 158.15, 158.22' - Bedding plane (3), horizontal, smooth, undulating, open	F	fracture development/dissolution at	
_				159.1' - Bedding plane, 0-<5 deg, rough,	片	154.7'	R16:8 minutes
			2	undulating, open 159.5' - Fracture, 50 deg, rough, stepped,	\vdash	_	Actual Not Recovered
160	160.0		NR	tight	\sqsubseteq		interval from 159.9-160.0'
					<u> </u>		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	GSC-04	SHEET	9	OF	9

ROCK CORE LOG

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723824.3 N, 457384.0 E (NAD83)

ELEVATION: 40.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, NW casing

WATER	LEVELS: 5.2	2 ft bgs	s on 5	/31/2007 START : 5/31/2007	END : 6/1	/2007	LOGGER : R. McComb	
≥∩≘	_ (9			DISCONTINUITIES		₀	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUG PLANARITY, INFILLING MATERIAL	AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
□	CO CO CO CO CO CO CO CO CO CO CO CO CO C	DA R	FR. FR. FR. FR. FR. FR. FR. FR. FR. FR.	THICKNESS, SURFACE STAINING, AND		SKI	Limestone 155.0-157.25' - variegated yellowish gray to light gray brownish gray, (5Y 7/2 to N7), fine grained, mild to moderate HCI reaction, medium strong to weak (R3 to R2), competent, becoming thinly laminated with depth, fossil casts and molds over 5-10%, voids 10-15%, cavities 1/16"x3/16" showing alteration coloring, transitioned to lithology below, becoming light olive brown in color 157.25-158.2' - variegated yellowish gray to light olive brown to moderate brown, (5Y 7/2 to 5Y 5/2 to 5Y 4/4), fine to medium grained, mild to moderate HCI reaction, weak (R2), competent, very thinly laminated with possibly organic material, trace fossils, some voids and cavities over 10-15% of surface 158.2-159.1' - yellowish gray, (5Y 7/2), some medium gray (n7-n8) mottling, fine grained, mild HCI reaction, weak to medium strong (R2 to R3), competent, voids up to 1/16" over 2-3%, several cavities 3/16"x3/8" over <1%, fossiliferous (<1%), casts/molds (echinoids) 159.1-159.9' - yellowish gray to light olive brown, (5Y 7/1 to 5Y 8/1), fine to medium grained, moderate to strong HCI reaction, weak (R2), fossiliferous, voids/cavities over 10-15% of surface No Recovery 159.9-160.0' Bottom of Boring at 160.0 ft bgs on 6/1/2007	DROPS, TEST RESULTS, ETC.



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-05 SHEET 1 OF 10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723689.4 N, 457584.8 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 5-7/8" tri-cone bit ORIENTATION: Vertical

WATER	LEVELS	: 1.2 ft bo	s on 5/5/	07 5	START : 5/4/2007 END : 5/6/2007 LOGGER : N. Jarzyniecki
>00				STANDARD	SOIL DESCRIPTION COMMENTS
N N N	SAMPLE	INTERVA	` ,	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
H BE		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
41.3	0.0			()	Topsoil 10:59 Begin drilling
-		1.2	SS-1	1-2-3 (5)	\(\sqrt{0.0-0.2'}\) - olive black, (5Y 2/1), roots, organics Poorly Graded Sand With Organics (SP)
-	1.5			(5)	☐ 0.2-1.2' - pale yellowish brown grading to moderate ☐ ☐ Driller's Remark: Hammer by M. Craus
					yellowish brown at 0.95', (10YR 6/2 to 10YR 5/4), moist, loose, very fine to fine silica sand, trace (manual with NWJ rod)
_					\nonplastic fines, 15% organics decreasing with depth \ \ \]
-					<u> </u>
-					_
-					-
-	-				-
5 36.3	5.0				Silty Sand (SM)
-		0.9	SS-2	3-2-2	5.0-5.9' - pale yellowish brown to light olive gray, ⊣∭∥
-	6.5	0.9	33-2	(4)	(10YR 6/2 to 5Y 6/1), moist to wet, very loose, very fine to fine silica sand, 25% nonplastic fines,
-	6.5				\becoming low plastic at 5.7'
-					†
-					
-					1
]
]
10	10.0				
31.3				8-14-18	Silt (ML) 10.0-10.91' - gravish orange, (10YR 7/4), wet, hard,
-	-	0.9	SS-3	(32)	10.0-10.91' - grayish orange, (10YR 7/4), wet, hard, nonplastic, rapid dilatancy, moderate HCl reaction, 5-10% very fine sand-sized, carbonate materials
-	11.5				(3-10 % very line sand-sized, carbonate materials
-					-
-	_				-
-					
-	-				
-	-				
15	15.0				1
26.3	15.3	0.2	SS-4	50/3 (50/3")	Poor Recovery Limestone Fragments 15.0-15.2' - grayish orange, (10YR 5/4), moderate
				(30/3)	HCl reaction, fragments up to 1/2"
_]]
-					_
-					
-					
-	-				-
-	-				-
-					-
20					++



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-05	SHEET	2	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723689.4 N, 457584.8 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 5-7/8" tri-cone bit ORIENTATION: Vertical

						ary, cathead, NWJ rod			. NI	ORIENTATION: Vertical
WATER	LEVELS	: 1.2 ft b	gs on 5/5/		START : 5/4/2007	END : 5/6/200 SOIL DESCRIPTIO		LUGGER		Jarzyniecki COMMENTS
중무 <i>글</i>	CAMPIE	INTERVA	.I /#\	STANDARD PENETRATION		JOIL DEJONIF HO	'I V		SYMBOLIC LOG	OUNINIENTO
ELC E AN ON (SAMPLE		. ,	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR			IC L	DEPTH OF CASING, DRILLING RATE,	
FH B		RECOVE	<u> </u>		MOISTURE	CONTENT, RELATIV	E DENSITY OF	R	BOL	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTEN	CY, SOIL STRUCTUR	E, WIINERALO	Gĭ	SYN	INSTRUMENTATION
21.3	20.0			. ,	Silt (ML)				Ш	
-		1.2	SS-5	28-42-36	20.0-21.2' - dus	sky yellow to grayish , nonplastic, rapid di	orange, (5Y 6	6/4 to -		-
-	21.5			(78)	⊢ HCl reaction, 1	0-15% very fine to n			Ш	1
-	21.0				\carbonate mate	erials		/ -		1
-								-		1
-								-		1
-								-		-
-								-		1
-								_		1
25	25.0							-		1
25 <u> </u>					Silty Sand (SN	1)			Ш	
-		1.0	SS-6	32-30-25 (55)	moderate HCI	yish yellow, (5Y 8/4) reaction, fine to coar	se sand-sized	nse, - I.		
-	26.5			(55)	√ 30% nonplastic	fines, 10-15% fine	gravel-sized	·' /		1
-					\limestone, carb	onate materials		/ -		1
-										_
-								_		1
-								_		_
								_		_
								_		1
30	30.0									
11.3					Silty Sand (SN	l) me as 25.0-26.0'				
		1.0	SS-7	33-28-23 (51)	30.0-31.0 - 3a	ine as 25.0-20.0				
	31.5			(5.7)						
_										_
										_
_										_
_										_
_								_		_
_								_		_
35	35.0				0116 0 1127	h 1 i 40 ***			7.17	
6.3			00.5	28-30-50/5	35.0-35.85' - S	h Limestone (SM) ame as 30.0-31.0' e:	xcept dark	_		
-		0.9	SS-8	(80/11")	vellowish orang	ge to grayish orange d HCl reaction, 30%	. (10YR 6/6 to	/-	Ш	
-	36.4				gravel-sized lin	nestone fragments	iiie to coarse	· / _		
-						-				
-								-		-
-								-		
-								-		Dilliel S Remark. 14.55 femove NVVJ fod
-								-		Driller's Remark: Casing set to 40.0'
-								-		Dilliol 3 Nethank. Cashiy Set to 40.0
40									$\vdash\vdash$	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-05	SHEET	3	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723689.4 N, 457584.8 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, NWJ rods, 5-7/8" tri-cone bit ORIENTATION: Vertical

WATER LEVELS : 1.2 ft bgs on 5/5/07							
				STANDARD	SOIL DESCRIPTION	ی ا	COMMENTS
AND N (ft)	SAMPLE INTERVAL (ft) RECOVERY (ft) #TYPE		PENETRATION TEST RESULTS	SOIL NAME LISCS CROLID SYMBOL COLOR	SYMBOLIC LOG	DEDTIL OF CASING POLICING DATE	
H BE ACE				SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND	
DEPT SURF ELEV			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYM	INSTRUMENTATION
1.3	40.0 40.8	0.8	SS-9	30-50/4 (96")	Sandy Silt With Limestone (ML) 40.0-40.85' - grayish olive mottled with olive gray,	1	Driller's Remark: 15:55 insert AWJ rod to clear out hole (with bit)
	40.0				(10Y 4/3 with 5Y 3/2), wet, hard, low plasticity, rapid dilatancy, mild HCl reaction, 35-40% fine to coarse sand-sized, 20-25% of sample is fine to coarse limestone fragments, carbonate materials Begin Rock Coring at 41.0 ft bgs See the next sheet for the rock core log		
					_	-	- - - - - - - - - -
- - 55 -13.7 - - - - -							- - - - - - - - - - - - - - - - - - -
60_						╀	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-05 SHEET 4 OF 10

ROCK CORE LOG

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723689.4 N, 457584.8 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

WATER	LEVELS : 1.2	2 ft bg	s on 5	/5/07 START : 5/4/2007 END : 5/6	6/200	7 LOGGER : N. Jarzyniecki	
				DISCONTINUITIES	ŋ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-	41.0		2	41.05' - Bedding plane, 10-25 deg, rough, undulating, open up to 1/2" 41.7' - Bedding plane or mechanical break,		Limestone 41.0-45.6' - moderate yellowish brown, (10YR 5/4), very fine to fine	5/5/07 08:07 begin coring 08:00 water level = 1.2' - below ground surface
-			>5	25 deg, rough, undulating		grained, moderate HCl reaction, voids (up to 1/8") over <5-30% of surface with interclasts at 41.0-41.9'	-
-	R1-NQ 5 ft 92%	87	1	42.95-43.1' - Fracture zone, intersecting fractures, fragments to 1" - 43.5' - Mechanical break		and 44.5-45.6', from 41.0-44.5' trace fossils up to 1/8" and 44.5-45.6' moderately fossiliferous, casts and	-
45			2	43.6' - Bedding plane or mechanical break, 15-20 deg, rough, undulating 44.5' - Bedding plane, <10 deg, rough,		molds up to 1" from 43.3-45.6' infill of highly voided and moderately fossiliferous material of the same	-
45 <u>-</u> -3.7 -	46.0		1 NR	undulating, open up to 1/4" 44.8' - Bedding plane or mechanical break, 15-20 deg, rough, undulating		color, with infill increasing to more than 70% of surface at 44.5', 41.0-43.1' very weak (R1), 43.1-44.4'	R1:6 minutes
-			>10	45.25' - Bedding plane or mechanical break, <5 deg, rough, undulating 46.0-46.9' - Fracture zone, multiple		medium strong (R3), 44.4-45.6' weak (R2) No Recovery 45.6-46.0']
_			2	intersecting fractures, fragments up to 4" 47.4, 47.6' - Bedding plane or mechanical break (2), <5 deg, rough, undulating		Limestone 46.0-49.05' - moderate yellowish brown, (10YR 5/4), fine grained,]
-	R2-NQ 5 ft 98%	38	>10	48.05' - Bedding plane or mechanical break, <5 deg, rough, undulating, open up to 1/8" 48.5-48.7' - Fracture zone, multiple		moderate HCl reaction, very weak to weak (R1 to R2), poorly competent, friable, organic laminar features (discontinuous) from 46.0-46.5'.	_
50			0	intersecting fractures, fragments up to 4" 48.95' - Bedding plane or mechanical break, <5 deg, rough, undulating, broken on edges		(uscontinuous) from 46.0-46.5, some (<5%) dissolution features up to 1/4" poorly fossiliferous, extremely weak (R0) voids up to 1/16" over	_
-8.7 -	51.0		0 NR	of fractures open up to 1/2" 49.7' - Mechanical break	Ħ	 45% of surface 49.05-50.9' - moderate HCl reaction, very weak to weak (R1 to R2), 	R2:3 minutes
-			2	51.15' - Bedding plane, 10 deg, rough, undulating, open up to 1/4" 51.75' - Bedding plane, with missing pieces		moderate to highly fossiliferous, casts up to 1"x1/2", voids to 1/16" over 15% of surface	_
-			0	(could be associated with dissolutions), open 1"		No Recovery 50.9-51.0' 51.0-54.5' - Same as 49.0-50.9' except fossils are moderate and up	_
-	R3-NQ 5 ft 91%	66	0	53.5' - Mechanical break	H	to 1/4", <1/16" voids over 20-30% of surface, infill of medium light gray (N6) and medium gray (N5) up to	-
55_ -13.7			>10	54.5-54.6' - Fracture zone, multiple intersecting fractures, 1" fragments —		1/8"x1/4", possibly breccia 54.5-55.55' - Same as 46.0-49.05' — except no organics, infill clasts at	R3:3 minutes
-	56.0		1 NR	54.95' - Bedding plane, 25 deg, rough, undulating, open up to 1", associated dissolution and in softer material	Ħ	51.0-54.5', dissolution feature at 54.95' (1-1/4"x3/4") No Recovery 55.55-56.0'	-
-			3	55.4' - Bedding plane, <5 deg, rough, undulating 56.3' - Fracture, 50 deg, rough, undulating,		Limestone 56.0-58.5' - moderate yellowish brown, (10YR 5/4), fine grained, very	-
-			>5	with silt-sized fragments 56.5' - Bedding plane or mechanical break, <5 deg, rough, undulating, open		mild HCI reaction, extremely weak (R0), voids (1/16") over 5-10% of surface with increasing voids and]
-	R4-NQ 5 ft 78%	30	>5	56.75' - Bedding plane, 10 deg, rough, undulating, open up to 1/8" 57.1-57.3' - Fracture zone, intersecting		hardness with depth to 20% of surface, trace cavities <1/4" and weak rock (R2) below 57.3']
60 -18.7			4	fractures, up to 2" fragments 58.7-59.0' - Fracture zone, intersecting fractures, up to 2" fragments, associated		_	R4:4 minutes
-10.7	61.0		NR	laminar organics		_	N4.4 IIIIIIules



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-05 SHEET 5 OF 10

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723689.4 N, 457584.8 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

WATER	LEVELS : 1.2	2 ft bg	s on 5	/5/07 START : 5/4/2007 END : 5/	6/200	7 LOGGER : N. Jarzyniecki	
				DISCONTINUITIES	ß	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-			>10	59.15' - Bedding plane, 10 deg, rough, undulating, open up to 1/4" 59.25' - Bedding plane, 10 deg, rough, undulating, open up to 1/8", very thin infill of	-		
-	R5-NQ		3	silt 59.35' - Bedding plane, 10 deg, rough, undulating, open up to 1/8"	Ħ	moderate HCl reaction, very weak to weak (R1 to R2), voids (1/16"-1/8") over 30-40% of surface, few cavities <1/2" (one 1"x1/2"), black bedding	
-	5 ft 98%	9	>10	59.65' - Bedding plane, 10 deg, rough, undulating, open up to 1/8" 61.3-61.5' - Fracture zone, intersecting		 plane laminations between 58.7-59.9' No Recovery 59.9-61.0' Limestone 	-
65_ -23.7	65_ 23.7_ 		>5	fractures, fragments to <1/16" to 2" 61.9' - Bedding plane, <5 deg, rough, undulating, open up to 1/4"	Ħ	 61.0-65.9' - moderate olive brown to moderate yellowish brown, (5Y 4/4 to 10YR 5/4), very fine to fine grained, 	R5:4 minutes
-			2 NR	62.3' - Fracture, 60 deg, rough, undulating 62.5' - Bedding plane, <5 deg, rough, undulating, open up to 1/4"		mild HCl reaction, very weak to weak (R1 to R2), occasional sections of extremely weak (R0), moderately	-
-			0	62.6' - Fracture, 60 deg, rough, undulating, opposite direction and possibly associated 63.1' - Fracture, 60 deg, rough, undulating	Ħ	competent and friable (variably), voids (1/16") over 5-10% of surface, sections with intermittent voids	
-			1	63.15' - Bedding plane, <5 deg, rough, undulating, open up to 1/4" 63.3' - Bedding plane, <5 deg, rough,	F	(secondary infill of 1"-2" cavities), very fine (<1/16" thick) black	
-	R6-NQ 5 ft 100%	57	2	undulating, open up to 1/4" 63.9-63.95' - Fracture zone, intersecting	Ħ	_ laminations decrease with depth No Recovery 65.9-66.0']
70			4	fractures, fragments to 1/2" 64.5' - Mechanical break 64.7-64.9' - Fractures, 40-85 deg, rough,		Limestone 66.0-67.2' - moderate yellowish brown, (10YR 5/4), fine grained,	-
-28.7	71.0		3	undulating, intersecting high angle 65.1' - Fracture, 80-85 deg, rough, undulating, continuation of a fracture in	F	moderate HCl reaction, weak (R2), voids (1/16"-1/8") over 20-30% of surface, trace shallow cavities up to	R6:6 minutes
-			2	64.7-64.9' 65.7' - Bedding plane, rough to smooth, undulating, bottom has fragments to 30 deg angle, top is <5 deg angle 67.25' - Bedding plane, <10 deg, rough to smooth, undulating, along organic bedding		 1/4", trace organic inclusion (spheroid and laminar) 67.2-67.6' - moderate olive brown, 	-
-			1			(10YR 5/4), mild to moderate HCl reaction, weak to very weak (R2 to R1), voids (1/16") over 5% of	-
_	R7-NQ 5 ft 96%	50	0	plane 68.3' - Bedding plane, <10 deg, smooth, undulating to planar	Ħ	 surface, 10% having 2" infill with voids (1/16") over 25-30% of surface, fine darker laminations increasing 	
- 75	0070		3	68.5, 68.6' - Mechanical break (2) 68.9' - Bedding plane, <10 deg, smooth, undulating, along organic bedding plane	Ē	 with depth 67.6-68.3' - Same as 66.0-67.2' 68.3-71.0' - Same as 67.2-67.6' 	
-33.7	76.0		1	69.0' - Bedding plane, <10 deg, smooth, undulating, along organic bedding plane 69.15, 69.2' - Bedding plane (2), <10 deg,	Ħ	— 71.0-75.8' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, 71.5-72.0'	R7:2 minutes
-	76.0		NR >5	smooth, undulating, along organic bedding plane 69.17' - Bedding plane, >85 deg, smooth,	F	 and 75.0-75.8' extremely weak (R0), weak to medium strong (R2-R3), moderately fossiliferous, casts up to 	-
-			3	undulating 70.0' - Bedding plane, <10 deg, smooth, undulating, along organic bedding plane		 1/4", organic inclusions over <5% up to 1/2"x1/8", <1/16" voids over 30-40% of surface, competent 	-
-	R8-NQ 5 ft	23	3	70.6, 70.62' - Bedding plane, <10 deg, smooth, undulating, along organic bedding plane	Ħ	_ No Recovery 75.8-76.0' -	
-	70%		>10	71.05' - Bedding plane, <5 deg, rough, undulating, associated with organic fractures,	臣	_	-
80 -38.7			NR	open to 1/4" 71.6' - Bedding plane or mechanical break, 30 deg, rough, undulating		<u>-</u>	R8:4 minutes
	81.0				巨	-	_

Rev. 7



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-05	SHEET	6	OF	10	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723689.4 N, 457584.8 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 1.2	2 ft bg	s on 5	/5/07 START : 5/4/2007 END : 5/6	6/200	7 LOGGER : N. Jarzyniecki	
≥∩ ::	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - -	R9-NQ 5 ft 90%	28	3 >5	72.5' - Bedding plane, top is <5 deg, bottom is 30 deg, piece missing, open to 1" associated with softer zone at bottom 72.85, 73.4, 73.5' - Mechanical break (3) 74.01' - Bedding plane, top is <5 deg, bottom is 30 deg, piece missing, open up to 1/2" associated with softer zone at bottom 74.15' - Fracture, 50 deg, rough, undulating, open up to 1/4"		Limestone 76.0-76.3' - very pale orange with medium light gray mottling, (10YR 8/2 with N5), very fine grained, moderate HCl reaction, medium strong to strong (R3 to R4), voids (1/16") over 5-10% of surface, some cavities up to 2"x1/2" some are infilled, transitions gradually above	- - - -
85_ -43.7 -	86.0		1 1 NR	74.2' - Bedding plane, top is <5 deg, bottom is 30 deg, piece missing, open to 1" associated with softer zone at bottom 75.0' - Bedding plane or mechanical break, <5 deg, rough, undulating 5.4, 75.5' - Mechanical break (2) 76.6' - Bedding plane. <5 deg, rough.		and below to 76.3-77.0' Limestone 76.3-77.0' - grayish orange, (10YR 7/4), fine grained, mild to moderate HCI reaction, weak to medium strong (R2 to R3), voids (<1/16") over 20-30% of surface, trace cavities	R9:8 minutes Water level = 3.0' below
- - -	R10-NG		1	undulating, open up to 1/4" 76.6-76.9' - Fracture zone, intersecting fractures, fragments to 2" 77.2' - Bedding plane, <5 deg, rough, undulating, open up to 1", associated with dissolution		<1/4", trace fine (1/16") black inclusions 77.0-77.7' - Same as 76.0-76.3' 77.7-78.8' - Same as 76.3-77.0' 78.8-79.5' - Same as 77.0-77.7' No Recovery 79.5-81.0'	ground surface -
90 -48.7	5 ft 40%	53	NR	77.5' - Bedding plane, <5 deg, rough, undulating, open up to 1", associated with dissolution 77.65' - Bedding plane, 30 deg, rough, undulating, open up to 1", associated with dissolution, lithologic change up to 1/2" open 77.95' - Bedding plane, <5 deg, rough, undulating, associated with soft material		Limestone 81.0-85.1' - moderate brown, (10YR 5/4), very fine grained, strong HCl reaction, medium strong to strong (R3 to R4), voids up to 1/16" over 20-40% of surface, moderately fossiliferous, casts to 1/2", organic bedding features at 82.0', very pale	R10:5 minutes
-	R11-NQ		>10	78.1' - Bedding plane, <5 deg, rough, undulating, open up to 1", associated with soft material 78.5' - Bedding plane, <5 deg, rough, undulating, associated with soft material 78.7' - Bedding plane, <5 deg, rough, undulating, open up to 1/4", associated with		orange (10YR 8/2) infill up to 4"x2" from 10-40% of surface (infilling poorly fossiliferous, trace voids to 1/16") 85.1-85.25' - dark yellowish brown, (10YR 4/2), strong HCl reaction, clay lens	- - -
- - 95_ -53.7	5 ft 82%	18	undulating, open up to 1/4", associated wi soft material 79.3' - Bedding plane, <5 deg, rough, undulating 79.4-79.5' - Fracture zone, intersecting fractures, fragments up to 1" 81.3' - Bedding plane, <5 deg, rough, undulating, <1/8" open 81.5' - Bedding plane, rough, undulating, <1/8" open 19.5' - Bedding plane, <5 deg, rough, undulating, open up to 1/2" 82.6' - Fracture or fracture zone, 85 deg, rough, undulating, pieces missing	79.3' - Bedding plane, <5 deg, rough, undulating 79.4-79.5' - Fracture zone, intersecting fractures, fragments up to 1" 81.3' - Bedding plane, <5 deg, rough, undulating, <1/8" open		85.25-85.5' - very pale orange to light gray, (10YR 5/4 to N7), fine grained, strong HCl reaction, medium strong to strong (R3 to R4), trace voids to 1/16" No Recovery 85.5-86.0' Limestone 86.0-88.0' - Same as 85.25-85.5'	R11:5 minutes
- - -	96.0			<5 deg, bottom 30 deg 81.95' - Bedding plane, <5 deg, rough, undulating, open up to 1/2" - 82.6' - Fracture or fracture zone, 85 deg, -		 except 86.0-86.9' is highly fossiliferous, casts to 1/2", light olive gray (5Y 5/2) silt infill, from 86.9-86.95' moderate yellowish brown color (10YR 5/4), dissolution cavities to 2" and some infill of 	- - - -
-	R12-NQ 5 ft 98%	95	0 >5	andulating, open up to 1/2" 83.5, 83.75, 84.05' - Mechanical break (3) 84.75' - Bedding plane, <5 deg, rough, undulating, mostly not open, missing fragments on small part of fracture (1/2") 85.2' - Bedding plane, <5 deg, rough,		moderate yellowish brown (10YR 5/4) No Recovery 88.0-91.0'	- - -
100_ -58.7 -	101.0		0	undulating, open up to 1" 86.92' - Bedding plane, 20 deg, rough, undulating, silt infill described in lithology, no stain, open up to 6"			R12:5 minutes

APPENDIX 2BB-903 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-05 SHEET 7 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723689.4 N, 457584.8 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

CORING	METHOD AI	ND EC	אורווטג	/IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	casin		ORIENTATION : Vertical
WATER	LEVELS: 1.2	ft bgs	s on 5	/5/07 START : 5/4/2007 END : 5/6	6/2007	7 LOGGER : N. Jarzyniecki	
	_			DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		·0	DESCRIPTION	SYMBOLIC LOG		
O A A	Z Z Z	_	FRACTURES PER FOOT	DESCRIPTION	□	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
ACI	JS E S	Q D (%)		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	点	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FRE	NG NG	Z D	AC R	PLANARITY, INFILLING MATERIAL AND	₩ I	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
E S E	8일뿐	Ω.	E H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	ιγ	CHARACTERISTICS	BROI G, TEGT REGGETG, ETG.
			NR/	87.75' - Bedding plane, 20 deg, rough,	ш	Limestone	
-			0	undulating, open up to 1-1/2", no infill,	Н	 91.0-92.9' - very fine grained, trace 	-
I -				associated with dissolution features	Н	voids (1/16") over 30% of surface	-
l _			>10	91.4-91.5' - Fracture zone, fragments to 1/2"x3/4" intersecting fractures -	Ш	increasing with depth, dusky yellowish brown (10YR 2/2), friable,	
			10	91.9' - Bedding plane, zone indurated with	Н	5-30% fossils increasing with depth,	
-	R13-NQ			softer organic silt material	ш	92.3-92.8' clay infill very pale orange	1
-	5 ft	18	>10	92.1' - Bedding plane, <5 deg, rough, -	ш	- (10YR 8/2)	-
_	86%			undulating, open up to 1/8"	Н	92.9-95.1' - yellowish gray, (5Y 7/2),	_
			>10	92.3, 92.5, 92.6' - Bedding plane (3), <5-20 deg, rough, undulating, infill (associated with -		very weak to medium strong (R1 to R3), highly fossiliferous casts to 1/2",	
105			> 10	infill of dissolution) described in lithology	Ш	voids over 20% of surface up to	1
-63.7			2	open up to 1/4"	Н	1/16", dissolution features to 3"x1"	R13:2 minutes
-			NR	92.8-93.05' - Fracture zone, fragments to	口	No Recovery 95.1-96.0'	-
_	106.0		INK	1/2"x3/4" intersecting fractures	Ш	Limestone	
				93.5' - Mechanical break	H	96.0-100.9' - yellowish gray, (5Y 7/2),	
-			0	93.95' - Bedding plane, <5 deg, rough, undulating, open up to 1/4"	口	 very fine grained, extremely weak to medium strong (R0 to R3), yellowish 	1
-			\vdash	95.0-95.01' - Fracture zone	₽₩	gray (5Y 8/1) to moderate yellowish	-
-			0	96.1' - Bedding plane, <10 deg, rough,	H	brown (10YR 5/4) infill, voids up to	-
				undulating, open <1/4"		1/16" over 25% of surface, highly	
	R14-NQ			97.8' - 85-90 deg, rough, undulating, open up	Ш	fossiliferous, casts and molds to 1/4",	1
-	5 ft	95	0	to 1/8" - 97.95' - Bedding plane, <5 deg, rough,	Н	shallow dissolution features up to 2"x1-1/2"	-
_	99%			undulating, up to 1/8" open	П	No Recovery 100.9-101.0'	-
I _			0	98.1-98.2' - Fracture zone, fragments to 1",	Н	_ Limestone	_
110			"	intersecting fractures		101.0-101.9' - yellowish gray mottled	
-68.7				99.45' - Bedding plane, <10 deg, rough,	1—1	with pale yellowish brown, (5Y 7/2	R14:3 minutes
-			0	undulating, open 1/8" 102.0-102.5' - Fracture zone, associated with	Н	with 10YR 6/2), very weak to extremely weak (R1 to R0), voids up	-
-	111.0		NR/	soft material and organic features,	Ш	to 1/16" over 15% of surface,	-
			0	intersecting fractures up to 2"	Н	fossiliferous casts and molds to 1/4",	
			"	102.5-103.25' - Bedding plane or fracture	Н	becomes softer with depth	
-				zone (10+), rough, undulating, up to 1/4"	ш	101.9-105.3' - very fine to fine	1
-			2	open 103.4-104.1' - Fracture zone, associated with	Н	grained, competent, 5% trace organics, fossil molds up to 1/2",	-
_				soft material and organic features,		- trace fossils, trace voids to 1/16",	_
	R15-NQ		4	intersecting fractures up to 2", fragments up	ш	very weak (R1) at 105.1'	
	5 ft 100%	78	1	to 2", highly fossiliferous with fossil molds	\mathbb{H}	No Recovery 105.3-106.0'	1
-	100 /0			(trace) same size as fragments		- Limestone	-
-			2	104.45' - Bedding plane, <5 deg, rough, undulating, up to 1/4" open	ш	106.0-110.95' - Same as 101.0-101.9' except very weak to	-
115				104.7-105.1' - Fracture zone, some bedding, —	H	— weak (R1 to R2), highly fossiliferous,	
-73.7				some intersecting, fragments to 2"	口	fossil casts and molds, trace to 15%	R15:5 minutes
-	116.0		2	105.3' - Bedding plane, <5 deg, rough,	14	<1/16" sized infill of very pale orange	1
-	116.0			undulating, up to 1/8" open	╆	- (10YR 8/2) decreasing with depth,	-
-			0	106.65, 108.1, 108.3, 108.5' - Mechanical break (4)	口	trace organic features No Recovery 110.95-111.0'	-
				112.4, 112.7, 113.0, 114.2, 114.4, 115.8,	Н	Limestone	
				115.85' - Bedding plane (7), <5 deg, rough,	Ш	111.0-116.0' - Same as 96.0-100.9']
-			2	undulating, <1/8" open	口	except (5Y 8/1), vellowish grav (5Y	-
-	D40 NO		-	113.5' - Mechanical break	₽	7/2) is mottled with yellowish gray	-
_	R16-NQ 5 ft	62	2	117.4' - Bedding plane, <5 deg, rough,	Ш	infill, (5Y8/1), very weak (R1), infill	
	100%	02	_	undulating 117.5' - Mechanical break	\Box	poorly fossiliferous, trace (<5%) voids up to 1/16", infill is over	
-				117.5 - Mechanical break 117.75' - Bedding plane, <5 deg, rough,	H	70-100% of surface at 111.0'	1
-			0	undulating	団	_	-
120				118.5' - Bedding plane, <5 deg, rough,	\square		I _{240.7}
-78.7			0	undulating	Н	_	R16:7 minutes
	121.0		ا	118.8' - Bedding plane, <5 deg, rough, undulating, 1/4" open	Ш]
				инацияну, тут орсн	П		

APPENDIX 2BB-904 Rev. 7



PROJECT NUMBER:

33884.FL BORING NUMBER:

GSC-05 SHEET 8 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723689.4 N, 457584.8 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

00	- WIETHTOD 7 ti	10 L	2011 10	MENT . Diethan D-30 3/N 232, mad rotary, NQ tools, HW	Casin	9	ORIENTATION . Vertical
WATER	LEVELS: 1.2	ft bg	s on 5	/5/07 START : 5/4/2007 END : 5/	6/200	LOGGER : N. Jarzyniecki	
				DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOCK TYPE COLOR	
HH H	N. A. Y.	(%)	FRACTURES PER FOOT	22001 11011	윽	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
A H E	E STER	(%) 🛭	F.S.	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOL	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
P.R.A.	S N N N N N N N N N N N N N N N N N N N	Ø	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
Δѕш	OIR	22	шФ		S		
			0	119.4' - Mechanical break	\vdash	116.0-121.0' - Same as 111.0-116.0'	
			"			 except from 116.0-118.1' highly fossiliferous and fine grained fossil 	1
-				•	╁	casts and molds to 1/2", medium	1 1
-			1	122 El Eracturo 45 dos rough undulating	╀	 light gray (N6) infill over <10%, voids 	1 -
_				122.5' - Fracture, 45 deg, rough, undulating		up to 1/16" over 20% of surface and]
	R17-NQ			123.15' - Bedding plane, <5 deg, rough,	\vdash	118.1-121.0' fine grained to very fine grained, size decreasing with depth	
	5 ft 100%	20	1	undulating, up to 1/4" open	╁	Limestone	1
-				•	ш	121.0-126.0' - Same as 111.0-116.0'	1
-			>10		╁┯	except 124.4-124.75' is mottled with	-
125	-83.7			124.8-124.95' - Fracture zone, intersecting —		_ pale orange (10YR 8/2) R17:2 minu	_
-83.7				fractures, 1-1/2" fragments	Н		R17:2 minutes
1 7	126.0		3	l			1 1
-				125.8-126.0' - Fracture zone, intersecting		L 126.0-131.0' - yellowish gray, (5Y	1
-	- - - R18-NQ - 5 ft		1	fractures, 1-1/2" fragments	╀┼┤	7/2), very fine to fine grained, very	-
_				126.75' - 80 deg, rough, undulating, open		weak to weak (R1 to R2), grain size	_
				1/8" to tight (missing very small fragments in	\vdash	increasing with depth, <10-25% voids	
			0	part of fracture)	╨	to 1/16", voids increasing with depth, moderately fossiliferous, fossils to	1
-				128.0' - Bedding plane, <5 deg, rough,	口	1/4", fossil size increasing with depth,	1
-		85	1	undulating, up to 1/4" open	╂┯	 trace dissolution zones to 1/2", 	-
_	100%					129.1-129.8' very fine to fine grained	_
			>10	129.1-129.8' - Bedding plane or mechanical	Ш		
130			-10	break, <5 deg, rough to smooth, planar to	Н		1
-88.7				undulating, tight, some have <1/8" open —			R18:5 minutes
-			1	130.3' - Bedding plane, <5-30 deg, rough to	₽	-	
-	131.0			smooth, planar to undulating, (break changes	口		1 -
			0	in middle of fracture, smoothness and planar change with angle), <1/8" open	┝	131.0-136.0' - Same as 126.0-131.0' - except from 132.2-132.7' fine and	
			"	" '		very fine grained, trace organic	
-				131.8' - Mechanical break	ш	content, moderate to highly	1 1
-			1	-	I_{T}	fossiliferous (casts and molds),	1
-	D40 NO			132.7' - Bedding plane, <10 deg, smooth to		133.35' 1/4" bedding plane of very light gray (N8)	1 4
I _	R19-NQ 5 ft	85	0	rough, undulating, up to 1/8" open 133.2, 133.5, 133.6' - Mechanical break (3)	╨	light gray (No)]
	100%	00		100.2, 100.0, 100.0 - Weenanical break (0)			
1 7				134.05' - Bedding plane, 15-20 deg, rough,	1—		1 1
405			1	undulating, could be mechanical break due to		_	1 1
135_ -93.7			<u> </u>	drilling	igspace	-	R19:8 minutes
55.7			1		\vdash	-	
	136.0			135.8' - Bedding plane, <5 deg, smooth,	\Box		l J
				undulating, rock fragments	\vdash	136.0-137.7' - Same as 131.0-136.0'	
			0	136.2, 136.3, 137.4 - Mechanical break (3)	\Box	 except grades from moderate yellowish brown to yellowish gray 	1
-				-	1	(10YR 5/4 to 5Y 7/2), fine to very fine	1 1
-			2			grained, extremely weak to weak (R0	-
_				137.7' - Bedding plane, <5 deg, rough,	口	to R1), very fine at 137.4', 1.2" thick	_
	R20-NQ	44	_E	undulating, 1/2" open		moderate olive brown (5Y 4/4), trace voids to 1/16"	
]	5 ft 98%	44	>5	137.95-138.3' - Bedding plane, <5 deg, smooth to rough, planar, <1/8" open except		- voida to 1/10	1
-				for 138.3' with up to 1/4" open	╨	-	1
-			1	138.5' - Mechanical break, along bedding	\Box	-	-
140_			<u> </u>	plane	\vdash	_	D00:40
-9ö./	98.7		0	138.6' - Bedding plane, <5 deg, rough, undulating, 1/4" open			R20:10 minutes
	141.0		سًا	andulating, 1/4 Open	\Box		
-				-	_		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-05 SHEET 9 OF 10

ROCK CORE LOG

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723689.4 N, 457584.8 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

WATER LEVELS : 1.2 ft bgs on 5/5			s on 5/	5/07 START : 5/4/2007 END :	5/6/	2007	7 LOGGER : N. Jarzyniecki	
≥∩ ∷	(9)			DISCONTINUITIES		Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION		SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
జౢౢౢౢౢౢౢ	RUI H, / ÆR	(%) Q	J- FO	DEDTH TYPE OBJENTATION POLICHNESS		Z l	MINERALOGY, TEXTURE,	FLUID LOSS, CORING RATE AND
F F ¥ ¥	RE VGT COV	αD	ACT R F(DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	- 1	MBC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SCI	CS LEP	RG	FE	THICKNESS, SURFACE STAINING, AND TIGHTNES	S	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
			NR/	139.3' - Bedding plane, <5 deg, rough,	┪	\Box	Limestone	
-			>10	undulating, open	+	+	- 137.7-138.3' - moderate olive brown,	-
-				140.15' - Fracture, 45 deg, rough, undulating,	╌	-+1	(5Y 4/4), very fine grained, medium	1 -
I _			5	open 141.0-141.25' - Fracture zone, intersecting	Ţ	Ц	strong (R3), voids (up to 1/16") over 20% of surface, moderate fossils	
				fractures, fragments 1", organic stain	ŀ	П	(casts) to 1/4"; interbedded with	1
1 7	R21-NQ			141.6, 141.8' - Bedding plane (2), 10-20 deg,	1		medium light gray (N6) with trace	1 1
-	5 ft	30	>10	rough, undulating, organic stain, up to 1/4" open associated dissolution features	1	Н	- voids to 1/16", poorly fossiliferous	1 1
-	82%			141.7' - Fracture, 85 deg, rough, undulating,	ŧ	П	138.3-140.9' - Same as 131.0-136.0' except grades from poorly	-
-			>10	organic stain, open to 1/8"	+	\dashv	- fossiliferous to moderate to high	1 -
145			0	142.1' - Bedding plane, <5 deg, rough,	ᅪ	╫	fossils, fossils up to 1/4" grades from	
-103.7				undulating, organic stain	T	Ш	trace voids (<1/16") to voids (1/16")	R21:11 minutes
-	146.0		NR	142.4, 142.5, 142.6' - Bedding plane (3), <5 deg, rough, undulating, up to 1/8" open	1	\dashv	 over 10% of surface, interbeds of light olive gray (5Y 5/2) up to 1/2" 	1
-	146.0			142.9' - Bedding plane, <5 deg, rough,	+	\Box	thick, interbed (discontinuous or	1
-			1	undulating, up to 1/2" open	+	Щ	could be infill) at 138.75' very light	-
_				143.1-143.4' - Fracture zone, intersecting		Т	gray (N8) and infill of same material	
				fractures, fragments to 1-1/2", organic stain 144.0-144.2' - Fracture zone, intersecting	ŀ	\dashv	seen in interbeds of light olive gray (5Y 5/2) at 140.15' that is 2" thick	1
			1	fractures, pieces to 1-1/2", organic stain	1	\dashv	No Recovery 140.9-141.0'	1 1
-	R22-NQ			144.4' - Bedding plane, <5 deg, rough,	-[Ц	Limestone	1 1
-	5 ft	62	1	undulating, up to 1/2"	ł	П	_ 141.0-144.2' - light gray to light olive	-
-	96%			144.7' - Bedding plane, <5 deg, rough, undulating, organic stain	-‡		gray, (N7 to 5Y 6/1), very fine grained, weak to medium strong (R2	1 -
_			4	144.9' - Bedding plane, 5 deg, rough,	╁	Щ	to R3), voids (up to 1/16") over	
150				undulating, up to 1/4" open	Ė	П	10-15% of surface, fossils up to 1/4",	1
-108.7			. 40	146.35' - Bedding plane, <5 deg, smooth to	7	+	dissolution features up to 2"x1/2",	R22:11 minutes
-			>10	rough, undulating, up to 1-1/2" open 147.1' - Fracture, 60 deg, rough, undulating	+	╫	_ dusky yellow (5Y 6/2) infill very fine grained, voids over 25%, few	1 -
-	151.0		NR.	148.5' - Bedding plane, 10 deg, rough,		Щ	1/4"-1/2" dissolution features	-
-			>10	undulating, up to 1/2" open	╁	П	_ 144.2-145.1' - moderate yellowish	1
				149.3, 149.45' - Fractures (2), 75-80 deg,	J		brown with wavy light olive gray beds, (10YR 5/4 with 5Y 5/2), up to	
			_	rough, undulating 149.65' - Bedding plane, 20 deg, rough,	H		1/2" thick and a 1-1/2" thick medium	1
_			>5	undulating, open <1/8"	1	П	light gray (N6) bed, dusky yellow and	1 1
-	R23-NQ			149.9' - Bedding plane, <5 deg, rough,	+	\forall	- light olive gray has 20-30% voids up	1 -
-	5 ft	56	1	undulating 150.25-150.4' - Fracture zone, intersecting			to 1/16", fossils to 1/8" No Recovery 145.1-146.0'	1 -
-	90%			fractures, 1" fragment	4	Щ	- Limestone	1 -
			2	150.6-150.8' - Fracture zone, intersecting	上	П	146.0-150.8' - moderate yellowish	
155				fractures, 1" fragment	Ţ	\blacksquare	brown to yellowish gray, (10YR 5/4 to]
-113.7			2	151.15-151.3' - Fracture zone, intersecting fractures up to 1"	十		 5Y 7/2), fine to very fine grained, grain size increasing with depth, 	R23:8 minutes
-	450.0		NR	151.4, 151.6' - Bedding plane, <5 deg, rough,		П	appears to have breccia clasts,	-
-	156.0		1417	undulating, open up to 1/2"	胩	\dashv	yellowish gray (5Y 7/2), pale olive	11:10 water level 3.0'
-				151.8' - Bedding plane, <5 deg, rough,			(10YR 6/2) and light gray (N7), moderately fossiliferous up to 1/4", at	- 11.10 water level 3.0
				undulating, up to 1/8" open 151.9-152.2' - Fracture zone, fragments to 2"			148.9' abrupt change to light olive	
				152.5' - Fracture, 65-70 deg, smooth,			gray (5Y 6/1), very fine grained,	11:11 grout hole, used 31
				undulating, organic stain			strong to very strong (R4 to R5),	bags of grout -
-				152.6' - Bedding plane, <5 deg, rough, undulating, organic stain, <1/8" open	$ \cdot $		trace voids to 20%, voids increase with depth, poorly fossiliferous with	-
-				152.8' - Bedding plane, <5 deg, rough,	-		bedding features at 150.05-150.35'	-
-				undulating, associated with dissolution zone			yellowish gray (5Y 8/1), olive gray	
				153.3' - Fracture, 65-70 deg, smooth,			(5Y 3/2) and pale yellowish brown	
]				undulating 154.4' - Fracture, 65-70 deg, smooth,	1		(10YR 6/2) No Recovery 150.8-151.0'	1
-				undulating	H		Limestone	-
-				154.8' - Fracture, 65-70 deg, smooth,	-		151.0-152.8' - Same as 137.7-138.3'	1
<u> </u>				undulating	-			



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-05	SHEET	10	OF	10	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723689.4 N, 457584.8 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Crews

00111110	INICITIODA	ND LC	ZOII IV	IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools	5, 1100	asiii	-	ORIENTATION : Vertical
WATER	LEVELS: 1.2	2 ft bas	s on 5	/5/07 START : 5/4/2007 EN	ID : 5/6	/2007	7 LOGGER : N. Jarzyniecki	
				DISCONTINUITIES			LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	<u> </u>		 		SYMBOLIC LOG	LITIOLOGI	COMMULITY
S S S S	JN ≻		FRACTURES PER FOOT	DESCRIPTION) L	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
뻐병은	5. H	(%	유전	DEDTIL TYPE OPIENTATION POLICINIES	,	ട്ര	MINERALOGY, TEXTURE,	FLUID LOSS, CORING RATE AND
₽₩¥	GT GT SOV) Q	D.	DEPTH, TYPE, ORIENTATION, ROUGHNESS PLANARITY, INFILLING MATERIAL AND	5,	BC	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
유등의	620	R Q D (%)	RA	THICKNESS, SURFACE STAINING, AND TIGHTN	NESS	≥	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
Δош	074	Ľ.	шп			S		
							Limestone	
1 -					-		- 152.8-154.4' - yellowish gray mottled	-
1 -					_		with pale olive, (5Y 7/2 with 10Y 6/2),	-
							very fine grained, organic laminations	
1 7							- at 153.55', dissolution features to 1/2"x1/4", moderately fossiliferous,	<u> </u>
1 -					-		fossils to 1/4", voids (1/16") over	-
1 4					_		- <10% of surface	
							154.4-155.5' - Same as 137.7-138.3'	
1 7					-		except weak to strong (R2 to R4),	-
-					-		 beds up to 5" thick 	-
							No Recovery 155.5-156.0'	_
]							Bottom of Boring at 156.0 ft bgs on	
-					-		- 5/6/2007	-
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-06 SHEET 1 OF 11

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723774.1 N, 457972.0 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

DRILLING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit

ORIENTATION: Vertical

DRILLIN	G METH	OD AND	<u>EQUIPM</u>	ENT : Dietrich D-5	50 S/N 232, mud rotary, cathead, NW rods, 3-7/8" tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 2.5 ft bo	gs on 4/1	7/07	START : 4/17/2007 END : 4/19/2007 LOGGER : C. Wallestad
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY
ON EE				TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,
ATI		RECOVE	ΕΚΥ (Π)		MOISTURE CONTENT, RELATIVE DENSITY OR OF DRILLING FLUID LOSS, TESTS, AND
E S S S			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
<u>оош</u> 42.5	0.0			(N)	Poorly Graded Sand (SP)
42.5	0.0			1-2-2	0.0-0.8' - very light gray to brownish gray, (N8 to 5YR -
l _		1.1	SS-1	(4)	√ 4/1), brownish gray mottling, moist, soft, very loose,
	1.5			` ′	fine grained, no HCl reaction, silica sand, dark mottling (organics) and 5% organics as roots and
-					Sandy Organic Soil (OL)
-					\ \ \ 0.8-1.1' - brownish black, (5YR 2/1), moist, no HCl \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
-					reaction, organic matter and/or nonplastic silt, 20%
l _					fine silica sand, organics as roots Water level at 2.5 below ground surface at 14:15
]
5	5.0				1
37.5	5.0				Silty Sand (SM)
-			00.0	1-3-4	5.0-6.2' - moderate yellowish brown, yellowish gray,
-		1.2	SS-2	(7)	(10YR 5/4, 5Y 8/1), wet, loose, fine grained,
_	6.5				nonplastic, moderate yellowish brown transitioning to yellowish gray, fine silica sand with 20-30% fines
					yellowish gray, line sinea sand with 20-50 // lines
-					
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l _					<u> </u>
10	10.0] [
32.5					Silty Sand (SM)
-		0.8	SS-3	2-4-14	10.0-10.2' - yellowish brown, (5Y 7/2), wet, medium
-		0.0	33-3	(18)	\dense, fine grained, no HCl reaction, fine silica sand \with 20% plastic fines \
-	11.5				Clavey Sand (SC)
					10.2-10.75' - yellowish gray, (5Y 8/1), wet, medium
					\dense, fine to coarse grained, low to medium
					plasticity, moderate HČl reaction, 30% low to medium plastic fines, one coarse gravel-sized limestone
-					fragment, organic lens from 10.55-10.6'
-					
-					
-					
15	15:9				
27.5		0.1	SS-4	50/1.5	Silt (ML) 15.0-15.1' - gravish vellow (5V.8/4) moist popplastic. Driller's Remark:15.2-16.0' heavy chattering
]				(50/1.5")	\ 15.0-15.1' - grayish yellow, (5Y 8/4), moist, nonplastic, -
-					\fine sand-sized limestone fragments with coarse
-					sand-sized to fine gravel-sized, carbonate materials -
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	GSC-06	SHEET	2	OF	11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723774.1 N, 457972.0 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

WATER	LEVELS	: 2.5 ft bg	s on 4/17	7/07 5	START : 4/17/2007 END : 4/19/2007 LOGGER : C. Wallestad	
≥∩≎				STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION COMMENTS	_
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	
TH B FACE		RECOVE	- ' '		MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	
DEP' SURI ELE\			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	
22.5	20.0	0.2	SS-5	50/2	Limestone Fragments	
				(50/2")	\textsquare \text{20.0-20.2'} - grayish yellow, (5Y 8/4), strong HCl \qu	
_						
-					1 1	
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-					- 1	4
-					- 1	-
-					1 1	-
25	25.0				1 1	-
17.5					Silty Sand (SM) 25.0-26.1' - grayish orange, (10YR 7/4), moist, very	
		1.1	SS-6	28-30-45 (75)	dense, mild to moderate HCl reaction, fine to coarse	_
-	26.5			. ,	sand-sized and trace gravel-sized, 35% nonplastic	
-						
-						-
-					- 1	4
-						-
-					1 1	+
30	30.0				1 1	
12.5				00.40.0	Silty Sand (SM) 30.0-30.85' - Same as 25.0-26.1' except moderate to	
_		0.9	SS-7	20-13-8 (21)	strong HCl reaction, gravish vellow limestone (10YR	
-	31.5				\7/4), from 30.7-30.85 and very stiff, not hard \ / -	
-						_
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-					1 1	-
-					1 1	-
-					1 1	-
35	35.0 35.2				1	
7.5	33.2	0.2	SS-8	50/2.5 (50/2.5")	Silty Sand (SM) \[\sqrt{35.0-35.15'} - Same as 25.0-26.1' \]	_
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-06 SHEET 3 OF 11

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723774.1 N, 457972.0 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

WATER	LEVELS	: 2.5 ft bo	gs on 4/17	7/07	START : 4/17/2007 END : 4/19/2007 LOGGER : C. Wallestad	_
>00				STANDARD	SOIL DESCRIPTION g COMMENTS	╝
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	
H BE ACE ATIO		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND	- 1
EPT SURF			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	١
2.5	40.0	0.1	\ SS-9 /	50/1	Limestone Fragments / Driller's Remark: Heavy chatter throughout	┨
-				(50/1")	\delta 40.0-40.1' - pale yellowish brown, (10YR 6/2), /- except no chatter at 41.0-41.5' /- moderate HCl reaction, carbonate	1
-					Inductate From reaction, carbonate	1
-					1 1	1
-]]	1
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_					_	4
45 -2.5	45.0 45.2	0.2	SS-10,	50/2	Silty Sand And Limestone (SM)	4
-2.5		0.2	33-10	(50/2")	45.0-45.2' - light olive gray, (5Y 5/2), wet, very dense,	4
-					fine to coarse grained, moderate HCl reaction, fine to coarse sand-sized, 20-25% fines, 40% of sample is	\exists
-					coarse sand to fine gravel-sized limestone fragments -	\exists
-					-	\exists
-					-	Ⅎ
-						1
-						1
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50_	50.0					_]
-7.5				45-25-40	Silty Sand And Limestone (SM) 50.0-51.25' - moderate yellowish brown, (10YR 5/4),	
_		1.3	SS-11	45-25-40 (65)	wet, very dense, fine grained, moderate HCl reaction, □ □ □ □ □	4
-	51.5				20-25% low plastic fines, 35-40% of sample is coarse sand to fine gravel-sized limestone fragments	4
-					-	4
-					-	\exists
-					-	\exists
-						Н
-						\exists
55	55.0					\exists
-12.5	00.0				Limestone And Silty Sand (SM) Driller's Remark: During SPT for SS-12,	\dashv
				7/1-1/24	\sqrt{55.0-55.2'} - Same as 50.0-51.25' except 60% of sample is limestone, 40% of sample is silty sand spoon fell 2.0' after 7 blows over 1 inch, possible 2' void at 55.1'	1
		0.2	SS-12	(8/25")	possible 2 void at 55.1]
	57.1]	
_]	1
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	GSC-06	SHEET	4	OF	11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723774.1 N, 457972.0 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

WATER	LEVELS	: 2.5 ft b	gs on 4/17	7/07 5	START : 4/17/2007 END : 4/19/2007	LOGGER	: C.	Wallestad
				STANDARD	SOIL DESCRIPTION		O	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	STANDARD PENETRATION TEST RESULTS			SYMBOLIC LOG	
H H H		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLO MOISTURE CONTENT, RELATIVE DENSITY (OR	OLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
HTF A			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALO		/MB	INSTRUMENTATION
-17.5				(N)	Oilte Oard And Lineatens (OM)		Ś	Finish addition at 47.40 are 4/47/07, authors
-17.5	60.0		00.40	42-32-50/4.5	Silty Sand And Limestone (SM) 60.0-61.2' - Same as 50.0-51.25' except 45-50%	% fine		Finished drilling at 17:48 on 4/17/07, setting HW casing to 61.0' below ground surface
l -		1.2	SS-13	(82/10.5)	to coarse limestone fragments, 30% fine to coal sand-sized, 20-25% low plastic fines	rse		_
-	61.4							
-					Begin Rock Coring at 61.5 ft bgs See the next sheet for the rock core log	- 4		_
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-06 SHEET 5 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723774.1 N, 457972.0 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

00111110		10 -	<u> </u>	MENT . Dietrich D-50 5/N 252, mud rotary, NQ tools, HW	,,,,,,,,,	•	ORIENTATION : Vertical
WATER	LEVELS : 2.5	ft bg	s on 4	/17/07 START : 4/17/2007 END : 4/	19/200	7 LOGGER : C. Wallestad	
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표원한	N Y Y	(%	FRACTURES PER FOOT		음	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
±ĕ,¥	E E E	(%) _Q	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
989	SEN S	Ø	RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
ПОП		ď	44	,	S		
l _	61.5		2	61.7' - Mechanical break	Н	Limestone - 61.5-65.8' - moderate yellowish	Resume drilling at 07:45 at 4/18/07 with rock coring -
1			~	62.0, 62.1, 62.65, 62.85, 63.15, 63.3, 63.75,	ш	brown, (10YR 5/4), fine grained,	Water level is 2.5' below
-				64.15, 65.4, 65.55' - Bedding plane or	Н	moderate HCl reaction, extremely	ground surface
-			4	mechanical break (10), horizontal, smooth, undulating, tight to 1/8" open	+	 weak to weak (R0 to R2), rock 	1 -
-				62.35' - Mechanical break	Ш	strength increasing with depth, voids,	-
	R1-NQ	20	2	02.00 100.1000.	Н	to 3/16" over 20-30% of surface, moderately fossiliferous with casts to	1
-	5 ft 86%	32	-		\top	1/4"-1/2", dissolution cavities to	1 7
-	3070				ш	1/2"x1" over 5-15% of surface, (dark	1 -
-22.5			1	_	Н	— possibly organic) material over	-
-22.5			L.,			5-10% as of surface from 61.5-62.3'	_
			1		ш	No Possyany 65 9 66 5'	R1:2 minutes
-	66.5		NR		\Box	- No Recovery 65.8-66.5'] 1
-	00.0			66.5-66.8' - Fracture zone	口	Limestone	1
-			10		╀┤	- 66.5-71.05' - Same as 61.5-65.8'	Driller's Remark: Driller
I -				67.1, 68.4, 68.9, 69.6, 70.5' - Bedding plane	ш	except very weak to weak (R1 to R2),	runs in 2nd gear at 350 psi -
1			4	or mechanical break (5), smooth, undulating, tight to 1/8" open	H	no dark/organic material, and all very weak to weak rock (R1 to R2)	12.10 2.13 godi at 000 poi
1 -			1	light to 170 open	1Н	- weak to weak rock (RT to R2)	1 7
-	R2-NQ				ш	_	1 -
-	5 ft	52	3		╂┼┤	_	1 -
l -	91%			69.1, 69.2, 69.85, 69.95, 70.4' - Bedding plane or mechanical break (5), rough,		_	1 -
70			6	undulating, tight to 1/2" open —	ш		
-27.5			0	70.15, 72.5, 72.75, 73.0, 75.05, 75.55' -	Ш		
-			1	Bedding plane or mechanical break (6),		-	R2:3 minutes
-				horizontal, smooth, undulating, tight	Н	No Possyan, 74 05 74 5'	1
-	71.5		NR	70.35' - Fracture or mechanical break, rough,	ш	No Recovery 71.05-71.5'	1 -
I _			1	undulating	Н	Limestone - 71.5-76.4' - Same as 61.5-65.8']
1			'			except no dark, possibly organic	1
-					ш	material, dissolution cavities to	1 1
-			4		Н	- 1"x1/2" over 5% surface, extremely	1 1
-	D0 N0			73.25, 73.6, 73.75' - Bedding plane or		weak rock (R0) from 72.2-72.6' and 72.9-73.4' and increasing to	I -
l _	R3-NQ 5 ft	66	2	mechanical break (3), <10 deg, rough,	Н	- moderately strong rock (R3) with]
1	98%	00	-	undulating, tight, 1/2" open 74.0' - Mechanical break		depth	1
75				Woonamour broak	\mathbb{H}	-] 1
-32.5			1	_	ᡛ╣		-
-			-		Ш	-	R3:9 minutes
-			1		H	_	1.0.3
	76.5		NID		口	- No December 70 4 70 F	
			NR.	76.6, 77.35, 77.55, 77.8, 78.4, 78.9, 79.9' -	Ш	No Recovery 76.4-76.5' Limestone]
-			2	Bedding plane (7), horizontal, smooth,	Ш	76.5-77.35' - moderately yellowish	1
-				undulating, tight to 1/8" open		brown to grayish orange, (10YR 5/4	-
-			10	77.8-78.15' - Fracture zone, fragments to	╂╫	to 10YR 7/4), medium grained,	Drillaria Damarii: 500/ I
I -				1"x2"	Д	moderate HCl reaction, very weak to medium strong (R1 to R3), voids to	Driller's Remark: 50% loss of circulation at 78'
1	R4-NQ	0-	_	78.25' - Fracture, 80 deg, smooth, undulating,	H	1/8" over 15-30% of rock, poorly	or oriodiation at 10
1 -	5 ft 64%	25	3	open 79.0' - Bedding plane or mechanical break,		fossiliferous with trace casts to 1/16"	1
	0-7/0		1	<10 deg, rough, undulating, 1/2"-1" open	╁┼┤	x3/16", trace dissolution cavities to	-
-37.5			<u> </u>	79.5' - Fracture, 80 deg, smooth, undulating, —	\Box	2"x1"	-
-57.5			NR	tight	口	_]
			INK		H	_	R4:7 minute
	81.5				Ш		1
					\Box		1



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-06 SHEET 6 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723774.1 N, 457972.0 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

WATER	LEVELS : 2.5	ft bgs	s on 4	/17/07 START : 4/17/2007 END : 4/	19/200	D7 LOGGER : C. Wallestad	
\$ D €	(%)			DISCONTINUITIES	၂ ၂	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH BI FACE	E RU 3TH, OVEF	(%) _Q	STUF FOO	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP' SURI ELE\	COR	RQI	FRA(PER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
				81.55,82.55,83.3,84.0' - Bedding plane or		Limestone	
-			3	mechanical break (4), horizontal, rough,	Н	 77.35-79.1' - grayish orange to pale yellowish brown, (10YR 7/4 to 10YR 	Driller's Remark: Void at
-				undulating, 1/4" open to open 81.95, 82.4, 83.15' - Bedding plane or	П	6/2), fine to medium grained, strong	81.5-82.0 (dropped stem), – 100% loss of circulation
-			10	mechanical break (3), 10-20 deg, rough, undulating, tight to 1/2" open	Ħ	 HCl reaction, weak to medium strong (R2 to R3), voids to 1/8" over 5-20% 	100 /0 1033 01 011 011 011
_	R5-NQ			82.4-83.8, 83.3-83.8' - Fracture zone (2),	H	of surface, poorly fossiliferous with	1
-	5 ft 76%	28	4	fragments to 1"x3" 84.1' - rough, 2 intersecting near vertical	Ш	 trace fossil casts to 1/8"x1/8", dissolution cavities to 1"x1/2" (trace) 	1
85			10	fractures, undulating	Ш	79.1-79.7' - Same as 76.5-77.35' — No Recovery 79.7-81.5'	1
-42.5				84.7-85.3' - Fracture zone, fragments to — 1-1/2"x3", fractures at 70-90 deg	Н	Limestone	1
			NR	-	Н	81.5-85.3' - Same as 79.1-79.7' No Recovery 85.3-86.5'	R5:5 minutes
	86.5				囯	_]
			10/	86.5-86.65' - only recovered rock	団	Limestone - 86.5-86.65' - Same as 79.1-79.7']
					H	No Recovery 86.65-91.5']
_				_	H	_]
_				_	H	-]
_	R6-NQ 5 ft	0	NR	_	H	-]
_	3%		INIX	<u>-</u>	H	_	
90 <u> </u>				_	Н		Driller's Remark: Core blockage caused no —
-47.5				-	Н	=	recovery for core run R6 R6:25 minutes
-				-	Н	_	Ro.25 minutes
-	91.5			-	H	Limestone	-
-			10	91.65, 92.9, 94.05, 94.5' - Bedding plane (4), horizontal, smooth, undulating to planar, tight	H	 91.5-94.1' - yellowish gray, (5Y 7/2), 	-
-				to 1/2" open -	団	very fine to fine grained, strong HCl reaction, medium strong (R3), voids	-
-			10	91.65-92.0' - Fracture zone, fragments to 1-1/2"x2", some silt infill	Ш	 to 1/16" over 5-10% of surface, trace fossil casts to 3/16", trace cavities to 	-
-	R7-NQ			92.5-92.8' - Fracture zone, fragments to 1-1/2"x1-1/2", silt and coarse sand infill,	\mathbb{H}	1-1/2"x1/16", with poorly competent	-
-	5 ft 94%	44	10	92.5-92.65'	Ħ	infill, silty layer at 91.9-92.0' and 92.5-92.65'	
95	J-70			93.25, 93.3, 93.55' - Fracture zone or - mechanical break (3), 70 deg, undulating to	Ħ	94.1-96.2' - very pale orange to	1
-52.5			1	stepped, smooth to rough	Ħ	— grayish orange, (10YR 8/2 to 10YR 7/4), fine to medium grained, strong	
-			0	93.5' - Fracture, 80 deg, smooth, undulating, - dark staining, tight	$\parallel \parallel$	HCl reaction, very weak to weak (R1 to R2), voids to 1/16" over 25% of	R7:21 minutes
	96.5		NR	93.75' - Fracture, as above at 93.5' except 20 deg	Ш	surface, trace fossil casts to	1
			2	94.1-94.25' - Fracture zone	\mathbb{H}	1/4"x1/8", no visible cavities, silt layer (low plasticity) from 94.1-94.5'	1
				95.7' - Fracture, 40 deg, smooth, planar, silty infill, tight	H	No Recovery 96.2-96.5']
			0	96.55, 96.6' - Bedding plane (2), 0-10 deg,	囯	Limestone 96.5-101.5' - Same as 94.1-96.2']
_				smooth, undulating to stepped, dark staining (possibly organics), infill, tight	Ш	except trace cavities with light]
-	R8-NQ 5 ft	97	1		Ш	colored infill to 1"x1-1/2"]
-	100%			99.4' - Mechanical break or fracture, 30 deg,	Н	- -	
100_ -57.5			1	rough, undulating, tight to 1/4" open	H	<u> </u>	
-51.5				100.1' - Fracture, at 99.4' except very rough and undulating	Ħ	- -	D9:7 minutos
-			0	-	H	- -	R8:7 minutes
	101.5				H		
$\overline{}$							



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-06 SHEET 7 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723774.1 N, 457972.0 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

WATER	LEVELS : 2.5	ft bgs	s on 4/	17/07 START : 4/17/2007 END : 4/	19/20	D7 LOGGER : C. Wallestad	
30€	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
ELO ON (f	N, AND RY (9	_	ZES T	DESCRIPTION	CLC	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
_			1	101.7' - Fracture, 80 deg, smooth, undulating, tight		Limestone 101.5-106.0' - Same as 94.1-96.2' except trace cavities to 1/2" diameter	_
-	50.110		10	102.8, 103.25, 103.3, 103.55, 103.9, 104.85, 105.65, 105.75' - Fracture (8), 0-20 deg, smooth, undulating to planar, tight to 1/4"	臣	with no infill and trace fossil casts to 3/4"x1/4"]
-	R9-NQ 5 ft 90%	69	3	open 103.25-103.3' - Fracture zone, fragments to 1/2"x1"		-	-
105 -62.5			1	-	井	<u> </u>	R9:7 minutes
-			∠ NR		井	No Recovery 106.0-106.5'	-
-	106.5		INIC		╁	Limestone	-
-			1	107.1, 108.4, 108.7, 109.25, 109.65, 109.8,	╁	 106.6-111.5' - Same as 101.5-106.0' except percentage of voids 	1
-				110.3' - Bedding plane or mechanical break (7), horizontal, smooth, undulating, tight to	廿	decreasing with depth down to 5%	1
-			1	(7), Honzonial, Smooth, undulating, light to 1/4" open	泄	-	1
	R10-NQ 5 ft	68	3				
_	100%	00	J		Ш	_	
110			4	_	Н	_	
-67.5 -				110.45-111.25' - Fracture zone, fragments to	\vdash	_	D10:6 minutos
-			10	2"x4", most at 40 deg	\blacksquare	_	R10:6 minutes
-	111.5			444 C 440 El. Espatusa Tana fragmanta ta	押	 111.5-116.5' - grayish orange, (10YR	-
-			>10	111.6-112.5' - Fracture zone, fragments to 2"x2", many horizontal bedding planes	世	- 7/4), fine to medium grained, strong	-
-					世	HCl reaction, extremely weak to very weak (R0 to R1), voids to 1/16" over	-
-			1		世	 5-20% of rock increasing in coverage with depth, trace fossil casts to 	-
-	R11-NQ			113.5' - Bedding plane, horizontal, smooth,	丗	1/4"x1/8", wavy bedding planes from	1
-	5 ft 92%	46	1	undulating, tight	\blacksquare	- 111.5-112.6'	1
115_ -72.5			10	114.7-114.9' - Fracture zone, fragments to _ 1-1/2"x2"		_	
			2	115.8' - Fracture or mechanical break, 10			R11:6 minutes
	116.5		NR	deg, rough, undulating, tight to 1/4" open		No Recovery 116.1-116.5'	Finish drilling on 4/18/07 at 17:00, at 116.5'
-			10	116.5-116.6, 116.85-116.95, 117.45-117.65, 119.3-119.5' - Fracture zone (4), fragment to 1-1/2"x1-1/2"	出	Limestone 116.5-120.7' - pale yellowish orange to pale yellowish brown, (10YR 8/2 to	Resume drilling at 07:20 on
_			10	116.6, 116.85, 116.95, 117.1, 117.3, 117.45, 117.65, 119.3, 119.5, 119.8, 120.5' - Bedding plane or mechanical break (11), all rough to		10YR 6/2), medium to coarse grained, strong HCl reaction, extremely weak to weak (R0 to R2),	4/19/07 -
-	R12-NQ 5 ft	46	10	smooth, undulating, open to 1/4" open, except 120.5' <10 deg	声	voids to 3/16" over 5-25% of rock, fossil casts to 1/2" diameter over 5%	
100	84%				田	surface, trace cavities filled with dark material	-
120 -77.5			10	_	坩	_	-
-			1		丗	No Posovoni 120 7 424 5	R12:8 minutes
-	121.5		NR		丗	No Recovery 120.7-121.5'	1
					\Box		



PROJECT NUMBER:

33884.FL

BORING NUMBER:

GSC-06 SHEET 8 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723774.1 N, 457972.0 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

WATER	LEVELS : 2.5	ft bgs	s on 4/	17/07 START : 4/17/2007 END : 4/	19/20	07 LOGGER : C. Wallestad	
≥ D ⊋	(°)			DISCONTINUITIES	၂ ၅	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH B FACE	E RU STH, OVEI	R Q D (%)	FOG	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP SUR ELE	COR	RQ	FRA(PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
				121.7-121.9' - Bedding plane, horizontal,	ш	Limestone	
-			4	smooth, planar to stepped, tight	丗	 121.5-126.2' - Same as 116.5-120.7' except voids decreasing to 5% 	1
			4	- 122.65,122.7, 122.85, 123.0, 125.25' -	Ш	coverage with depth, highly fossiliferous from 121.5-124.4 with	1
			4	Bedding plane or mechanical break (5), 0-5 deg, smooth, undulating, tight	Н	casts to 1/4"-1/2" over 15% of]
	R13-NQ 5 ft	48	2	-	H	surface, solution cavities to 1/4"-1/2" over 5-7%, interval of fine grained	
_	94%	.0		124.4' - Fracture zone or mechanical break.	F	moderately strong (R3) rock with	_
125_ -82.5			10	20 deg, smooth, undulating, tight	Ħ	distinct lamination and trace voids (up to 1/16") at 121.7-121.9'	_
-02.5				124.5 - Fracture, 80 deg, smooth, planar, tight	H	_	R13:5 minutes
-			10	124.95' - Fracture, 30 deg, smooth, planar, tight	H	_	- 17.10.0 1111111111111111111111111111111
-	126.5		NR	125.25-125.6' - Fracture zone, fragments to	H	No Recovery 126.2-126.5' Limestone	-
-			10	3"x1" 125.6' - Fracture, 65 deg, smooth, planar,	H	 126.5-131.0' - very pale orange, 	-
-				open 125.9-126.0' - Fracture zone, fragments to	Ш	_ (10YR 8/2), fine to coarse grained, strong HCl reaction, extremely weak	-
-			4	1"x1-1/2"	띰	 to very weak (R0 to R1), grain size becoming more coarse with depth, 	-
-	R14-NQ		40	126.5-127.0' - Fracture zone, some dark staining, fragments to 2"x1"	F	voids to 1/8" over 5-25% of surface,	1
-	5 ft 90%	26	10	127.0, 127.3, 127.45, 128.0, 128.2, 128.35,	H	 trace cavities to 1/2"x1" filled with light colored infill, poorly fossiliferous 	1
130			4	129.25, 129.4, 130.7, 130.8' - Bedding plane or mechanical break (10), 0-5 deg, smooth,	$oxed{oxed{\square}}$	with trace casts to 1/4"]
-87.5			4	planar to undulating, tight 129.55, 129.95, 130.2' - Fractures, 50 deg,	Щ	_	
_			2	smooth, undulating to planar, tight to 1/4"	H		R14:4 minutes
_	131.5		NR	open 129.7' - Fracture, rough, undulating, near -	H	No Recovery 131.0-131.5'	_
_			10	vertical, open 131.75, 131.8, 131.95, 132.0, 132.35, 132.45'	H	Limestone - 131.5-135.05' - Same as	-
-				- Bedding plane (6), horizontal, smooth,	╁	126.5-131.0' except laminated at 134.25-134.9'	-
-			2	planar, tight 131.85' - Fracture, vertical, smooth, planar	H	-	-
-	R15-NQ			132.55, 132.95, 134.45, 135.15, 135.35' - Bedding plane (5), horizontal, smooth,	\vdash	-	-
-	5 ft 84%	34	10	planar, tight	Ħ	-	-
135	01/0			133.85, 134.25' - Bedding plane or mechanical break (2), 0-10 deg, rough,	Ħ	-	1
-92.5			5	undulating, 1/4" open 134.35-134.55' - Fracture zone, fragments to	H	135.05-135.7' - pale yellowish brown,	-
			1	1"x2"		(10YR 6/2), coarse grained, strong HCl reaction, voids to 1/8" over	R15:10 minutes
	136.5		NR	134.65' - Fracture, 30 deg, smooth, planar, open	H	5-30% of rock (variable), trace fossil casts and molds to 1/4"x1/8", trace]
			>10	136.6' - Fracture or mechanical break,	H	_ dark laminations]
				vertical, smooth, undulating, tight 136.75, 137.15, 137.55, 132.6, 138.05,' -	H	No Recovery 135.7-136.5' - Limestone] _
-			>10	Bedding plane (5), horizontal, rough to smooth, undulating, many open (next to	H	_ 136.5-138.4' - Same as	
-	D46 NO			fracture zone)	円	135.05-135.7' except 10% fossil casts and molds to 1/2" diameter,	-
-	R16-NQ 5 ft	38	>10	137.15-137.55, 138.2-138.75, 139.65-139.8' - Fracture zone (3), fragment to 1-1/2"x1/2"	囯	and color darkens to moderate yellowish brown with depth (10YR	-
440	78%			138.2, 138.25, 138.4. 138.85, 139.25, 139.65' - - Bedding plane (6), horizontal, rough to	囯	– 5/4)	-
140 -97.5			10	smooth, undulating, many open (next to	団	138.4-138.85' - Same as 121.7-121.9' except pale yellowish	-
-	-81.18- -			fracture zone) 138.4-138.7' - Fracture zone, many bedding	団	 brown, (10YR 6/2) 138.85-139.65' - Same as 	R16:7 minutes
-	141.5		NR	planes horizontal	Ш	136.5-138.4'	-
	1 71.0				П	-	
					\Box		



PROJECT NUMBER:

33884.FL

BORING NUMBER:

GSC-06 SHEET 9 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723774.1 N, 457972.0 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS : 2.5	ft bg	s on 4	/17/07 START : 4/17/2007 END : 4/	19/20	D7 LOGGER : C. Wallestad	
				DISCONTINUITIES	U	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) ם כ	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
-145 -102.5	R17-NQ 5 ft 88%	O.R.	2 4 >10 10	THICKNESS, SURFACE STAINING, AND TIGHTNESS 140.2' - Mechanical break or bedding plane, 5 deg, rough, undulating, 1/4" open 141.7, 141.95, 142.65, 142.8, 143.2, 143.35, 143.6' - Fractures or mechanical break (7), 0-20 deg, rough, undulating, horizontal-MB, tight to 1/2" open 143.65' - Fracture zone, as 141.7' except dark stain and tight 143.85-144.25' - Bedding plane, horizontal, smooth, undulating, open 144.4, 144.8, 144.9, 145.0, 145.8' - Bedding plane (5), horizontal, smooth 144.4-144.9' - Fracture zone, fragments to	NAS H	CHARACTERISTICS Limestone 139.65-140.4' - yellowish gray with moderate yellowish brown infill, (5Y 7/2 with 10YR 5/4), fine grained, strong HCI reaction, medium strong (R3), voids to 1/8" over 5-15% surface, cavities to 2"x1" over 20-30% of rock with infill material, trace fossil casts and molds to 1/2"x1/16", infill is coarse grained weak rock (R2) with voids to 1/8" over 25-30% surface and moderate HCI reaction No Recovery 140.4-141.5'	DROPS, TEST RESULTS, ETC.
-	146.5		NR 10	1"x1/2" 146.5-146.55' - Fracture zone, fragments to 1"x1/2" 146.55, 147.5, 148.6, 148.7, 149.1, 149.3,		Limestone 141.5-144.25' - Same as 139.65-140.4' 144.25-145.9' - pale yellowish brown,	-
-	R18-NQ		10	140.35, 147.5, 148.6, 148.7, 149.1, 149.3, 149.35, 149.45, 149.7, 148.75, 150.5, 150.7' 147.7' - Bedding plane, 10 deg, smooth, undulating, 1/2" open		(10YR 6/2), fine grained, moderate HCl reaction, medium strong (R3), voids to 1/8" over 0-15% surface, dark 1/16" thick laminations over	- - -
150_	5 ft 88%	50	6	_		 20% of rock, voids increasing in percentage with depth No Recovery 145.9-146.5' Limestone 	- - -
-107 <u>.5</u> - -	151.5		3 NR	150.1' - Mechanical break, (by drillers) 150.7' - Fracture, vertical, rough, undulating, tight		146.5-150.9' - pale yellowish brown to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), coarse grained, mild to strong HCl reaction,	R18:8 minutes
-			>10			extremely weak to medium strong (R0 to R3), (weaker rock from 147.7-149.5'), voids to 3/16" over 20-40% of rock, moderately fossiliferous with casts and molds to 1/4"x1/2" (many echinoderm casts),	- - -
- - 155	R19-NQ 5 ft 84%	46	10			 three 1" thick light colored, fine grained, medium strong (R3) layers at 146.65', 147.0', and 150.8' No Recovery 150.9-151.5' Limestone 	- - -
-112.5 -	450.5		1 0 NR			151.5-155.7' - light olive gray to pale yellowish brown, (5Y 7/2 to 10YR 6/2), fine to coarse grained, mild to moderate HCl reaction, weak to	R19:7 minutes -
-	156.5		10	156.5-156.8,159.1-159.3' - Fracture zone (2), fragments to 2"x1" 156.8, 157.05, 157.2, 157.4, 158.2, 159.1' - Bedding plane, horizontal, smooth, planar to		 medium strong (R2 to R3), voids to 1/16" over 5-20% of surface (variable), trace fossil casts, dark thick laminations from 153.8-154.25' 	- -
-	R20-NQ 5 ft	33	10	undulating, tight except adjacent to fracture zone		No Recovery 155.7-156.5' Limestone 156.5-159.4' - Same as 146.5-150.9' except moderate yellowish brown, (10YR 5/4), and a 4"-thick, light	-
160 -117.5	58%		NR	<u>-</u>		(R3) rock layer at 157.05' No Recovery 159.4-161.5'	- R20:5 minutes
	161.5						-



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-06

SHEET 10 OF 11

ROCK CORE LOG

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723774.1 N, 457972.0 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

00111110	WETTOD /	ND L	ZOII IV	/IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HVV	Casin		ORIENTATION: Vertical
WATER	LEVELS: 2.5	ft bg	s on 4	/17/07 START : 4/17/2007 END : 4/	19/200	D7 LOGGER : C. Wallestad	
> -				DISCONTINUITIES	ניו	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표병한	AUN H, A	(%	FRACTURES PER FOOT	DEDTH TYPE OF FUTATION POHOUNES	일	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H A A	ZOV	RQD(%)	P. F.	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	l BC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SUB	SE	R Q	FR/	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
				161.5-161.7' - Fracture zone, dark staining,	ш	Limestone	
-			10	fragments to 1/2" thick, all bedding planes at	\Box	- 161.5-162.5' - Same as 156.5-159.3'	-
-				horizontal 162.25, 163.15, 163.4, 163.55, 165.05, 165.4'	世	and 146.5-150.9' except pale yellowish brown, (10YR 6/2), fine	-
l -			10	- Bedding plane (6), horizontal, smooth,	Н	grained, moderate HCl reaction,	-
I _				undulating to planar, some with dark staining,	Ш	medium strong to weak (R3 to R2),	l _
	R21-NQ	19	10	tight except next to fracture zone 162.45' - Fracture or mechanical break. <10	Н	5-15% voids <1/16", trace cavities <- <1/4"	
	5 ft 80%	19	10	deg, rough, undulating, 1/2" open	Ħ	162.5-165.5' - Same as	
165				162.6-162.85' - Fracture zone, some dark	Ш	144.25-145.9' except grayish orange	-
-122.5			10	staining, parallel 45 deg fractures, tight — 162.7' - Fracture, 70 deg, smooth, undulating,	団	 to pale yellowish brown, (10YR 7/4 o 10YR 6/2), very fine to fine grained, 	
-			<u> </u>	dark staining, tight	+	moderate HCl reaction, strong (R4),	R21:8 minutes
-			NR	163.65' - Fracture, 70 deg, smooth, planar,	口	5% coverage of voids (<1/16"),	-
-	166.5			dark staining, tight 164.0-165.05' - Fracture zone, fragments to	₽₩	increasing to 15% with depth	
l _			>10	3"x1"	Щ	No Recovery 165.5-166.5' Limestone	1
1			10	166.5-167.5, 168.2-168.5, 169.2-164.65,	\mathbb{H}	166.5-168.5' - Same as 161.5-162.5'	1
-				170.35-170.55' - Fracture zone (4),	Ħ	_	· -
-			>10	fragments to 4"x1-1/2" 167.65,168.65' - Fractures (2), rough,	╁┼┤	_	1
-	R22-NQ			undulating, no stain or infill, tight	団	_ 168.5-171.0' - Same as 162.5-165.5'	-
-	5 ft	17	>10	168.2, 168.5, 168.85, 169.2, 169.8, 170.35,	╂┼┤	except voids to 1/8" over 5-30% of	-
-	90%			178.55' - Bedding plane (7), horizontal, rough to smooth, undulating to planar, no stain or	H	surface (variable) and laminations	
170_			>10	infill, tight except next to fracture zone	Н	throughout	
-127.5				169.75, 170.3' - Fractures (2), 70 deg,	Д		1
			1	smooth, undulating, little dark staining, open and tight respectively	Н		R22:6 minutes
-	171.5		NR	and agree of the second	П	No Recovery 171.0-171.5'	· -
-	17 1.0			171.55, 172.05, 172.1, 172.65, 173.2, 173.4,	╁┼	Limestone	-
-			3	173.5, 173.9, 175.55, 176.0, 176.1, 176.35' -	田	- 171.5-176.4' - grayish orange, (10YR	-
-				Bedding plane (12), horizontal, smooth, undulating to planar, some with dark staining,	丗	7/4), fine grained, mild HCl reaction, weak to medium strong (R2 to R3),	-
-			3	tight except by fracture zone	H	voids to 3/16" over 5-20% surface	-
-					\Box	(variable), trace fossil casts to	
_	R23-NQ 5 ft	72	>10	173.5-173.9, 176.35-176.4' - Fracture zone (2), fragments to 2"x2"	Ш	1/4"x1/2", trace cavities to 1"x1/2"] _
	98%	12	10	(2), naginonia to 2 x2	\square		1
175					\mathbb{H}	_	1
-132.5			0	_	\Box		_
-					╁┼┤	_	R23:7 minutes
-			4		Ш	_	-
-	176.5		NR/		H	No Recovery 176.4-176.5'	-
l _			7	173.5-173.9, 170.35-176.4, 176.6, 176.9,	Ħ	Limestone	_
_				177.0, 177.3, 177.4, 177.6, 178.6, 178.65, 179.5, 179.8, 179.85, 180.25, 180.35, 180.75	Н	176.5-181.15' - Same as	_
			_	- Bedding plane (15), horizontal, smooth,	Ш	171.5-176.4' except trace dark laminations at 177.4-177.7' and	1
-			2	undulating to planar, few with dark stains,	\mathbb{H}	cavities to 1/2" diameter over 10% of	1
-	R24-NQ			tight except on fracture zones 176.95' - Fracture, vertical, smooth,	Ħ	rock from 180.5-180.95'	1
-	5 ft	36	3	undulating, tight	╫	_	-
-	93%			177.1' - Fracture, 80 deg, smooth, undulating,	団	_	-
180 -137.5			10	open 177.9' - Fracture, 25 deg, rough, undulating, —	H		_
-137.5				tight	耳		 _
			2	178.85' - Fracture, horizontal, same as 177.9'	Щ		R24:8 minutes
	181.5		NR	except horizontal 179.65' - same as 177.1' except rough	Ш	No Recovery 181.15-181.5'	1
	.5			170.00 Same as 177.1 except loagi	1 1		
			_				



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-06	SHEET	11	OF	11	

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723774.1 N, 457972.0 E (NAD83)

CORING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: P. Buchler

WATER LEVELS: 2.5 ft bgs on 4/17/07 START: 4/17/2007 END: 4/19/2007 LOGGER : C. Wallestad DISCONTINUITIES LITHOLOGY COMMENTS DEPTH BELOW SURFACE AND ELEVATION (ft) CORE RUN, LENGTH, AND RECOVERY (%) 90 FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS Limestone 180.3' - Fracture, same as 179.65 3 180.4-180.8' - Fracture zone, fragments to 181.5-185.0' - Same as 176.5-181.15' except layer of 2"x2" 182.15' - Fracture, 20 deg, smooth, medium strong (R3) rock at undulating, tight 182.3, 182.35, 182.6, 182.65, 183.05, 183.15, 183.65, 184.6, 184.7, 184.8' - Bedding plane 5 183.1-183.65' R25-NQ (10), horizontal, smooth, undulating to planar, 5 ft 62 1 100% some dark staining, tight except by fracture zone 185 10 183.0' - Fracture, 80 deg, rough, undulating, -142.5 185.0-186.5' - pale yellowish brown, open (10YR 6/2), coarse grained, 184.6-184.85' - Fracture zone, fragments to R25:9 minutes moderate HCI reaction, medium 1-1/2"x2" 0 strong (R3), voids to 1/16" over Total depth of boring is 185.3, 185.4' - Fractures (2), 30 deg and 20 186.5 15-25% of surface, fossil casts to 186.5' deg, rough, undulating 3/4"x1/2" over 20% of surface Bottom of Boring at 186.5 ft bgs on 4/19/2007



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-07	SHEET	1	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723499.5 N, 458024.9 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

						END : 4/00/0007		D . (ORIENTATION: VEItical
WATER	LEVELS	: 1.25 ft k	yys on 4/2		START : 4/20/2007	END: 4/20/2007 SOIL DESCRIPTION	LUGGE	T : (C. Wallestad COMMENTS
≥9€	CANADIT	INTERVA	1 (4)	STANDARD PENETRATION		GOIL DEGURIF HON		- 8	CONVINCENTS
D E E O	SAMPLE	INTERVA		TEST RESULTS	SOIL NAME	E, USCS GROUP SYMBOL,	COLOR.	2	DEPTH OF CASING, DRILLING RATE,
H B		RECOVE			MOISTURE	CONTENT, RELATIVE DEN	NSITY OR	2	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENC	CY, SOIL STRUCTURE, MIN	NERALOGY		INSTRUMENTATION
42.7	0.0			(14)	── Topsoil (OL)			7/	
-	0.0	1.1	SS-1	1-3-4	\ 0-0.2' - grayish l	black, (N2), moist, organi	c matter with /	1	
-		1.1	33-1	(7)	\20% fine silica s	sand Sand With Organics (SP		╀	<u> -</u>
-	1.5				0.2-1.1' - brown	ish gray to grayish black,	(5YR 4/1 to	┨	-
-					N2), moist, loos	se, fine silica sand with 40	% organic	1	_
_					tines, decreasin	ng to 10% with depth		1	_
_								⇃	
l _								┨	
l _									
								1	
5	5.0							1	1
37.7					Silty Sand (SM))		1	1 1
-		1.2	SS-2	2-1-1	5.0-6.2' - pale yo	, ellowish brown to modera 5/2 to 10YR 5/4), wet, very	te yellowish		<u> </u>
-	6.5			(2)	HCl reaction, fin	ne silica sand with 30% no	onplastic	#	4
-	0.5				∖fines			┨	-
-								┨	-
-								┨	-
-								┨	-
-								┨	-
-								1	-
-								1	_
10	10.0				- (a)			ļ,	_
32.7				0-0-0	Fat Clay (CH) 10.0-10.35' - gra	ayish blue, (5PB 5/2), moi	ist very soft	1	4
_		0.4	SS-3	(0)	high plasticity, n	no dilatancy, no HCl reacti		1	
_	11.5			, ,	\silica sand			╛	
								1	
-								1	
-								1	1
-								1	1
1 -								1	1
4.5	15.0							1	-
15 <u> </u>	15.0				Silt (ML)			+	┧ ⊣
-		0.8	SS-4	4-5-3	15.0-15.8' - grav	yish yellow, (5YR 8/4), we	t, medium	$\ \ $	-
-		0.0	33-4	(8)	stiff, nonplastic,	rapid dilatancy, moderate very fine sand, carbonate	e materials	╀	7
-	16.5				trace organics,	1/16" thick gray layer at 1	5.2'	+	-
-								-	-
-								1	-
-								1	
I -								1	
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20									
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-07

SHEET 2 OF 6

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723499.5 N, 458024.9 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

WATER	LEVELS	: 1.25 ft b	ogs on 4/2	20/07	START : 4/20/2007	END : 4/20/2007	LOGGEF	R : C.	Wallestad
> 0 00				STANDARD		SOIL DESCRIPTION		၂ ဗွ	COMMENTS
ELOV ON (#	SAMPLE	INTERVA	` ,	PENETRATION TEST RESULTS	SOIL NAME	E, USCS GROUP SYMBOL,	COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
TH B FACE		RECOVE			MOISTURE	CONTENT, RELATIVE DEN CY, SOIL STRUCTURE, MIN	NSITY OR	/BOL	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENC	71, 30IL 31ROCTORE, IVIII	NLIVALOGI	SYN	INSTRUMENTATION
22.7	20.0			0.00	Silt (ML) 20 0-21 3' - Sam	ne as 10.0-10.35' except	areenish -	\prod	_
l -		1.3	SS-5	3-3-3 (6)	gray, (5G 6/1), r	medium stiff, no HCI reac	tion, with	Ш	_
-	21.5				three concretion	v mottling (5Y 5/6) in 15-2 ns to 1"x1/4" between 20.0	20% of silt, 0-20.5' /-	╨	-
-								ł	-
-							-	ł	-
-							-	ł	-
-							-	1	-
-							-	1	-
25	25.0						-	1	1
17.7				0.00	Sandy Fat Clay	t olive gray, (5YR 6/1), wi	th mottling -		
l -		1.3	SS-6	2-2-2 (4)	from 25.0-25.3'.	moist, soft, high plasticity	v. no		_
-	26.5					CI reaction, 30% fine silication in the silication is reaction.			_
-								ł	-
-	_						-	ł	-
-							-	ł	-
-							-	1	-
-	-						-	1	-
30	30.0						-	1	1
12.7				0.4-	Organic Soil (O	DH) e black, (5Y 2/1), moist, s	tiff modium -	$\langle \langle \langle \rangle \rangle \langle \langle \rangle \rangle$	
		1.5	SS-7	2-4-7 (11)	to high plasticity	, slow dilatancy, no HCl r	eaction,		
-	31.5				5-10% fine silica 30.45-30.55'	a sand, fine silica sand le	ns from	8555	_
-	-							-	-
-							-	ł	-
-							-	ł	-
-	-						-	1	-
-	1						-	1	1
35	35.0						-	1	1
7.7					Organic Soil (O	DH) e gray, (5Y 4/1), wet, med	dium etiff -	<i>}}}<</i>	
_		1.0	SS-8	3-5-3 (8)	medium to high	plasticity, slow dilatancy,	no HCl	555	
-	36.5				reaction, 40% fir	ne silica sand	/		_
-							-		-
-	-						-	-	-
-	-						-	1	-
-	-						-	1	-
-	-						-	1	-
40	1						-	1	1



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	GSC-07	SHEET	3	OF	6

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723499.5 N, 458024.9 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

WATER	LEVELS	: 1.25 ft b	gs on 4/2	20/07 S	START : 4/20/2007 END : 4/20/2007 LOGGE	R : C.	Wallestad
				STANDARD	SOIL DESCRIPTION	U	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COIL NAME LICCO CROUD OVARDOL COLOR	SYMBOLIC LOG	DEDTILOF CACING DOULING DATE
H BE ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	30Li	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPT SURF			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYME	INSTRUMENTATION
2.7	40.0				Sandy Organic Soil (OH)	222	
-		1.1	SS-9	6-6-7 (13)	40.0-41.1' - Same as 35.0-36.0' except 30-40% fine silica sand	T	1
	41.5			(10)			1
]]
_						1]
-						-	
-						-	-
-						-	-
						┨	-
45 -2.3	45.0				Sandy Organic Soil (OH)	227	,
-		1.4	SS-10	3-5-6	45.0-46.4' - Same as 40.0-41.1' except grayish orange, (10YR 7/4), mottled, silt stringers	- }}}	-
-	46.5			(11)	orange, (1011(174), motted, six samgers	- \$\$\$\$	1
-						1	1
]]
_						1	_
-						1]
-						-	-
-						-	-
50 -7.3	50.0				Interbedded Organic Soil With Silt (OH)	777	-
-		1.2	SS-11	6-16-20	50.0-51.2' - Organic Soil (OH) is same as 30.0-31.5' except olive black (5Y 2/1), moist, hard, 10-15% fine	-{ }}	-
-	51.5			(36)		- K(((-
-	01.0				hard, no to low plasticity, no organics	1	1
						1]
]]
-						1	_
-						-	
-						-	-
55 <u> </u>	55.0				Silt (ML)	╂┈	-
-		1.3	SS-12	18-28-50/3 (78/9")	55.0-56.3' - pale yellowish brown to moderate	- 	-
-	56.3			(1019)	yellowish brown, (10YR 6/2 to 10YR 5/4), wet, hard, low plasticity, rapid dilatancy, moderate to strong HCl	<u>Ш</u>] -
-					reaction, 1/4"-1" thick organic layers at 55.25' and 55.8' respectively, 5-10% fine sand	1	1
-						1	1
]]
_						1]
-						1]
-						-	-
60						+	_



PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	GSC-07	SHEET	4	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723499.5 N, 458024.9 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

						ary, carrieau, Avvj rous, 5-776			ORIENTATION : Vertical
WATER	LEVELS	: 1.25 ft	ogs on 4/2	20/0 <i>7</i> S	START : 4/20/2007	END : 4/20/2007	LOGGEF	(: C. T	Wallestad
200				STANDARD		SOIL DESCRIPTION		g	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	AL (ft)	PENETRATION TEST RESULTS				SYMBOLIC LOG	
ᆱ识흔		RECOVE	ERY (ft)			E, USCS GROUP SYMBOL, CONTENT, RELATIVE DEN		Į	DEPTH OF CASING, DRILLING RATE,
T A A			#TYPE	6"-6"-6"		CY, SOIL STRUCTURE, MIN		₩	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
			#IYPE	(N)	OCHOICIEN	01, 0012 011 001 01 CL, MIN	LIVILOO!	S	INC INCINENT/TION
-17.3	60.0			. ,	Silt (ML)			ш	
-	00.0	1 40	SS-13	17-42-50/5	60.0-61.0' - Saı	me as 55.0-56.3' except tra	ace dark -	$\ \ $	-
l -		1.0	55-13	(92/11")	mottling, 1/16"	thick organic soil layer at 6	30.1'. trace	Ш	_
	61.4				\fine sand-sized	d and gravel-sized limeston	e fragments	ı	
-							-	1	
-							-	1	-
-							-	ł	-
l -							_	1	_
								ı	
-							-	1	
-							-	1	-
-							-	1	-
65	65.0							 	_
-22.3					Silt (ML)	ve gray with grayish orange	a mottling		
I -		1.5	SS-14	5-10-14 (24)	(5Y 4/1 with 10	YR 7/4), wet, very stiff, low	z mounig,]
-	00 F			(24)	rapid dilatancy,	, moderate HCl reaction, 5-	-10% fine	1111	-
-	66.5					vel-sized limestone fragme		₩	-
-					\carbonate mate	erials, 10% organic laminat	tion / _	1	_
l _							_	1	_
								ı	
-							-	1	_
-							-	1	-
-							-	ł	-
I -							_	1	_
70	70.0							ı	
-27.3					Interbedded O	rganic Soil And Silt (OH)		222	At 13:35 water level is 1.25' below ground
-		1.5	SS-15	6-6-5		me as 50.0-51.2' except st		R ???	surface -
-		1.0	00 10	(11)	irregular beddir	ng and pockets of material	-	K <<<	-
-	71.5							$\mathcal{K}(\mathcal{C})$	_
l _							_	J	
								1	
-							-	1	-
-							-	ł	-
l -							-	1	_
I _							_		
1]
75	7F 0						-	1	1
75 <u> </u>	75.0	 	 		Organic Soil W	Vith Sand (OH)))))	
-				2-4-10	75.0-76.1' - oliv	ve gray, (5Y 3/2), wet, stiff,	medium to -	 }}}	-
I -		1.1	SS-16	(14)	high plasticity, s	slow dilatancy, no HCl read	ction, 20%	$\langle \langle \langle 1 \rangle \rangle \rangle$	_
1	76.5				very fine silica : 75.05-75.75'	sand, fine silica sand layer	r trom	L.,,	
					13.03-13.13			1]
-							-	1	-
-							-	1	-
-							_	1	_
I _							_		
-							-	1]
-							-	1	-
80			-					\vdash	
1								1	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-07	SHEET	5	OF	6	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723499.5 N, 458024.9 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

WATER	LEVELS	: 1.25 ft b	gs on 4/2	20/07	START : 4/20/2007 END : 4/20/2007 LOGGEF	R : C.	Wallestad
				STANDARD	SOIL DESCRIPTION	U	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	. ,	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H BE ATIC		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR	BOLI	DRILLING FLUID LOSS, TESTS, AND
DEPT SURF ELEV			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMI	INSTRUMENTATION
-37.3	80.0				Silt (ML)	Ш	
		1.0	SS-17	10-28-16 (44)	80.0`-81.0' - grayish orange, (10YR 7/4), wet, hard, low plasticity, rapid dilatancy, moderate HCl reaction,	$1 \parallel \parallel$]
	81.5			(• •)	trace coarse gravel-sized limestone fragment, carbonate materials, 1/8" thick dark layer at 80.3'		
-					Garbonato matemato, no unos dan layor at co.c	1	_
-					-	-	-
-					-	┨	-
-					-	┨	-
-					-	1	-
85	85.0				-	1	1
-42.3					Sandy Organic Soil (OH) 85.0-86.2' - olive black, (5Y 2/1), wet, very soft,	} }}	
		1.2	SS-18	0-0-0 (0)	medium to high plasticity, slow dilatancy, no HCl		
_	86.5				reaction, 30-40% fine silica sand	1,,,,	_
-					-	-	-
-					-	┨	
-					-	1	-
-					-	1	1
-					-	1	1
90	90.0						
-47.3				0-0-0	Sandy Organic Soil (OH) 90.0-91.3' - Same as 85.0-86.2' except 5-50% sand	\$\$\$	
-		1.3	SS-19	(0)	decreasing with depth	- {}}	-
-	91.5				-	 	-
-					-	┨	-
-					-	1	1
]]
]]						1]
-					-	-	-
95 <u> </u>	95.0			05 50/5	Silt With Limestone Fragments (ML)	\prod	-
-	95.9	0.6	SS-20	25-50/5 (75/11")	95.0-95.6' - pale yellowish brown, (10YR 6/2), wet, hard, nonplastic, rapid dilatancy, moderate HCl	₩	-
-					reaction, carbonate, 1/16"-3/16" thick silt/limestone	1	-
					interbeds		1
]]
-					-	-	
-					-	-	-
-					-	-	-
100					-	1	-
100						\vdash	
						1	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	GSC-07	SHEET	6	OF	6

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723499.5 N, 458024.9 E (NAD83)

ELEVATION: 42.7 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

						ry, cathead, AWJ rods, 3-7/			ORIENTATION : Vertical
WATER	LEVELS	: 1.25 ft l	ogs on 4/2	20/07 S	START : 4/20/2007	END: 4/20/2007	LOGGE	₹ : C.	Wallestad
<02				STANDARD PENETRATION		SOIL DESCRIPTION		چ ا	COMMENTS
ANE (#	SAMPLE	INTERVA	L (ft)	TEST RESULTS	COU MARAE	LICCE CDOUD CVMDOU	COLOR	C LC	DEDTH OF CASING DOULING DATE
4 4 110		RECOVE	ERY (ft)		MOISTURE	E, USCS GROUP SYMBOL, CONTENT, RELATIVE DEI	NSITY OR	Ĭ	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENC	CY, SOIL STRUCTURE, MI	NERALOGY	SYMBOLIC LOG	INSTRUMENTATION
-57.3	100:9	0.4	SS-21	50/6	Silt (ML)			Ш	Finished drilling/sampling at 15:30 on
-				(50/6")	hard, low plastic HCl reaction, ca 3/16" thick at 10	rayish orange, (10YR 7/4 city, slow to rapid dilatano irbonate material, organio 0.1' and 100.3' g at 100.5 ft bgs on 4/20/	y, moderate c soil layers		\text{4/20/07} \text{Total depth of boring 100.5'} \text{Surface collapse; filled with grout}
-					Bottom of Bornit	g at 100.5 it bgs 011 4/20/	2001		- -
-									-
105 -62.3							_	1	
-								1	-
-									-
-									-
-									-
-67.3 -							_		-
-									-
-									-
-									-
-								-	
115 -72.3							_	1	_
-								1	-
-								1	-
-								1	-
-								1	
120							_	\vdash	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-07A

SHEET 1 OF 14

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723463.8 N, 458028.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

WATER	LEVELS	: 5.0 ft bo	s on 4/21	/07	START : 4/21/2007 END : 4/26/2007 LOGO	GER:	C.	Wallestad, R. McComb
				STANDARD	SOIL DESCRIPTION		g	COMMENTS
N (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COLL NAME THOSE OBOTHS SAME OF SE		010	DEDTIL OF CACING SPILLING SATE
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
EPT! URF, LEV#			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		YME	INSTRUMENTATION
43.1	0.0			(N)	Poorly Graded Sand With Organics (SP)	+	0)	4/21/07 at 07:55 start SPT
-	0.0	1.1	SS-1	1-2-3	0.0-1.1' - brownish black to brownish gray, (5YR 2/1 to			-
-		1.1	33-1	(5)	5YR 4/1), moist, loose, fine silica sand, 20% organic material decreasing with depth	#		-
-	1.5				\ 3 · · · · · · · · · ·	′ ┨		-
-						\exists		-
-						+		-
-						\exists		-
-						+		-
-						4		-
						-		-
5 38.1	5.0				Silty Sand (SM)	\dashv_{1}		
-		1.1	SS-2	2-2-3	5.0-6.1' - moderate vellowish brown to gravish orange.	-{		-
-		1.1	33-2	(5)	(10YR 5/4 to 10YR 7/4), wet, loose, fine silica sand, 20% nonplastic fines, trace organics as roots		Ш	-
-	6.5				(′ ┨		-
-						+		-
-						4		-
-						-		-
_						-		-
-						-		-
_						-		-
10 33.1	10.0				Silt (ML)	+	П	
-		4.4	ee 2	3-8-10	10.0-11.1' - grayish orange, (5YR 7/4), wet, very stiff, nonplastic, rapid dilatancy, moderate HCl reaction,	-		-
-		1.1	SS-3	(18)	nonplastic, rapid dilatancy, moderate HCl reaction, 10% very fine sand-sized, all carbonate	\mathbb{A}	Ш	-
-	11.5				1076 Voly illio dana dizoa, ali darbonato	/ 		-
-						4		-
-						4		-
-						+		-
-						+		-
-						+		-
						+		-
15 28.1	15.0 15.4	0.3	SS-4	50/5	_ Silt (ML)	+	Ш	
	13.4	0.0	55° 4	(50/5")	15.0-15.3' - Same as 10.0-11.1' except hard	/丰		-
-						+		-
-						+		-
-						+		-
-						+		-
-						+		-
-						+		-
-						+		-
-						+		-
20						+		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-07A	SHEET	2	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723463.8 N, 458028.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

						TAID 1/20/2027			ONIENTATION : Vertical
WATER	LEVELS	: 5.0 ft bo	gs on 4/2	1/07 •	START : 4/21/2007	END : 4/26/2007	LOGGE	<u>₹:C.</u>	Wallestad, R. McComb
300				STANDARD PENETRATION		SOIL DESCRIPTION		ď	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	TEST RESULTS	COIL NAME		COL OR	SYMBOLIC LOG	DEDTH OF CACING DRILLING DATE
불병		RECOVE	ERY (ft)			E, USCS GROUP SYMBOL, (CONTENT, RELATIVE DENS		P	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTF/ EVA			#TYPE	6"-6"-6"		CY, SOIL STRUCTURE, MINE		₩	INSTRUMENTATION
				(N)				S	
23.1	20.0				Silt (ML)	me as 10.0-11.1' except da	de vallouriah		
		0.9	SS-5	5-10-15 (25)		5/6), 1/8" thick layer at 20.5			
_	21.5			(23)	\ fine to coarse s	and-sized limestone fragme	ents at /	1	1
-	21.5				\20.0-20.3' and 2	20.75-20.9'		1	-
-								┨	-
-								┨	-
_								4	_
_								4	_
									_
25	25.0							1	1
18.1					Sandy Silt (ML))	_	lШ	1 7
-		0.9	SS-6	10-20-23	25.0-25.9' - gray	, yish orange, (10YR 7/4), w d dilatancy, moderate HCI	et, hard,	1111	-
-		0.0		(43)		arse sand-sized, carbonate		Ť	1 -
-	26.5					· · · · · · · · · · · · · · · · · · ·		┨	-
-								-	-
_								4	_
_									_
-								1	1
30	30.0							1	1
13.1	30.0	0.2	SS-7	50/4	Silty Sand (SM))		111	
-				(50/4")	30.0-30.2' - gra	yish orange, (10YR 7/4), w	et, very	┨	-
-						te HCl reaction, fine to coar % nonplastic fines, 10% fine		-	-
-						nestone fragments, carbona		-	-
_					materials			4	_
								1	_
								1]
-								1	1
-								1	1
	05.0							1	-
35 8.1	35.0 35.3	0.3	SS-8	50/4	_ Silty Sand (SM))		111	HW casing set at 35 ft below ground surface
-		0.0	333	(50/4")	35.0-35.3' - mod	derate olive brown, (5Y 4/4), wet, very	1	- Triv dubling out at our it bolow ground during our
_						te HCI reaction, fine to coal		-	_
_						% nonplastic fines, trace fin nestone, carbonate materia		1	_
					<u> </u>		-	1	
]
]								1]
-	40.0							1	1
-	40.2	0.1	SS-9	50/2	∟ Limestone Frag	gments		Ħ	1
-				(50/2")	\ 40.0-40.05' - mo	oderate yellowish brown, (1		1	-
-					moderate HCl r	eaction, coarse sand-sized	iragments	1	-
40					Pogin Dools On	ring at 40.0 ft has		╀	
					See the next sh	ring at 40.0 ft bgs neet for the rock core log			
		I	l					1	



PROJECT NUMBER:

33884.FL

BORING NUMBER:

GSC-07A

SHEET 3 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723463.8 N, 458028.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

CORING	NIL ITIOD A	ND L	JUIFIN	IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	Casiii	3	ORIENTATION: Vertical
WATER	LEVELS : 5.0	ft bg	s on 4		26/20		
≥0₽	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
AGE	L H.	(%) Q	158	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Ğ	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
무류렛	SAG	Ø	AAC ER F	PLANARITY, INFILLING MATERIAL AND	₩.	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
		ď	E 2	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	
3.1	40.0 R1-NQ 1 ft	0	1		Н	Limestone - 40.0-40.85' - light olive gray, (5Y	R1:2 minutes
1	41.0 85%	U		40.6' - Fracture, 70 deg, smooth, undulating	ш	5/2), medium to coarse grained,	
-	11.0		NR.	to stepped, tight	Н	strong HCl reaction, weak (R2),	1
1 -			>10	41.0-41.4' - Fracture zone, fragments to 2"x1"	П	 mottled with grayish orange (10YR 7/4), voids to 1/8" over 15-25% of 	1
-				41.75' - Bedding plane or mechanical break, horizontal, smooth, undulating, tight	╁┼	surface, trace cavities to 1"x1/4",	-
-			0	Horizontal, Smooth, andulating, light	ш	- trace fossils to 1/2"x1/4"	-
-	R2-NQ				Ш	No Recovery 40.85-41.0' Limestone	-
-	5 ft	0	0		\vdash	 41.0-43.7' - light olive gray, (5Y 5/2), 	-
-	54%				H	fine to coarse grained, weak to	_
l _					Н	moderate HCl reaction, extremely weak (R0), poorly competent, trace	
45			NR		Ш	voids to 1/16", unconsolidated sandy	
-1.9				_	Н	silt from 42.5-43.55' No Recovery 43.7-46.0'	R2:2 minutes
-	46.0				П	_ No Recovery 43.7-46.0	1
-	40.0				ш	Sandy Silt (ML)	1 1
-			N/A		11111	 46.0-48.25' - moderate yellowish brown, (10YR 5/4), wet, medium 	-
-					$\ \ $	grained, strong HCl reaction,	-
-			N/A		$\ \ $	- carbonate silt with 20-50% carbonate	-
-	DO NO				41111	_	1 -
-	R3-NQ 5 ft	24	>10		Ш	Limestone	1 4
l -	94%			40.05 40.05L Dadding plans approach size L	Н	48.25-50.7' - moderate yellowish brown, (10YR 5/4), medium to]
l _			4	48.95, 49.05' - Bedding plane or mechanical break (2), horizontal, smooth, planar, tight to	\Box	coarse grained, moderate HCl	
50			ı .	1/4" open		reaction, highly competent, voids to	_
-6.9			3	49.0' - Fracture or mechanical break, vertical, smooth, planar, open	Н	1/8" over 15-45% of rock, trace fossil casts to 3/16" diameter	R3:3 minutes
	51.0		NR	49.8, 50.1' - Fractures (2), 60 deg, rough,	ш	No Recovery 50.7-51.0'	
				undulating, tight 50.15' - Fracture, 30 deg, rough, undulating,	Ш	Limestone	1
_			0	tight	Н	 51.0-56.0' - grayish orange, (10YR 7/4), fine to coarse grained, 	1
-				50.4' - Fracture, 80 deg, rough, undulating,		moderate to weak HCl reaction,	1
-	-		3	tight 50.5' - Fracture, 50 deg, rough, undulating,	Н	extremely weak to weak (R0 to R2),	1 -
-	R4-NQ			tight	口	voids to 1/8" over 10-40% of rock, trace fossils to 1/8" diameter,	-
-	5 ft	11	1	52.1, 52.5, 52.85, 53.98, 54.2, 54.75, 55.4' -	H	 extremely weak, fine grained rock at 	-
-	100%			Bedding plane or mechanical break (7), horizontal and 10 deg, smooth, undulating,	\Box	53.5-54.2' and 55.4-55.6', voids over 10-15% of surface. 25-30% dark	R4:4 minutes
-			2	tight		- laminations 1/16"-3/16" thick	R4.4 Illillutes
55				_	Н	_	_
-11.9			1		Ш	_	
	56.0				Ы	_	
			NI/A		\Box	56.0-56.3' - Same as 51.0-56.0'	1]
]		N/A		1	− Silt (ML) _ 56.3-57.7' - grayish orange, (10YR	1
1 -	1			•	1	7/4), fine grained, strong HCl	1 1
-			1	57.4, 59.15' - Bedding plane or mechanical	1Щ	reaction, extremely weak (R0),	4 1
-	R5-NQ			break (2), horizontal, smooth, undulating, tight to 1/4" open	Ш	grading to extremely weak (R0) limestone, thinly bedded with 1/16"	1 1
-	5 ft	34	0		Ш	 – \thick, dark laminations (possible 	1
1 -	98%		-		口	organics) over 25% of surface Limestone] -
-			1		Н	Limestone]
60					Ш		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-07A

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723463.8 N, 458028.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

SHEET 4 OF 14

				VICENT : Dietrich D-30 3/N 232, Midd Totaly, NQ tools, HW			100055 0 111 1 1 5 11	_	ORIENTATION . Vertical
WATER	LEVELS : 5.0	πbgs	s on 4.	<u>/21/07 START : 4/21/2007 END : 4/</u> DISCONTINUITIES	26/20)U7	LOGGER : C. Wallestad, R. Mo	CC	COMMENTS
ĕ9£	CORE RUN, LENGTH, AND RECOVERY (%)			 	8	H	LITHOLOGY		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	ZAN YN YN		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ı	ROCK TYPE, COLOR,		SIZE AND DEPTH OF CASING,
A CE	T.H.	(%) _Q		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ	ı	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,		FLUID LOSS, CORING RATE AND
FR.	ORE ING	Ω	SAC ER F	PLANARITY, INFILLING MATERIAL AND	₩	ı	AND ROCK MASS		SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
SE	CC EE	ď	FH	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś		CHARACTERISTICS		BROT 6, 1201 R200210, 210.
-16.9			N/A		Ш	K	Silt (ML)	$\overline{}$	R5:5 minutes
_	61.0		IN/A		╨	1	59.7-60.3' - grayish orange, (10YR 7/4), strong HCl reaction, extremely	П	1
-	01.0		NR.	•	I	ት '	weak (R0), grading to extremely	П	1
-			1	61.5, 65.8' - Bedding plane or mechanical	╂	Ħ	weak (R0) limestone, thinly bedded	П	-
-				break (2), 20 deg, smooth, undulating to	4111	H	with 1/16" thick, dark laminations	П	-
I _			2	planar	4111		(possible organics) over 25% of surface	П	
			-	62.3' - Bedding plane or mechanical break,	Ш	T	Limestone	Г	
-	R6-NQ			horizontal, smooth, undulating to planar 62.5' - Bedding plane or mechanical break, 5	Ή	1	60.3-60.9' - Same as 51.0-56.0'		1
-	5 ft	84	N/A	deg, smooth, undulating to planar		╊	No Recovery 60.9-61.0'		-
-	98%				╨	╂╵	Limestone 61.0-61.4' - pale yellowish brown,		-
-			N/A		一	1	(10YR 6/2), fine to coarse grained,		
65				_		Ь	moderate HCl reaction, very weak to	Н	
-21.9			1				weak (R1 to R2), competent, voids to		R6:9 minutes
1 7	66.0				1		1/8" over 5-15% of rock, trace cavities to 1.0' diameter most filled		1
-	00.0		NR.	66 15 66 9! Dodding plans or machanize!	╨	\dagger	with extremely weak rock (R0), few	Г	-
-			2	66.15, 66.8' - Bedding plane or mechanical break (2), horizontal, smooth, undulating,	仠	+	open, trace dark laminations		-
-				tight to 1/4" open	╀	╂╢	Silt (ML)		_
I _			1		Д	1	61.4-62.6' - poorly competent as 56.3-57.7'		
			'		Н	┨	Limestone		
	R7-NQ				Ė	T	62.6-64.8' - pale yellowish brown,		1
-	5 ft 100%	57	0	-	╀┴	╁	(10YR 6/2), fine to coarse grained,		-
-	100%			68.85' - Fracture or mechanical break, 20	仜	1	moderate HCl reaction, very weak to weak (R1 to R2), competent, voids to		-
-			1	deg, rough, undulating to stepped, tight	╁╌	╁	1/8" over 5-15% of rock, trace		-
70				69.5, 70.4' - Bedding plane or mechanical break (2), horizontal, smooth, undulating, —		┺	cavities to 1.0' diameter most filled		
-26.9			1	tight to 1/4" open	Н	Ł	with extremely weak rock (R0), few		R7:3 minutes
	71.0		'		П	1	open, trace dark laminations (possible organics)		
				71.1, 73.55, 73.8' - Bedding plane or	Н	Ł	Silt (ML)		1
-			1	mechanical break (3), horizontal, smooth,	Ľ	1	64.8-65.9' - poorly competent as		-
-				undulating to planar, 1/16" thick infill of fines	╨	╁	56.3-57.7'		-
-			2	infill, tight 72.05' - Fracture, 55 deg, rough, undulating,	口	1	No Recovery 65.9-66.0' Limestone		_
-	[tight	╀	╁	66.0-71.0' - moderate yellowish		
	R8-NQ	70	10	72.55' - Fracture, 70 deg, rough, undulating,	片	1	brown, (10YR 5/4), moderate to		
1 7	5 ft 100%	70	10	tight	\vdash	ſ	strong HCl reaction, extremely weak to weak (R0 to R2), voids to 1/16"		1
-				73.8-74.3' - Fracture zone	\Box	1	over 0-25% of rock, trace fossil		1
			10		\vdash	╁	casts, trace dark laminations,		-
75 <u> </u>				74.9' - Fracture, 85 deg, smooth, undulating —	世	╁	extremely weak from 66-66.6',		R8:6 minutes
"			1	75.05' - Fracture, 60 deg, smooth, undulating	$oxed{\Box}$	+	67.3-68.3', and 69.1-71.0' 71.0-72.6' - Same as 66.0-71.0'		1.0.0
	76.0			75.4' - Fracture, 50 deg, smooth, undulating	\vdash	1	except extremely weak (R0)		
						1	72.6-73.5' - moderate yellowish		
1 7			0		╨	Ŧ	brown, (10YR 5/4), coarse grained, moderate HCl reaction, weak to		1
-					口	1	moderate HCI reaction, weak to medium strong (R2 to R3),		-
-			1	77.25, 78.1' - Bedding plane or mechanical	+	+	competent, voids to 3/16" over		
-	DO NO			break (2), 85 deg, smooth, planar, tight		1	15-30% of rock, fossil casts to		-
_	R9-NQ 5 ft	77	2		╨	╁	3/16"x3/8" over 5-15% of rock, trace cavities to 1/4"x1.5', trace dark		_
	96%		L	78.7' - Fracture, 30 deg, rough, undulating,	口	1	material (possible organics)		
				tight	\vdash	ſ	73.5-74.4' - Same as 71.0-72.6'		1
80			1	79.25-79.85' - Fracture zone, fragments to 1" diameter		1			1
30_				ulai i i cici	╅	t			
					1				
					_	_			



PROJECT NUMBER:

33884.FL

BORING NUMBER:

GSC-07A

SHEET 5 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723463.8 N, 458028.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

COMING	METHODA	ND LC	ZUIFIN	/IEN1: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	casiii		ORIENTATION : Vertical
WATER	LEVELS: 5.0	ft bgs	s on 4	/21/07 START : 4/21/2007 END : 4/2	26/200	17 LOGGER : C. Wallestad, R. McC	Comb
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOCK TYPE COLOR	
E H	N. A. C.	(9)	FRACTURES PER FOOT	2200.111 110.11	윽	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
FAF	STER OVE	(%) O	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BQ I	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
E-S-P	RNA	Ø	RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Į≅Į	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	074	œ	ш о		S		
-36.9			>10	79.75, 79.85' - Mechanical break or fractures	ш	Limestone	R9:8 minutes
_	01.0		l	(2), horizontal, rough, undulating, associated - with dissolution cavity, open	H	 74.4-76.0' - moderate yellowish brown, (10YR 5/4), coarse grained, 	_
-	81.0		NR.	80.4' - Fracture, 75 deg, rough, associated		moderate HCl reaction, weak to	-
-			>10	with dissolution cavity, open	₽₩	- medium strong (R2 to R3),	_
				80.4-80.8' - Fracture zone, fragments 1.5"x2"	ш	competent, voids to 3/16" over	
				81.0-81.05, 81.55-81.95' - Fracture zone (2),	Ш	15-30% of rock, fossil casts to	
-			2	fragments 1.5"x2"	Н	- 3/16"x3/8" over 5-15% of rock, trace	-
-	D40 NO			81.05, 81.55, 81.95' - Bedding plane or mechanical break (3), horizontal, rough,	Ш	cavities to 1/4"x1.5", trace dark material (possible organics)	_
l _	R10-NQ 5 ft	43	3	undulating, open by fracture zones	Ш	- 76.0-77.25' - Same as 74.4-76.0'	_
	85%	40		81.45' - Fracture or mechanical break, 40	Н	except voids decreasing with depth	
				deg, rough, undulating, tight to 1/4" open	Ш	77.25-78.1' - Same as 56.3-57.7'	1
			4	82.1, 83.6' - Bedding plane or mechanical	╂┼┦	- except trace dark laminations	-
85 <u> </u>			_	break (2), rough, undulating, tight to 1/4"	╀╫	(possible organics) 78.1-79.6' - dark yellow orange to	D40:7
-41.9			0	82.8' - Fracture or mechanical break, 30 deg,	口	moderate vellowish brown, (10YR 6/6	R10:7 minutes
	86.0		NR	smooth, planar, tight	Н	to 10YR 5/4), fine grained, strong	
-				83.45' - Fracture or joint, 60 deg, undulating,	Ш	HCI reaction, weak to medium strong	
-			2	as 81.5'	ш	(R2 to R3), voids to 1/8" over	-
-				84.25' - Bedding plane, <10 deg, smooth, undulating, apparently along possible organic	\vdash	20-45% of rock, trace fossil casts 1/4" diameter, trace cavities to 1"x2"	_
			10	layer, tight	Ш	with competent, medium strong rock	
_			10	84.85' - Fracture or mechanical break, 40	ш	(R3) infill	
-	R11-NQ			deg, rough, undulating, 1/4" open	╁┼	79.6-80.8' - grayish orange to pale	_
-	5 ft	51	2	85.0' - 20 deg		yellowish brown, (10YR 7/4 to 10YR	_
-	87%			86.2, 87.35, 88.9, 89.7' - Bedding plane or mechanical break (4), horizontal, smooth,	ш	6/2), moderate HCl reaction, medium strong (R3), competent, voids to	_
			10	undulating to planar, tight except for fracture	Ш	3/16" over 0-35% of rock, cavities to	
90			10	zone	Ш	3"x1" over 25-30% of rock, cavities	
-46.9			10	86.45, 86.65' - Fractures or mechanical break —	╁┼┼	partially filled with weak rock infill,	R11:8 minutes
-			NR	(2), 50 deg, rough, undulating, tight to 1"	Ш	trace fossil casts to 1/2"x1/4"	-
_	91.0		INIX	open 87.2' - Fracture or mechanical break, 20 deg,	\vdash	No Recovery 80.8-81.0' - Limestone	_
			٦	smooth, undulating, open by fracture zone	Н	81.0-81.7' - Same as 78.1-79.6'	
_			2	87.2-87.35, 89.7-90.35' - Fracture zone (2),	Ш	81.7-82.1' - Same as 79.6-80.8'	
-				20 deg, up to 2"x3" diameter	Н	- 82.1-83.3' - Same as 77.25-78.1'	-
-			2	88.75' - Fracture, 85 deg, smooth, undulating 89.0' - Fracture, 50 deg, smooth, undulating		_ 83.3-85.25' - Same as 81.0-81.7'	-
_				91.6' - Fracture, 50 deg, smooth, planar, tight	Щ	except trace 1/16"-3/16" thick dark laminations (possible organics)	
	R12-NQ		1	91.65' - Fracture, 70 deg, smooth, undulating,	$\vdash\vdash\vdash$	No Recovery 85.25-86.0'	
	5 ft 74%	28	10	tight	口	Limestone	1
-	1 - 1 /0		H	92.55' - Fracture, 35 deg, smooth, planar,	ш	- 86.0-90.35' - pale yellowish brown to	-
-			10	tight 92.65' - Fracture, 60 deg, smooth, planar,	Н	moderate yellowish brown, (10YR 6/2 to 10YR 5/4), medium grained,	-
95				tight —	口	— moderate HCl reaction, very weak to	
-51.9			NR	93.05' - Fracture, 60 deg, smooth, undulating,	Н	medium strong (R1 to R3),	R12:11 minutes
	96.0			tight	団	competent, voids to 3/16" over	1
-	50.0			93.2' - Fracture, 80 deg, smooth, undulating,	╁┼┦	20-30% of rock, trace fossil casts to	-
-			>10	tight 93.55' - Fracture or mechanical break. 20	╀╫	3/16" diameter, trace light gray infill material (medium strong)	-
_				deg, rough, undulating, 1/16"-3/16" open	口	No Recovery 90.35-91.0'	
				93.55-94.25' - Fracture zone, fragments to	Н	Limestone	
-			10	1.5"x2.5", infill in cavities	Ш	91.0-93.55' - Same as 86.0-90.35'	
-	R13-NQ		<u> </u>	94.25' - Bedding plane, horizontal, smooth,	Ш	except less voids (10-25%) than at	-
_	5 ft	15	3	planar, open 96.0-96.75' - Fracture zone, dark, fragments	H	92.0-92.5'	
	70%			to 3"x1", stain on many faces	Ш		
1 7			4	96.75' - Bedding plane, horizontal, smooth,	Щ	-	1
-			<u> </u>	planar, tight	╁┼┼	-	
100					H		
1			I	1	ıl		

APPENDIX 2BB-929 Rev. 7



WATER LEVELS: 5.0 ft bgs on 4/21/07

PROJECT NUMBER: BORING NUMBER: 338884.FL GSC-07A SHEET 6 OF 14

ROCK CORE LOG

LOGGER: C. Wallestad, R. McComb

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723463.8 N, 458028.1 E (NAD83)

DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell ELEVATION: 43.1 ft (NAVD88)

END: 4/26/2007

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing START: 4/21/2007

WALLE	LLVLLS . J.	it bg.	3 011 7/		T	· · · · · · · · · · · · · · · · · · ·	
30₽	<u> </u>			DISCONTINUITIES	P00	LITHOLOGY	COMMENTS
N A N E	 NN O⊗		SII.	DESCRIPTION	13	ROCK TYPE, COLOR,	OIZE AND DEDTH OF CACH
ᆱᆼ	7. A.	(%	NEE OTE		1 🖺	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
T A Y	Ser F	(%) Q	CT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	1	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	A Q	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	0 1 1	ιĽ			0)		D40:0 minutes
-56.9			NR	97.1' - Fracture, 85 deg, smooth, undulating,	\vdash	93.55-94.7' - grayish orange, (10YR - 7/4), fine grained, strong HCl	R13:9 minutes
Ι -	101.0			dark, tight 97.15-97.25' - Bedding plane, horizontal,	Ш	reaction, medium strong (R3),]
I -	101.0			smooth, planar, 1" thick silt, tight	 	competent, voids to 1/8" over 0-15%	07:55 water level = 2.5'
-				97.35' - Fracture, 75 deg, smooth, undulating,	₽	 of surface, trace cavities to 1/4" 	below ground surface -
I _				dark, tight	Ш	diameter, tight plastic clay infilling in	NW casing set at 101 ft
l				97.6-97.7' - Fracture zone, fragments to		some cavities	below ground surface
I -			NR	1"x3/4" - 98.5' - Fracture, 20 deg, rough, undulating,	╨	No Recovery 94.7-96.0'	No recovery at 101.0-104.3 -
-	R14-NQ			98.5° - Fracture, 20 deg, rougn, undulating, tight		Limestone 96.0-97.2' - very pale orange, (10YR	due to core barrel blockage _
l _	5 ft	9		98.85' - Fracture, 70 deg, smooth, undulating,		= 8/2), fine grained, moderate HCl	_
	34%	3		dark, tight	\vdash	reaction, medium strong (R3), voids	
-				98.9, 99.0' - Bedding plane or mechanical	┢┌	to 1/16" over 0-10% of surface, dark	1
-			>10	break (2), horizontal, smooth, planar, tight	匚	staining on broken face	-
105			10	99.15' - Fracture, 20 deg, rough, undulating,	₽	97.2-97.7' - very pale orange, (10YR	
-61.9				tight ————————————————————————————————————		→ 8/2), fine grained, strong HCl reaction, extremely weak to weak	R14:10 minutes
I -	106.0		3	dark, tight	\Box	(R0 to R2), competent, voids to 1/16"	1
-	106.0			99.8' - Fracture, 75 deg, smooth, undulating,	╙	over 10-20% of rock, moderately	-
l -			>10	open	ᄪ	fossiliferous with casts and molds to	-
				104.3-104.7' - Fracture zone, dark staining on	厂	3/16"x3/8", trace dark inclusions	
-				some faces, fragments to 3/4"x1.5"	╙	97.7-98.9' - dark yellow orange to	1
-			>10	104.7, 104.9, 105.0, 105.15' - Mechanical break (4), horizontal, smooth, undulating		moderate yellowish brown, (10YR 6/6 to 10YR 5/4), fine grained, moderate	-
l -	B. 1 = 1 : -			104.95' - Fracture or mechanical break, 40	\Box	HCl reaction, medium strong (R3),	-
	R15-NQ 5 ft	0	>10	deg, smooth, planar, dark, tight	\vdash	competent, voids between 1/16"-1/8"	
	66%	J	[10	105.2' - Bedding plane, horizontal, smooth,		over 30%, few secondary cavity]
I -	55,3		0	planar, dark, open	匚	infilling up to 1/2", strong HCl	1
-				105.4, 105.75' - Mechanical break (2)	₽	reaction on infilling (similar to	-
110				105.7' - Bedding plane, horizontal, smooth, undulating, tight to 1/2" open —	厂	78.1-79.6') 98.9-99.5' - Same as 96.0-97.2'	
-66.9			NR	106.25, 107.2, 109.2' - Fractures (3), 80 deg,		No Recovery 99.5-104.3'	R15:4 minutes
I -	1110			smooth, undulating, dark, open (missing	╨	Limestone	1
-	111.0			opposite face)	仜	- 104.3-105.7' - grayish orange, (10YR	-
-			10	106.4-107.1, 107.5-109.0' - Fracture zone	 	7/4), fine grained, moderate to strong	-
				(2), fragments to 3"x2", some dark staining on faces in lower interval	\vdash	HCI reaction, medium strong (R3), medium strong (R3) at 105.4', voids	
I -				109.0' - Fracture, 20 deg, smooth, undulating,	ш	up to 1/16" over 0-30% (mostly]
-			0	dark, missing opposite face	 	0-5%) of surface, trace dark	-
-	D40 1:0			111.0-111.15' - Fracture zone, fragments to	╀	 laminations 3/16" thick 	-
I -	R16-NQ 5 ft	46	10	1"x1/4"	ш	105.7-106.0' - fine to medium	
	94%	70	'	111.15' - Mechanical break or bedding plane,	\vdash	grained, moderate to strong HCI	
Ι -				horizontal, rough, undulating, open (missing - opposite face)	╨	- reaction, extremely weak to very	1
-			3	111.35' - Fracture, 80 deg, rough, undulating,	仜	weak (R0 to R1), very weak rock at 105.75', voids up to 1/16" over 5-15%	-
115_				tight —	⊬	— of rock, trace dark inclusions	
-71.9			>10	113.25-113.6' - Fracture zone, fragments up	\vdash	106.0-109.3' - grayish orange, (10YR	R16:3 minutes
I -	116.0		-	to 2" in diameter	ш	7/4), medium to coarse grained,	1
-	116.0		NR	113.25, 113.6' - Bedding plane or mechanical	 	weak to strong HCl reaction,	-
-			10	break (2), smooth, undulating, open (missing opposite face)	╀	extremely weak to weak (R0 to R2), poorly competent, voids to 1/8" over	-
			اا	113.95, 114.1' - Fractures (2), 45 deg and 35	口	25% of surface, fossil casts to	
Ι -				deg, tight to 1" open	\vdash	3/4"x1/4" over 3-12% of surface,	1
-			0	114.6' - Bedding plane or mechanical break,	⇈	trace dark mottling	1
-	D47.10			smooth, undulating, tight to 1/4" open	匚	No Recovery 109.3-111.0'	-
l -	R17-NQ 5 ft	90	1	114.85' - Fracture, 80 deg, rough, undulating,	⊢	Limestone]
	100%	30		dark, stain 115.35-115.7' - Fracture zone, fragments to	\vdash	111.0-115.7' - Same as 106.0-109.3' No Recovery 115.7-116.0']
I -				2"x2"	仜	Limestone	1
-			1	116.6' - Fractures (2), 80 deg, smooth,	╀	116.0-119.1' - Same as 106.0-109.3'	-
120				undulating, intersecting, tight	片		
					1		
	1		ı !		1	i e e e e e e e e e e e e e e e e e e e	

APPENDIX 2BB-930 Rev. 7



PROJECT NUMBER:

33884.FL

BORING NUMBER:

GSC-07A

SHEET 7 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723463.8 N, 458028.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

CORING	NIETHOD A	ND EC	אורוע	MENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	Casiri	<u> </u>	ORIENTATION : Vertical
WATER	LEVELS: 5.0	ft bgs	s on 4	/21/07 START : 4/21/2007 END : 4/	26/200	D7 LOGGER : C. Wallestad, R. McC	comb
>00				DISCONTINUITIES	၂ ၂	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		SII	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	OLZE AND DEDTH OF GARING
불병은	RUF ÆR	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	딝	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
₽₽₩	AG CO	αD	ACT R F(PLANARITY, INFILLING MATERIAL AND	MB(WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
BSI	SHR	R	FE	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SY	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-76.9				116.75' - Bedding plane or mechanical break,	ш	Limestone	R17:5 minutes
-	4040		0	<10 deg, smooth, undulating, tight	\vdash	- 119.1-119.5' - yellowish gray, (5Y	1 -
-	121.0			116.9' - Fracture or mechanical break, 60 deg, smooth, undulating, tight	Ħ	_ 7/2), weak HCl reaction, weak to medium strong (R2 to R3), voids to	1 -
-			1	118.95' - Bedding plane or fracture, 20 deg,	Н	 1/8" over 0-20% of surface, trace 	
l -				smooth, undulating, tight 119.5' - Bedding plane, horizontal, smooth,	Ш	cavities to 1.5'x1/4" with no infilling 119.5-121.0' - Same as 106.0-109.3'	1 -
l -			1	undulating, tight	Н	- 121.0-123.55' - Same as	_
			' I	121.6, 122.6, 125.5' - Bedding plane (3),		116.0-121.0' except increased fossil	
	R18-NQ			horizontal, smooth, undulating, tight	Н	casts with depth, voids up to	
-	5 ft 99%	99	0		Ш	 1/2"x1/4" over 5-10% of rock 123.55-123.85' - Same as 	1 1
-				•	Ш	119.1-119.5' except fossil	1 1
			0		\vdash	- casts/molds to 1/2"-1/4" over 5% of	
125_ -81.9				_	丗	rock, trace cavities filled with clay, tight, many voids infilled	R18:11 minutes
-			1		Н	_ 123.85-125.95' - moderate yellowish	-
l -	126.0				ш	brown, (10YR 5/4), medium to coarse grained, moderate HCl	_
l _			2	126.3, 126.9, 127.1 127.65, 127.7, 127.95,	Н	reaction, weak (R2), voids to 1/16"	
			_	128.0, 128.4, 128.45, 129.65' - Bedding plane	Ħ	over 30-40% of rock, no visible	
			4.0	(10), horizontal, smooth, undulating to planar,	Н	fossils or cavities No Recovery 125.95-126.0'	1
-			10	mostly tight except at fracture zones 127.65-127.7. 128.4-128.95' - Fracture zone	ш	Limestone	1
-	R19-NQ			or bedding plane (2), horizontal, fragments to	Н	126.0-127.7' - Same as	1 1
-	5 ft	58	10	1/2"x1/4"		_ 123.85-123.95' except extremely weak to medium strong rock (R0 to	
-	90%				Н	R3), mostly weak rock, moderately	
-			>10		ш	fossiliferous with echinoderm molds	1 4
130_				129.65-129.95' - Bedding plane, horizontal,		to 1/2"x1/4" at 126.3-127.7', trace fossil molds throughout entire run	
-86.9			0	smooth, undulating to planar, mostly tight except by fracture zones	Н	127.7-128.0' - Same as 104.3-105.7'	R19:10 minutes
	131.0		NR	oxoopt by madaro zoneo		128.0-130.5' - Same as 126.0-127.7'	
				131.05, 132.1, 132.3, 133.8, 133.95, 134.2,	Н	 No Recovery 130.5-131.0' Limestone 	07:30 water level = 3.0'
-			1	134.3, 134.4, 134.65' - Bedding plane (9),	ш	131.0-134.9' - Same as 126.0-130.5'	below ground surface
-				horizontal, smooth to rough, undulating to planar, tight except by fracture zones and	Н	- except moderately fossiliferous from	1 1
-			10	where missing opposite face	口	_ 132.6-133.8' with casts to 1/2"x1/4" over 5-10% of rock, bigger voids	1 -
-	R20-NQ			132.05, 134.65' - Fractures (2), 60 deg, rough to smooth, undulating to planar	╂┼┤	 and coarser texture with depth, thick 	-
-	5 ft	42	10	132.5-132.65. 133.8-133.95, 134.2-134.3,	П	rock as at 104.3-105.7' and 134.0-134.8'	-
-	78%			134.65-134.8' - Fracture zone (4), fragments		107.0 ⁻ 10 1 .0 -]
I -			>10	to 1.25"x1/2" 134.2' - Bedding plane, horizontal, smooth to	\square	_	
135_				rough, undulating to planar, tight except by	岸	— Na Barray 404 0 400 0	
-91.9			NR	fracture zones where missing opposite face	Ш	No Recovery 134.9-136.0'	R20:6 minutes
-	136.0		INK		Ш	-	1
-	100.0			136.0-136.75' - Fracture zone or bedding	+	_ Limestone	1 1
-			>10	plane, horizontal, fragments up to 1"x2"	口	- 136.0-137.0' - pale olive, (10YR 6/2),	-
-				136.75, 136.95, 137.0, 137.2, 137.45. 137.55,	₽	fine to medium grained, weak HCl reaction, medium strong (R3),	-
-			5	137.75, 138.1' - Bedding plane (8), horizontal, smooth, planar, tight	Ш	- competent, trace voids to 1/16", trace	-
-				137.3, 138.5' - Mechanical break (2)	H	cavities on interbeds to 1/2" thick]
_	R21-NQ 5 ft	42	1		口	with increased percentage of voids to 3/16" over 30-60% infill	
I -	5 π 82%	42	'		H	5, 10 OVG1 50-00 /0 IIIIIII	1
-					Ш		1
140			1		Ш	_	1
140					\Box		
					_		



PROJECT NUMBER: BORING NUMBER: 338884.FL

GSC-07A

SHEET 8 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723463.8 N, 458028.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

WATER	LEVELS: 5.0	ft bgs	on 4/	21/07 START : 4/21/2007 END : 4/	26/20	D7 LOGGER : C. Wallestad, R. McC	omb
3 □ €				DISCONTINUITIES	g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ZES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH BI	E RU 3TH, OVEF	(%) _Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SURF	SOR	ROI	FRAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMI	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-96.9	024			139.85' - Fracture, 70 deg, rough, undulating,	<u> </u>	Limestone	R21:8 minutes
-	141.0		NR	tight	╁	- 137.0-138.1' - grayish orange, (10YR	1
-	141.0			-	F	7/4), medium to coarse grained, weak HCl reaction, weak to medium	
-			10	141.3' - Fracture, 80 deg, smooth, undulating, tight	岸	 strong (R2 to R3), voids to 3/16" over 15-40% of surface, trace fossil casts 	1
-				141.35' - Bedding plane or mechanical break,	Ħ	138.1-140.1' - moderate yellowish	1
-			>10	horizontal, smooth, undulating, machine/rock - grinding, so not tight	H	 brown, (10YR 5/4), medium grained, weak HCl reaction, medium strong 	1
-	R22-NQ		40	141.75 - Fracture, 80 deg, rough, undulating,	╙	(R3), competent, voids to 1/8" over	1
	5 ft 84%	8	10	tight and no grind mark 141.75-143.3' - Fracture zone, associated	匚	 20-25% surface, trace fossil casts to 1/2"x1/4" 	1
			>10	with cavities, some staining (dark), fragments average 1" diameter up to 2"x5"	Ħ	No Recovery 140.1-141.0' Limestone	1
145			>10	143.3 - Fracture, 70 deg, smooth, undulating,	」	141.0-141.75' - Same as	
-101.9			10	open, missing opposite face 143.7' - Fracture or mechanical break, rough,	上	138.1-140.1' 141.75-145.2' - light olive gray with	R22:11 minutes
	146.0		NR	undulating, dark, 1/4" open	上	pale orange mottling, (5Y 6/1 with	<u> </u>
			>10	144.0' - Fracture, 80 deg, rough, undulating, open	H	10YR 8/2), fine grained, strong HCl reaction, medium strong (R3),	<u> </u>
_			- 10	144.0-145.2' - Fracture zone, as 141.75-142.3'	F	(possible preferential flow path, oxidation/reduction), competent,]
_			2	146.0-146.7' - Fracture zone, fragments to 2"	片	voids to 3/16" over 10% of surface,	
_				diameter 146.7' - 20 deg, rough, undulating, dark,	片	fossil casts to 1" diameter over 5% surface, dissolution cavities to 1"x2"	
-	R23-NQ 5 ft	42	3	open, missing opposite face	世	over 10% surface, 1/2" cavities	-
_	82%			146.85' - Fracture, 70 deg, rough, undulating, dark, tight	₽	without infilling, voids to 3/16" over 30-40% of infilling, decreased	-
-			3	146.95 - Fracture, 30 deg, smooth, planar 147.05, 148.45' - Fractures (2), 40 deg,	厈	_ mottling with depth	-
150 <u> </u>			0 /	smooth, undulating —	ፗ	No Recovery 145.2-146.0' Limestone	R23:6 minutes
-			NR	147.8, 148.15, 148.25' - Bedding plane (3), <5 deg, rough, undulating, tight to 1/4", low	士	146.0-149.25' - dark yellowish orange, (10YR 6/6), fine to medium	-
-	151.0			angle fracture	士	grained, moderate HCl reaction,	Note: after fractures were
-			1	149.35' - Bedding plane or mechanical break, <5 deg, rough, undulating, open, missing		medium strong (R3), competent, voids to 1/8" over 5-20% of rock,	measured, it was noticed -
-				opposite face	╁	- fossil casts to 1" diameter over	that the beginning of this run is the end of R23,
-			10	149.35-149.55' - Fracture zone, fragments up to 2"x1"	厈	0-10% surface, infilling or interbedded material 1"-4" thick at	therefore subtract 0.9' from - all depths.
-	R24-NQ			149.55' - Fracture, 40 deg, smooth, planar - 149.68' - Fracture, <5 deg, rough, undulating,	Ħ	 147.5', 148.3', 148.8', and 149.15', infilling consists of light olive gray (5Y) 	
-	5 ft 100%	62	>10	open, missing opposite face		5/6), fine grained limestone, strong	1
-	10070			151.2' - Fracture, 65 deg, smooth, undulating to stepped, possible stain, tight	出	 HCl reaction, trace voids to 1/16", trace cavities to 3/4" diameter, dark 	1
155			2	152.25' - Fracture, 20 deg, smooth,		laminations at 149.25'	1
-111.9				undulating to stepped, open by fracture zone — 152.45' - Fracture, 40 deg, smooth,	\vdash	— 149.25-150.1' - Same as 138.1-140.1' except weak to medium	R24:6 minutes
1 7	156.0		4	undulating 152.45-153.05, 153.45-154.0' - Fracture zone	$oxed{\square}$	strong (R2 to R3), trace organics No Recovery 150.1-151.0'	1
			3	(2), fragments 2" diameter	厂	Limestone]
			J	152.75' - Fracture, 20 deg, smooth, undulating to stepped, open	口	151.0-155.5' - Same as 146.0-149.25' except trace dark,]
			2	153.3' - Fracture, 65 deg, smooth, planar,	\vdash	wavy laminations at 154.5']
				possible stain, tight 153.45' - Fracture, 85 deg, smooth, planar,	\vdash	156.0-158.5' - pale yellowish brown, (10YR 6/2), fine grained, strong HCl]
	R25-NQ 5 ft	68	1	open 154.0' - Fracture, 75 deg, smooth, planar	厈	reaction, medium strong (R3), trace voids and fossil casts to 1/4"	
_	98%			154.05' - Mechanical break	Ħ	diameter	
-			3	154.6, 155.6, 155.8, 156.05' - Bedding plane (4), horizontal, smooth, undulating, tight 1/4"	H	-	-
160				open	\vdash		_
$\overline{}$					1		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-07A SHEET 9 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723463.8 N, 458028.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

CORING	NIETHOD A	ND E	JUIPIV	IENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW	casin	3	ORIENTATION : Vertical
WATER	LEVELS: 5.0	ft bg	s on 4/	21/07 START : 4/21/2007 END : 4/	26/20	D7 LOGGER : C. Wallestad, R. McC	comb
	<u></u>			DISCONTINUITIES	ניו	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
핊일은	Z A A	(%	FRACTURES PER FOOT		임	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
±Ã.∀	GTF F	Q D (%)	PS	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	IBO	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
		a Q	'RA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ×	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-116.9	016	ш.	ш.п.	1FC 1FL FO doe and 00 doe amouth planes	0)		DOE:0 minutes
-110.9			10	156.45' - 50 deg and 80 deg, smooth, planar, open, missing opposite face	╨	158.5-160.9' - interbedded rock as - 156.0-158.5' with rock as	R25:9 minutes
1	161.0			156.5' - Fracture, 50 deg, smooth, undulating,		138.1-140.0' in layers 2"-4" thick,	
-	·		NR)	tight	Н	dark, wavy laminations (1/8") at	1
-			1	156.65' - Fracture, 65 deg, smooth, planar,		- 158.85'	1
-				tight 156.7, 159.05, 159.15,159.5, 160.35, 160.5' -	₩	No Recovery 160.9-161.0' Limestone	-
l -			10	Bedding plane (6), horizontal, smooth,		- 161.0-163.5' - Same as 138.1-140.1'	
1			'	undulating, tight, some planar		except moderate yellowish brown to	
-	R26-NQ			157.15' - Fracture, 50 deg, smooth,	Н	dark yellowish brown (10YR 4/2 to	1
-	5 ft	23	>10	undulating, tight 157.7' - Fractures (2), 70 deg and 5 deg,	世	 10YR 5/4) mottling from 161.7-163.5' 163.5-164.5' - pale yellowish brown, 	1
-	70%		- 40	smooth, undulating, open, missing opposite	╂┯	(10YR 6/2), fine to medium grained,	-
-			>10	face		strong HCl reaction, medium strong]
165				158.95' - Fracture, 65 deg, smooth,	\Box	(R3), voids to 1/8" over 10-20% of	
-121.9			NR	undulating, tight 160.35-160.5' - Fracture zone, fragments up		rock, fossil cavities to 1/2"-1/4" over	R26:8 minutes
1 -	166.0			to 1"x2'		 5-10% of rock, possible high percentage of dissolution cavities as 	1
-	166.0			161.85' - Fracture, 45 deg, smooth,	₩	evidence by fracture zone breakage	-
-			NR	undulating, tight	匝	_ pattern	-
l -			>10	162.15' - Fracture or mechanical break,	┢	No Recovery 164.5-166.6'	_
1				smooth, undulating, tight to 1/4" open 162.5' - Bedding plane, <10 deg, smooth,		Limestone 166.6-168.7' - Same as 163.5-164.5'	
-			>10	undulating, tight	Ш	_ 100.0 100.7 Came at 100.0 101.0	1
-	R27-NQ	l)		162.0-164.5' - Fracture zone, fractures	╁	-	Moderate chatter at 168.0-
-	5 ft	42	>10	associated with dissolution cavities		-	168.5' –
-	88%			166.6-168.7' - Fracture zone, fragments to 3"x2", average 1/4" diameter, associated with	₽	_ 168.7-171.0' - Same as 163.5-164.5'	-
Ι.			2	possible dissolutions cavities		except pale yellowish brown to dark	
170			-	168.7, 169.8, 169.85, 170.2, 170.35' -	\vdash	 yellowish orange, (10YR 6/6 to 10YR 6/2), fine grained, voids to 1/16" over 	
-126.9				Bedding plane (5), horizontal and 10 deg, — smooth, planar, dark, tight except next to		5-20% of surface, few cavities to	R27:7 minutes
-			2	fracture zone	oxdot	- 1/8"-3/4", medium strong (R3),	1 -
-	171.0				\vdash	moderate HCl reaction 171.0-171.5' - Same as 168.7-171.0'	-
l -			5			_	-
l _				171.55, 173.55' - Fractures (2), 60 deg,	╟	171.5-172.2' - light olive gray, (5Y - 5/2), very fine grained, mild HCl	
1				rough, undulating, tight 171.65, 171.75, 171.85, 172.3' - Bedding		reaction, very strong (R5), voids to	
I -			10	plane (4), horizontal, smooth, undulating,	1—	3/16" over 5% of surface, weak HCl	1
-	R28-NQ	l)		tight		- reaction, 1" thick, fine grained	-
-	5 ft	55	10	470 FEL Bodding plan 40 L	+	section at 171.7' 172.2-173.6' - dark yellowish orange,	-
-	100%			173.55' - Bedding plane, 10 deg, smooth, undulating, tight		- (10YR 6/6), fine to medium grained,	_
			10	173.65' - Fracture, 45 deg, rough, undulating,		mild HCl reaction, weak (R2), with	
175			10	tight	\vdash	light olive gray, moderate to coarse	1
-131.9				174.9-174.95' - Bedding plane, 10 deg,	口	— grained (80% orange, 20% gray, bimodal), 1/16" voids over 40%,	R28:7 minutes
1 -			10	smooth, undulating, associated with lamination surfaces, tight		trace larger voids/cavities (<3/16")	-
-	176.0		\vdash	174.95-175.55' - Fracture zone, fragments to		 173.6-176.0' - pale yellowish brown 	-
l -			10	3"x1"	╨	to dark yellowish orange, (10YR 6/2	_
			'	175.55' - Fracture, 30 deg, smooth, planar,		to 10YR 6/6), very fine grained, 5-10% voids (1/16"), 5% cavities	
1 -				tight 175.7' - Fracture, 70 deg, smooth, planar,	\Box	from round 1/4" to 1/4"x1/2"	1 1
-			10	tight	╁	elongate, fossiliferous, strong (R4)	-
-	D00 N0	l		175.85' - Fracture, 20 deg, smooth, planar,	厂	_ dropping to weak to medium (R2 to	-
-	R29-NQ 5 ft	45	10	tight	\vdash	R3) below 174.8', HCl reaction similar to 163.5-164.5'] _
	100%	.		176.0-176.25' - Fracture zone, fragments to		_ 176.0-181.0' - Same as 173.6-176.0'	
				1"x2"	\vdash	except weak to medium strong (R2 to]
180			2			R3)	1
180							_
1							
$\overline{}$					1		



PROJECT NUMBER:

33884.FL

BORING NUMBER:

GSC-07A

SHEET 10 OF 14

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723463.8 N, 458028.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT: Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

WATER	LEVELS : 5.0			/21/07 START: 4/21/2007 END: 4/		07 LOGGER : C. Wallestad, R. McC	comb		
				DISCONTINUITIES	U	LITHOLOGY	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,		
H BE ATIC	E RUI	(%) Q	TUR -00-	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LIG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND		
EVENT I	SORE	RQD	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	3YME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.		
-136.9	014	ш.	шш	176.25' - Fractures (2), 70 deg and 40 deg,	0)		R29:10 minutes		
-	101.0		10	smooth, planar, open, intersecting fractures,	H	-	-		
-	181.0			fracture zone 176.55' - Bedding plane, horizontal, smooth,	Ħ	_ Limestone	-		
-			>10	undulating, tight to 1/4" open 176.9, 177.0' - Fractures (2), horizontal,	Ħ	 181.0-185.2' - pale yellowish brown to dark yellowish orange, (10YR 6/2 	1		
-				smooth, undulating, fragments to 1"x1/4"	H	to 10YR 6/6), fine to very fine	1		
-			>10	177.8' - Fracture, 75 deg, smooth, undulating, open by fracture zone	Ш	 grained, strong HCl reaction, medium strong to very strong (R3 to 	1		
-	R30-NG		. 40	177.8-178.2' - Fracture zone, fragments to 2"		R5)	1		
	5 ft 84%	8	>10	diameter 178.2' - Fracture, 75 deg, smooth, undulating,	Н	_	1		
			>10	dark, open 178.35' - Fracture, 55 deg, smooth, planar,	Н	_]		
185			/10	dark, tight	Щ				
-141.9			1	178.45, 178.7' - Fractures (2), 55 deg, smooth, undulating, tight	Щ	_ No Recovery 185.2-186.0'	R30:9 minutes		
l _	186.0		NR	178.85-179.1' - Fracture zone, fragments to 1" diameter	Н				
-			>10	179.9' - Fracture, 20 deg and 55 deg,	Н	Limestone - 186.0-189.4' - Same as 181.0-185.2'			
-				smooth, planar, tight 180.0' - Fracture, 30 deg, smooth, planar,	H	except strong to very strong (R4 to	-		
-			>10	dark, tight	Ħ	R5) -	-		
-				180.75-181.0' - Fracture zone, fragments to 1"x2"	H	_	-		
-	R31-NQ 5 ft	0	>10	181.0-181.45, 182.0-184.35' - Fracture zone (2), fragments to 2"x2", some staining	H	_	-		
-	68%		>10	181.45' - Fracture, 20 deg, smooth, planar,	H	_	-		
400			- 10	open by fracture zone 181.65' - 10 deg and 75 deg, smooth,	Ш	No Recovery 189.4-191.0'	Core blockage		
190 -146.9				NR	undulating to planar, tight —	Н	_	R31:6 minutes —	
-	191.0						INIX	181.85, 181.9' - Fractures (2), 75 deg, smooth, planar, tight	田
-	191.0			184.35' - Fracture, 85 deg, smooth, undulating, dark, open by fracture zone	囯	Limestone	1		
-			10	184.65' - Bedding plane, <5 deg, smooth,	口	- 191.0-191.4' - Same as 186.0-189.4' 191.4-195.9' - moderate yellowish	1		
-			. 40	undulating, tight 185.0' - Fracture, 85 deg, smooth, undulating,	Ш	brown, (10YR 5/4), fine grained,	1		
			>10	open by fracture zone	Ш	 moderate HCl reaction, medium strong (R3), voids to 1/8" over 	1		
	R32-NQ 5 ft	65	3	186.0-189.4' - Fracture zone, fragments to 5"x2", dark staining on many faces	Н	10-25% of rock, fossil casts to 1/4" diameter over 5-10% of rock, trace]		
	98%	00	J	191.0-191.3' - Fracture zone, fragments to 3" x 1"		dissolution cavities filled with lighter]		
-			0	191.3' - Fracture, 40 deg, smooth, undulating,	Ħ	colored porous rock; 193.1-193.2' - same as 191.0-191.4' and]		
195_			_	dark, some staining, open to fracture zone 192.2' - Fracture, 60 deg, rough, undulating, —	H	181.0-189.4'	D20: Dun time :t		
-151 <u>.9</u> -			1	tight 192.5' - Fracture, 70 deg, rough, undulating,	H	-	R32: Run time not recorded -		
-	196.0		NR/	tight	H	No Recovery 195.9-196.0'	-		
-			8	192.5-192.8' - Fracture zone, fragments to 2" in diameter	H	Limestone 196.0-198.9' - pale yellowish brown	-		
-				192.8' - Bedding plane, 10 deg, rough, undulating, low angle fracture, tight	Н	to grayish orange, (10YR 6/2 to	-		
-			>10	193.15' - Bedding plane, <10 deg, smooth,	H	L 10YR 7/4), very fine grained, strong HCl reaction, strong to very strong	-		
-	R33-NG	l !		planar, tight 193.25' - Fracture, 50 deg, smooth, planar,	円	(R4 to R5), 5-10% voids (1/16"),	-		
-	- 5 ft 97%	60	2	tight	囯	trace cavities from 1/4" round to 1/4"x1/2"	-		
-	31 /0			193.75' - Fracture, 30 deg, smooth, planar, tight	Ħ	-			
200			0	195.7' - Bedding plane, horizontal, smooth, planar, tight to 1/4" open	田	<u> </u>	1		
				pianal, ignitio 1/7 open	\Box				
1					1				

APPENDIX 2BB-934 Rev. 7



BORING NUMBER: PROJECT NUMBER: 338884.FL

GSC-07A

SHEET 11 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723463.8 N, 458028.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION: Vertical

WATER	LEVELS : 5.0	ft bg	s on 4/	21/07 START : 4/21/2007 END : 4/2	26/200	7 LOGGER : C. Wallestad, R. McC	omb
≥∩≘	(%)			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	C LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH B FACE	E RL 3TH, OVEF	(%) _Q	STUF F00	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP- SURI ELE/	COR	S S	FRA(PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-156.9				196.45, 196.6' - Bedding plane (2),	ш	Limestone	R33: Run time not
-	201.0		>10	horizontal, smooth, planar to undulating, dark, some staining, tight to 1/8" open	Ш	 198.9-200.85' - pale yellowish brown to grayish orange, (10YR 6/2 to 	recorded -
-	201.0		NR)	196.8' - Fracture, 80 deg, smooth, undulating,	H	10YR 7/4), fine grained, moderate	_
-			1	dark, some staining, tight to 1/16" open 197.0' - Fracture, 50 deg, smooth, undulating,	Н	 HCl reaction, strong (R4), 2" infilling of elongate cavities 1/8"-1/2" wide]
			10	tight 197.05' - Fracture, 10 deg, smooth,	Н	and up to 1" long with dark gray infilling, 10% voids (1/16"), trace	
			10	undulating, tight	Ħ	cavities predominantly round up to	
_	R34-NQ 5 ft	58	>10	197.2' - Fracture, 75 deg, rough, undulating, open -	Ħ	1/2" - No Recovery 200.85-201.0'	_
_	100%	00	- 10	197.2-197.7' - Fracture zone, fragments	Н	Limestone	_
-			5	2-1/2"x 1", some dark staining 198.3' - Fractures (2), 65 deg and 25 deg,	H	201.0-201.3' - pale yellowish brown, (10YR 6/2), fine grained, moderate to	_
205				smooth, planar, tight, intersecting 200.35' - Bedding plane, horizontal, smooth,	₽	strong HCl reaction, medium strong (R3), competent	D24: Dun time not
-161.9			3	planar to undulating, dark, some staining,	円	201.3-206.0' - pale yellowish brown	R34: Run time not recorded –
-	206.0			tight to 1/16" open 200.35-200.85' - Fracture zone, fragments	幵	to grayish orange, (10YR 6/2 to 10YR 7/4), fine grained, strong HCl	-
-			>10	1"x2" - 201.5' - Fracture, 40 deg, smooth, undulating,	口	reaction, medium strong (R3), competent, voids to 3/16", trace	-
-				tight	団	fossil cavities, trace dark laminations	-
-			3	202.5' - Fracture, 70 deg, smooth to rough, undulating, tight	丗	to 3/16" thick, yellowish orange, porous inclusions to 1"x1/2" over	-
-	R35-NQ			202.8' - Fractures (2), 60 deg, smooth,	Ш	5-10% of rock from 201.3-203.5'	-
-	5 ft 98%	48	>10	undulating, 2 parallel fractures, tight 202.9-203.7' - Fracture zone, fragments to	H	206.0-207.2' - Same as 201.0-201.3' except trace laminations (3/8" thick)	-
-			. 40	3-1/2"x1"	Ħ	with high void % and one cavity 1"x1/8"	-
210			>10	undulating, tight	Ħ	207.2-210.9' - moderate yellowish	_
-166.9			3	204.0, 204.5, 204.75. 205.3' - Bedding plane (4), horizontal, smooth, planar to undulating,	H	 brown to light olive gray, (10YR 5/4 to 5Y 5/2), fine grained, moderate 	R35: Run time not recorded -
	211.0		(NR)	tight to 1/4" open 204.15' - Fracture, 20 deg, smooth,	Ħ	HCl reaction, weak to medium strong (R2 to R3), voids to 3/16" over 30%	Tecorded
-			1	undulating, tight to 1/4" open	H	of rock, trace fossil casts to	_
-				205.4' - Fracture, 80 deg, smooth, undulating, tight	H	1/2"x1/4", suspected dissolution in fracture zones, secondary infilling	_
-			10	206.0-206.3' - Fracture zone, fragments to 1.5"x1"	H	with light olive gray, medium strong rock (R3) to 2"x1/2" in brown rock,	_
-	R36-NQ			206.3' - Bedding plane, horizontal, smooth,	₽₽	moderate HCl reaction	-
-	5 ft	52	>10	planar to stepped, open to fracture zone 207.05' - Bedding plane, horizontal, smooth,	冊	No Recovery 210.9-211.0' Limestone	-
-	99%			planar, tight -	田	- 211.0-211.4' - Same as 207.2-210.9'	-
045			2	207.2' - Fracture, 70 deg, smooth, planar, tight	口	211.4-212.9' - yellowish gray to grayish orange, (5Y 7/2 to 10YR 7/4),	-
215 <u></u> -171.9				207.85' - Fracture, 40 deg, rough, undulating, — tight	団	 very fine grained, very strong HCI reaction, strong (R4), no voids, trace 	R36: Run time not
1 -	216.0		2	208.35' - Fracture, vertical and 40 deg,	団	1/4" cavities, HCl reaction similar to	recorded -
1 -	_ 10.0		NR/	rough, undulating, open, missing opposite - face	団	201.0-201.3' 212.9-215.95' - pale yellowish brown	1
1 -			0	208.6-208.95' - Fracture zone, fragments to 1.5"x1"	Ш	to moderate yellowish brown, (10YR 6/2 to 10YR 5/4), fine grained,]
1 -			0	209.0' - Bedding plane, horizontal, smooth,	用	moderate to strong HCl reaction,]
			Ŭ	planar, tight 209.5-210.0' - Fracture zone, fragments to	Ħ	medium strong to strong (R3 to R4), voids to <1/16" from 10-30%, a few	
-	R37-NQ 5 ft	80	1	1.5"x1" 210.25' - Fracture, 30 deg, smooth,	Ħ	to many cavities up to 1/2" No Recovery 215.95-216.0'	
-	98%	-		undulating, tight to 1" open	Ħ	110 RECOVERY 2 15.35-2 10.0	_
-			3	210.6' - Fracture, 30 deg, smooth, undulating, tight to 1/2" open	H	-	_
220					붜		_
$\overline{}$							



PROJECT NUMBER: BORING NUMBER: 338884.FL

GSC-07A

SHEET 12 OF 14

ORIENTATION : Vertical

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723463.8 N, 458028.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

WATER	LEVELS: 5.0	ft bgs	s on 4/	21/07 START : 4/21/2007 END : 4	/26/200	7 LOGGER : C. Wallestad, R. McC	Comb
30₽	(%			DISCONTINUITIES	_ g	LITHOLOGY	COMMENTS
BELO' CE AN	RUN, 'H, AND ÆRY (9	(%)	'URES JOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMB0	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-176.9 -			2	211.8, 212.1, 212.25, 212.3, 212.4, 212.65' - Bedding plane (6), 25 deg, smooth, planar,	\square	Limestone - 216.0-216.5' - Same as 201.0-201.3'	R37: Run time not recorded
-	221.0		NR)	tight except by fracture zone 212.35' - Fracture, 25 deg, smooth, planar,	+	and 211.4-212.9', 216.5-218.6' except trace voids to 1/16" and layers	-
-			5	open, missing opposite face	╂╫	- 1/4"-1/8" thick with infill materials as	-
-			-	212.65-213.6' - Bedding plane, 25 deg, smooth, planar, tight except by fracture zone	\blacksquare	216.5-218.6' 216.5-218.6' - yellowish gray, (5Y	-
-			>10	213.6' - Fracture, 25 deg, smooth, planar,	$-\Box$	- 7/2), medium to coarse grained,	-
-	R38-NQ		-	open, missing opposite face 214.0' - Fracture, 60 deg, smooth, undulating,	口	weak to moderate HCl reaction, weak to medium strong (R2 to R3),	-
-	5 ft 68%	23	10	tight 214.6' - Fracture, 45 deg, rough, undulating,	丗	 voids to 1/8" over 20-30% of rock, fossil casts to 1/2" diameter over 5% 	-
-	0070		10	tight	丗	of rock, trace inclusions of dusky	-
225				215.6' - Fractures (2), 60 deg and 40 deg, smooth, undulating, intersecting fractures,	Ш	 yellow (5Y 7/4), low percentage of voids, infill to 4"x2" 	-
-181.9			NR	tight to 1/8" open 215.75' - Fracture, 30 deg, smooth, planar,	+	218.6-220.5' - Same as 201.0-201.3' and 211.4-212.9' except trace voids	R38: Run time not
	226.0			tight to 1/8" open	\Box	to 1/16" and layers 1/4"-1/8" thick	recorded -
			10	218.6' - Fractures or bedding plane (2), 35 deg and horizontal, smooth, planar to	\Box	with infill materials as 216.5-218.6' 220.5-220.9' - yellowish gray, (5Y	-
			10	stepped, intersecting fractures, open, missing	耳	7/2), medium to coarse grained,	
			10	opposite face 219.0, 219.3, 219.75' - Bedding plane (3), <5	芦	weak to moderate HCl reaction, weak to medium strong (R2 to R3),	_
_				deg, rough, undulating, tight to 1/4" open 219.9-220.0' - Fractures (3), 0,90,50 deg,	出	voids to 1/8" over 20-30% of rock, fossil casts to 1/2" diameter over 5%	_
_	R39-NQ 5 ft	35	4	smooth, planar, intersecting fractures, tight to	₽	of rock, trace inclusions of dusky	_
_	92%			1" open, missing opposite face 220.5-220.55' - Fracture zone, fragments to	\square	yellow (5Y 7/4), low percentage voids, infill to 4"x2"	Chattaring (madarata) at
_			>10	1/2" diameter		No Recovery 220.9-221.0' Limestone	Chattering (moderate) at 229.0'
230_ -186.9			40	221.5, 221.65, 221.9, 223.3, 223,4, 223,55, 223.65, 223.9, 224.1' - Bedding plane (9),	-111	221.0-221.6' - moderate yellowish	R39: Run time not
-			10 NR	horizontal and 5 deg, smooth, planar, tight except by fracture zone	丗	brown, (10YR 5/4), fine grained, moderate to strong HCl reaction,	recorded -
-	231.0		NR	221.6, 223.35' - Fractures (2), 80 deg,	Ш	strong to very strong (R4 to R5),	-
-			10	smooth, undulating, tight 221.95' - 50 deg, smooth, undulating, tight	╂┼╂	15-20% <1/16" voids, laminar appearance in both color and void	R. McComb begins logging
-				222.55-222.9' - Fracture zone, fragments to 2"x1/2", mostly 1" diameter	\Box	percentage, transitions from above and below gradual	-
-			10	223.0' - Bedding plane, 5 deg, rough,	Ħ	221.6-221.75' - yellowish gray, (5Y	-
-	R40-NQ		. 40	undulating, tight to 1/2" open 223.55' - Bedding plane, horizontal and 5	\Box	- 7/2), fine grained, strong HCI reaction, strong to very strong (R4 to	-
	5 ft 92%	30	>10	deg, smooth, planar, tight except by fracture	111	R5), no voids as 201-201.3' and 211.4-212.9', gradual transitions	-
			>10	zone 223.65-223.9' - Fracture zone, fragments to	罝	above and below	
235_			- 10	2"x1/2", mostly 1" diameter 223.9' - Bedding plane, horizontal and 5 deg, _	Ш	221.75-223.7' - grayish orange to yellowish orange, (10YR 7/4 to 5Y	
-191 <u>.</u> 9			>10	smooth, planar, tight except by fracture zone	$\perp \perp \mid$	7/2), fine grained, strong HCl	R40: Run time not recorded -
	236.0		NR	224.1-224.15' - Fracture zone, fragments 1/2"x1/4"	円	reaction, very weak to weak (R1 to R2), voids to 1/16" over 5-25% of	-
-			>10	226.0-226.2, 227.65-227.8, 230.1-230.15, 230.4-230.45' - Fracture zone (4), fragments	珥	surface, many cavities up to 3/4" some of which infilled with 25% void	-
-				to 2"x1"	坩	rock, strong HCl reaction throughout	-
-			>10	226.7' - Mechanical break 227.25' - Mechanical break	\Box	223.7-224.2' - Same as 221.6-221.75'	-
-	R41-NQ			227.6, 227.65, 227.8, 228.2, 228.45, 228.5,	\Box	_ 224.2-224.4' - Same as	-
-	5 ft	10	>10	228.9, 229.15, 230.3' - Bedding plane (9), horizontal, smooth, undulating to planar, tight	+	221.75-223.7' No Recovery 224.4-226.0'	-
-	70%		>10	except by fracture zones 230.3' - Bedding plane, horizontal, smooth,	\Box	-	-
240			- 10	undulating, tight except by fracture zone		-	-
240					怈		



PROJECT NUMBER:

33884.FL

BORING NUMBER:

GSC-07A

SHEET 13 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723463.8 N, 458028.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

				IENT : Dietrich D-50 5/N 252, mid fotally, NQ tools, HW				ORIENTATION : Vertical
WATER	LEVELS : 5.0	ft bgs	s on 4		26/20 •	07	·	
30≎	<u></u>			DISCONTINUITIES	ğ	L	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ı	ROCK TYPE, COLOR,	CIZE AND DEDTH OF CACING
불병은	ER, F, R	(%) Q	N C	DEDTIL TYPE OPIENTATION POLICINICO	1 ≒	ı	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
T A A	9.64E	0	CT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	β	ı	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
	유민	a Q	-R/	THICKNESS, SURFACE STAINING, AND TIGHTNESS	\ }	ı	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-196.9	L	_		231.1' - Fracture, <10 deg, rough, stepped,	+ "	╄	Limestone	R41: Run time not
			NR	open		1	226.0-277.65' - yellowish gray, (5Y	recorded -
	241.0			231.4-231.7' - Fracture zone, <10 to 90 deg,	\vdash	l	7/2), medium grained, strong HCl	
				rough, stepped to undulating, open	Н	Ł	reaction, weak to medium strong (R2	
-			>10	232.8' - Fracture, <10 to horizontal deg,		1	to R3), voids to 1/8" over 5-25% of	-
-				rough, undulating, open 232.9-233.4' - Fracture, 80 deg, rough,	╙	₽	rock decreasing with depth, fossil casts to 2"x 1" over 5-10% of rock	-
l _				undulating, open -	┢	L	Limestone	
				233.4-234.5, 234.8-235.6' - Fracture zone		1	227.65-229.15' - yellowish gray, (5Y	
-	R42-NQ			(2), <10 to horizontal deg, rough, stepped to	╙	Ł	7/2), medium grained, strong HCl	1
-	5 ft	0		undulating, open	\vdash	t	reaction, extremely weak to weak	-
-	18%		NR	236.0-237.0, 237.0-238.0' - Fracture zone		ļ.	(R0 to R2), trace voids to 1/16", trace cavities to 1"x2", dark laminations to	-
				(2), horizontal to 90 deg, rough, stepped to undulating, open	⊬	L	1/8" thick over 10-20% of surface	
245				238.0-239.5' - Fracture zone, various		1	Clay With Silt (CL-ML)	1
-201.9				orientations, predominantly limestone gravel	1—	r	229.15-229.85' - medium plasticity,	R42: Run time not
-				241.0-241.9' - Fracture zone, various	╀	╁	poorly competent, clay and silt with	recorded -
-	246.0			orientations, predominantly limestone gravel	\Box	1	limestone fragments to 1/4", strong]
			_10	246.0-248.4' - Fracture zone, horizontal to 90	┝	Ł	pungent sulfur or petroleum odor (fetid)	
1 7			>10	deg, rough, stepped to undulating, open, gravel-sized to fine cobble-sized limestone	Ľ	ſ	229.85-230.6' - Same as	1
-				fragments	口	ŀ	227.65-229.15'	-
-			>10	247.0' - Mechanical break	╀	╁	No Recovery 230.6-231.0'	-
I _				_		1	Limestone	<u>_</u>
	R43-NQ		>10		ш	1	231.0-235.2' - yellowish gray, (5Y	
-	5 ft 48%	0		-	Н	Ł	7/2), fine grained, moderate HCI reaction, very weak to weak (R1 to	1
-	4070			-		ŀ	R2), voids up to 1/16" over 15-20%;	4/26/07 11:35 total depth at
-				-	₽	₽	<3-5% from 232.8-233.8', where	251.0'
250_			NR		ҥ	L	limestone appears to become	
-206.9					\Box	1	conglomerate (harder fragments	R43: Run time not
-	251.0				╨	Ł	within matrix), cavities up to 3/4"-1-3/16"x3/8"-3/4", penetrate into	recorded -
-	251.0				┢	ħ	core surface, becomes thickly	
-				-	1	H	laminated and less fragmented with	-
l _				_	1	L	depth with voids and cavities	
					ı	П	235.2-235.6' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction,	
-				-	1	H	extremely weak (R0), poorly	1
-				-	1	Н	competent, somewhat friable;	-
-				-	1	H	crumbles to silt and sand-sized	1 4
				_	1	Ll	material (5-10%)	
							No Recovery 235.6-236.0' Limestone]
1 7				·	1		236.0-239.1' - yellowish gray, (5Y	1 1
-				_	1	H	7/2), fine grained, mild HCl reaction,	-
-				-	1	F	very weak (R1), poorly competent to] _
				_	1	L	competent, somewhat friable, voids	
					1	1	up to 1/16" over 50-60% of surface, cavities >5, 2"x2", trace fossil]
1 7				-	1	r	molds/casts	1
-				-	1	F	239.1-239.5' - yellowish gray, (5Y	1 -
-				-	1	F	7/2), very fine grained, moderate to] -
				_	1	L	strong HCl reaction, strong (R4),	
					1	ľ	competent, voids covering 3-10% of surface	1
1 7				-	1	L	No Recovery 239.5-241.0'	1
-				-	1	F		1 -
-				-	1	F		1
					L			
					Γ	Γ		
					1	1		
					-	_		-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-07A	SHEET	14	OF	14	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723463.8 N, 458028.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Jacksonville, FL; Driller: B. Truitt; Cathead Operator: M. Pennell

CORING METHOD AND EQUIPMENT : Dietrich D-50 S/N 232, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS : 5.0) ft bg	s on 4/	/21/07 START : 4/21/2007 END : 4/2	26/200	007 LOGGER : C. Wallestad, R. McComb
				DISCONTINUITIES	Ö	LITHOLOGY COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS RIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
			<u>d</u>			Limestone 241.0-241.9' - yellowish gray, (5Y 7/2), mild HCI reaction, very weak (R1), competent, broken into gravel-sized fragments, voids <1% to over 30.40%, cavities up to 1" and penetrating 10% of rock No Recovery 241.9-246.0' Limestone 246.0-245.4' - yellowish gray, (5Y 7/2), fine grained, weak to moderate HCI reaction, extremely weak to weak (R0 to R2), competent, become friable at depth, voids and cavities over 20-30% of surface >10%, limestone at 248.0' becomes extremely weak, friable, trace fossil casts and molds No Recovery 248.4-251.0' Bottom of Boring at 251.0 ft bgs on 4/26/2007



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-08

SHEET 1 OF 10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723365.5 N, 457759.0 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: R. Haire, T. Williams

WATER	LEVELS	: 13.8 ft l	ogs on 04	/22/07	START : 4/21/2007 END : 4/23/2007 LOGGER : C. Dougherty
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
HE SE		RECOVE	ERY (ft)	120111200210	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTH			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
				(N)	
43.2	0.0			2-2-2	Poorly Graded Sand With Organics (SP) 0.0-0.9' - medium light gray, (N6), moist, loose, fine Began drilling at 16:30, 4/21/07
_		1.2	SS-1	(4)	silica sand, organic material, trace nonplastic fines,
_	1.5				plant roots Silty Sand (SM)
_					\0.9-1.2' - grayish brown, (5Y 3/2), moist, loose, fine \ _
_					silica sand, 25% nonplastic fines, organic material
_					.
_					 .
_					 .
_					 .
5	5.0				
38.2				2-3-3	Poorly Graded Sand With Silt (SP-SM) 5.0-5.9' - grayish yellow, (5Y 8/4), wet, loose, fine
_		0.9	SS-2	(6)	silica sand, 5-10% nonplastic fines, some plant roots
_	6.5				_ _ _ _ .
_					-
_					-
_					-
_					-
_					-
_					-
10 <u> </u>	10.0				City Cond (CM)
- 33.2				3-4-4	Silty Sand (SM) 10.0-11.0' - yellowish gray, (5Y 7/2), wet, loose, fine
_		1.0	SS-3	(8)	grained, fine silica sand, 25% low plastic fines
-	11.5				
-					
-					
-					
-					
-					
-					
15 <u> </u>	15.0				Silty Sand (SM)
		, ,	00.4	3-2-3	15.0-15.95' - Same as 10.0-11.0'
-		1.0	SS-4	(5)	
-	16.5				
-					
-					
-					
-					
-					
-					
20_					++



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-08

SHEET 2 OF 10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723365.5 N, 457759.0 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: R. Haire, T. Williams

WATER	LEVELS	: 13.8 ft b	gs on 04	/22/07	START : 4/21/2007 END : 4/23/2007 LOGGEF	R : C.	Dougherty
				STANDARD	SOIL DESCRIPTION	g	COMMENTS
AND (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COLL NAME LICCS CROLID SYMBOL COLOR	010	DEDTIL OF CACING DUILLING DATE
H BE		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	BOLI	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	INSTRUMENTATION
23.2	20.0				Silty Sand (SM)		
		1.3	SS-5	2-2-3 (5)	20.0-21.3' - Same as 15.0-15.95' -]
	21.5			(-)			_
_					_	1	_
-					-	-	-
-					-		-
-					-	┨	-
-					-		1
25	25.0				-	1	1
18.2				0.00	Silty Sand (SM) 25.0-25.5' - Same as 15.0-15.95' and 20.0-21.3'		
_		1.0	SS-6	2-2-3 (5)	Clayey Sand (SC)		_
-	26.5				\ 25.5-26.0' - yellowish gray, (5Y 7/2), moist, loose, fine / silica sand, 30% medium plastic fines	-	-
-					-	ł	-
-					-	┨	-
-					-	1	1
-					-		1
]
30	30.0					ļ.,,	<u> </u>
13.2			00 -	0-0-1	Silty Sand (SM)		Driller's Remark: Weight of hammer drove sampler through top 12 inches of sample
-		1.4	SS-7	(1)	very loose, fine grained, silica sand, 30% nonplastic to low plastic fines, 30.35' abrupt contact in materials,		Stop work for the day, drilled to 30.0' below ground surface, collected 30.0-35.35',
-	31.5				1/2" thick gray fat clay (CH) seam	Y //	stopped at 17:35 - Drilling resumes 08:40, 4/22/07
-					Clayey Sand (SC) 30.35-31.35' - yellowish gray with medium gray	1	Water level 13' 10" below ground surface at
-					mottling, (5Y 7/2 with N5), moist, very loose, fine grained, silica sand, 35% medium to high plastic fines		08:30
					_]
-					<u>-</u>	1	
-					-	-	-
35 8.2	35.0				Sandy Fat Clay (CH)	///	Slough at top of 35.0-36.5' has silty sand
-		1.5	SS-8	2-5-8	35.0-36.5' - medium gray with yellowish gray mottling, (N5 with 5YR 7/2), moist, medium stiff, high plasticity,		with iron oxide modules up to 1/4" (most about 1/16")
-	36.5			(13)	35% fine silica sand increasing with depth, mottling		
-	23.5				increasing with depth at 35.7'	'	1
]
_					-		
-					-	1	-
-					-	1	-
40					-	1	-
40							-
						1	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-08

SHEET 3 OF 10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723365.5 N, 457759.0 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: R. Haire, T. Williams

WATER	LEVELS	: 13.8 ft l	ogs on 04	/22/07	START : 4/21/2007 END : 4/23/2007 LOGGER : C. Dougherty
				STANDARD	SOIL DESCRIPTION 5 COMMENTS
LOW AND N (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	
ACE ATIO		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
3.2	40.0			(14)	Silty Sand (SM)
-		1.2	SS-9	1-2-1	40.0-41.2' - light olive gray with medium dark gray mottling, (5Y 5/2 with N4), wet, loose, fine silica sand,
-	41.5			(3)	25% nonplastic fines
-	41.0				1
-					1
-					1
					1
] [
]
45	45.0				
-1.8				3-4-3	Fat Clay With Sand (CH) 45.0-45.5' - light olive gray with medium dark gray
_		1.5	SS-10	(7)	mottling, (5Y 5/2 with N4), moist, medium stiff, high plasticity, no dilatancy, 20% fine silica sand
_	46.5				Organic Soil With Sand (OH)
-					45.5-46.4' - grayish black, (N2), moist, medium stiff, high plasticity, slow dilatancy, interfingered with fine
-					\sand, medium gray (N5)
-					Silty Sand (SM) 46.4-46.5' - Same as 40.0-41.2' except light olive
-					gray, (5Y 5/2)
-					
	50.0				
50 -6.8	50.0				Silty Sand (SM)
-		1.5	SS-11	2-2-2	\ \ \ 50.0-50.3' - yellowish gray, (5Y 7/2), wet, loose, fine \ \ -\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
-	51.5			(4)	Organic Soil With Sand (OH)
-	01.0				50.3-51.5' - Same as 45.5-46.4'
-					1
-					1
]
]
_					」
55	55.0				
-11.8				2-3-2	Organic Soil With Sand (OH) 55.0-56.5' - Same as 45.5-46.4' except 30% sand
_		1.5	SS-12	(5)	→
_	56.5				
-					
-					
-					
-					- - - - - - - - -
-					-
60					++



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-08

SHEET 4 OF 10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723365.5 N, 457759.0 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: R. Haire, T. Williams

WATER	LEVELS	: 13.8 ft k	ogs on 04	/22/07	START : 4/21/2007 END : 4/23/2007	LOGGEF	R : C.	Dougherty		
				STANDARD	SOIL DESCRIPTION			COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS			SYMBOLIC LOG			
H H		RECOVE	RY (ft)	120111200210	SOIL NAME, USCS GROUP SYMBOL, COL MOISTURE CONTENT, RELATIVE DENSIT	LOR, Y.OR	SLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND		
PTH			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERA		MBK	INSTRUMENTATION		
				(N)	A. (14)		တ်			
-16.8 _	60.0	0.9	SS-13	25-50/5	Silt (ML) 60.0-60.9' - yellowish gray, (5Y 7/2), moist, ha	ard. low -	$\ \ $	_		
_	60.9			(75/11")	plasticity, rapid dilatancy, moderate HCl react	ion, with _	Ш	_		
_					carbonate, 1/2" sandy organic soil (OH) seam of sample	at top		_		
_					(a saw ja s			_		
_						-		_		
_						-		_		
_						-		_		
_						-		_		
						_		_		
65	65.P									
-21.8		0.0	SS-14	50/1.5 (50/1.5")	No Recovery 65.0-65.1'			Driller's Remark: Not sure if drilling resistance, while increasing, is indicative of		
				(50/1.5)			1	rock.		
								Only minor amount of sand (probably slough material) in sampler		
								We will drill to 70.0' and try another split		
								spoon. Driller's Remark: Chatter while drilling, some -		
								rock fragments in cuttings		
						-				
						-				
						-	1			
70	70.0					-	1			
-26.8					Silt With Sand (ML)					
		1.5	SS-15	31-41-49 (90)	70.0-71.5' - yellowish gray, (5Y 7/2), moist, ha grained, rapid dilatancy, moderate HCl reaction	ara, fine	1	_		
	71.5			(50)	15-20% fine to coarse sand-sized, trace fine	-	1	_		
-					gravel-sized limestone fragments, carbonate			_		
-						-		_		
-						-	1	_		
-						-	1	_		
-						-	1			
-						-	1			
75	75.0 75.2		00.40	50/0	Au. 4.4.)	-	1	1		
-31.8	/5.2	0.2	SS-16	50/2 (50/2")	Silt (ML) 75.0-75.2' - Same as 70.0-71.5' except 20% o	coarse T	T'''	-		
-				\ <u>-</u>	sand sized		1	-		
-					Begin Rock Coring at 75.0 ft bgs See the next sheet for the rock core log	-	1	-		
-					Obe the fiest sheet for the fock core log	-	1	-		
-						-	1	-		
-						-	1	-		
-						-	1	-		
-						-	1	-		
-						-	1	-		
-						-	1	-		
80							\vdash			



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-08

SHEET 5 OF 10

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723365.5 N, 457759.0 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: R. Haire, T. Williams

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing

WATER	LEVELS: 13	.8 ft b	gs on (04/22/07 START : 4/21/2007 END : 4	/23/200	D7 LOGGER : C. Dougherty		
30₽	(%)			DISCONTINUITIES	<u>ا</u> ۾ [LITHOLOGY	COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.	
-31.8 - - - -	75.0 R1-HQ 5 ft	7	NR			No Recovery 75.0-77.5'	13:50, 4/22/07, soil split spoon sampling is halted. Will set casing and begin rock coring T. Williams becomes operator Driller's Remark: Little resistance to drilling until	
- - - - 80	30%		>10 2 NR	77.5-78.0, 78.5-79.0, 80.2, 80.7, 80.8' - Mechanical break (5), fragments too irregular to determine fit		Limestone 77.5-79.0' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, weak (R2), voids abundant, only 78.0-78.5' (75% of surface) No Recovery 79.0-80.0'	about 77.5' R1: Run time not recorded	
-36.8 - -	80.0		4 plana	81.0, 81.3' - Joint (2), horizontal, smooth, planar, some organic material		Limestone - 80.0-81.9' - Same as 77.5-79.0 - except laminated bedding below 80.4', trace organics along bedding - 80.5-81.4', voids (<1/16") >5% of	- - - -	
- -	R2-HQ 5 ft 84%	15	4	81.3-81.9' - Fracture, vertical, rough, undulating, black, staining on 75% of surface 81.9, 85.5, 85.9, 86.2, 86.9, 87.3, 87.5, 88.6, 90.3-90.9, 91.7, 92.1' - Mechanical break (11)		surface, along bedding plane 81.9-84.2' - yellowish gray, (5Y 7/2), fine grained, moderate HCl reaction, weak (R2), voids (1/16") over 75% of surface (1/16" or larger) over 5%, laminated bedding at 87.2-87.5',	- - -	
- 85_ -41.8	85.0		0 NR	-		88.1-88.3', and 88.9-94.1' No Recovery 84.2-85.0' Limestone	R2: 7 minutes	
-			2			- 85.0-90.0' - Same as 81.9-84.2' except laminated uneven bedding at 85.1-85.3', and 86.2-86.9', trace large (3/8") voids, weakly competent interval 88.6-89.4', trace organics	- - -	
-	R3-HQ 5 ft 100%	65	0			87.5-88.0' - -	-	
90_ -46.8	90.0		>10	_		- - - 90.0-92.3' - Same as 81.9-84.2'	R3: 6 minutes -	
-			>10 1			except from 91.0-91.8' has 75% area as very few voids, abundant voids <1/16" of surface, larger voids - (3/16"x 3/4" and smaller) are present 91.4-92.2' (5% of area)	- - -	
-	R4-HQ 5 ft 66%	38	>10 2 NR	92.5-93.0' - Fracture zone 93.0, 93.15' - Mechanical break (2)		Silt (ML) 92.3-92.7' - light olive brown, (5Y 5/2), moderate HCI reaction, carbonate derived, limestone fragments at bottom of zone	- - - R4: 6 minutes	
95	95.0					-	-	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-08

SHEET 6 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723365.5 N, 457759.0 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: R. Haire, T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

COKING	INLITIODA	ND L	ZUIFIV	MENT: CME 550X S/N 340253, mud rotary, HQ tools, H	/v cas	ng .	ORIENTATION : Vertical
WATER	LEVELS: 13	8 ft b	gs on	04/22/07 START : 4/21/2007 END : 4	/23/20	07 LOGGER : C. Dougherty	
	_			DISCONTINUITIES	(J	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION		ROCK TYPE, COLOR,	
의 등 시 이 이 시 이 이 시 이 이 시 이 이 시 이 이 시 이 이 시 이 이 시 이 이 시 이 이 시 이 이 이 시 이 이 이 시 이 이 이 이	N. A. Y.	(9)	FRACTURES PER FOOT	B2001 11011	SYMBOLIC	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
FXF	ER OVE	Q D (%)	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOI	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
	N N N N	ø	ER Z	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Į₹	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	074	<u>~</u>	正凸	, , , , , , , , , , , , , , , , , , ,	Ś		
-51.8				95.0-95.4' - Fracture zone	\vdash	Limestone	
-			>10		1	- 92.7-93.3' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction,	•
-				95.8, 96.1' - Mechanical break (2)	\Box	very weak (R1), voids (1/16") over	-
-			2		₽	- 30% of surface	
				96.6-97.6' - Fracture, vertical	\vdash	No Recovery 93.3-95.0'	
	R5-HQ					Limestone	
-	5 ft	47	3	97.6-98.0' - Mechanical break (3)	+	- 95.0-95.4' - Same as 92.7-93.3'	-
-	68%		. 40	` '	╂	except trace organics 95.4-95.7' - yellowish gray, (5Y 7/2),	Driller's Remark: lost
I _			>10	98.0-98.3' - Fracture zone		strong HCl reaction, very weak (R1),	circulation at 98.0'
					\vdash	voids (1/16") over 85% of surface	on outdition at 50.0
-			NR		\perp	95.7-96.1' - Same as 92.7-93.3'	R5: 10 minutes
					+	96.1-98.4' - Same as 95.4-95.7'	-
	100.0		<u> </u>	400 0 400 01 5	+	except very fine grained, few voids,	
-56.8			>10	100.0-100.8' - Fracture zone, also organics and carbonate derived silt		interfingering limestone with voids	_
			10			over 75% of surface, trace organics	
1 -				100.9-101.4' - Fracture or mechanical break,	111	throughout; thin zones (1-1/5") of	· -
-			1	79 deg, rough, undulating 101.4-101.9' - Fracture zone, some	+-	carbonate-derived lean clay at	-
_				fragments have slight dark staining	╨	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	_
	R6-HQ	60	2	102.3. 102.8. 103.0. 103.2. 103.5' -		- Fat Clay (CH)	
	5 ft 94%	60	-	Mechanical break (5)	\perp	100.0-100.4' - yellowish gray, (5Y	_
-				(0)	+-	7/2), thin (3/8") layered limestone at	-
-			4		$-\Box$	_ 100.3', carbonate derived	-
-				103.5-103.9' - Fracture, 70 deg, tight	ᅪ	Fat Clay (CH)	
			0			100.4-100.6' - black, (N1), strong HCI reaction, carbonate derived	R6:5 minutes
105	105.0		NR		μ	Silt (ML)	_
-61.8	100.0		INIX	-	+-	100.6-101.0' - light olive gray, (5Y	
-						- 5/2), strong HCl reaction, carbonate	-
_					╨	derived	_
						Limestone	
					1—	101.0-104.2' - yellowish gray, (5Y 7/2), fine grained, strong HCl	_
-	R7-HQ				+-	reaction, very weak to weak (R1 to	-
-	5 ft	0	NR			 R2), voids (1/16") over 75% of 	-
	0%				-	surface, large voids (up to 3/8" x	_
						3/4") over <5%, very fossiliferous 104.2-104.7' - Same as 101.0-104.2'	
1 1					\coprod	except light olive gray, (5Y 7/2),	· ·
-					+	moderate HCl reaction	R7: 2 minutes
-					亡	- No Recovery 104.7-110.0'	
110	110.0			_	╨		
-66.8					\vdash	Limestone	Driller's Remark: rod drop
			1	110.7. 111.9! Machanical break (2)		- 110.0-111.9' - yellowish gray with medium gray mottling, (5Y 7/2 with	3 feet at 110.0' below - ground surface
-				110.7, 111.2' - Mechanical break (2)	+	N5), very fine grained, strong HCl	ground surface
-			3		世	 reaction, very weak to weak (R1 to 	-
			<u> </u>	111.6, 111.8' - Joint (2), horizontal, tight	<u>_</u>	R2), voids (1/16" or less) over 85%]
	R8-HQ				\vdash	of surface, moderately fossiliferous	
1 7	5 ft 38%	37			\perp	- (casts and molds) No Recovery 111.9-115.0'	· -
-	30 /0				+	_ 140 Necovery 111.9-110.0	-
-			NR		╨	<u> </u>	-
					Д		_
					\vdash		R8: 1 minute
145	445.0				世	<u> </u>	-
115	115.0				+		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	GSC-08	SHEET	7	OF	10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723365.5 N, 457759.0 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: R. Haire, T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

00111110	METHODA	ND LC	ZOII IV	IENT: CIME 550X S/N 340253, mud rotary, HQ tools, HV	v cas	ising ORIENTATION: Vertical
WATER	LEVELS: 13	.8 ft b	gs on (04/22/07 START : 4/21/2007 END : 4/	23/20	2007 LOGGER : C. Dougherty
>	(9)			DISCONTINUITIES	ß	LITHOLOGY COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		SE.	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,
HU	RUF ÆR	(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	1	MINERALOGY, TEXTURE, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H P H	AGT COV	R Q D (%)	ACT R F(PLANARITY, INFILLING MATERIAL AND	MBG	WEATHERING, HARDNESS, AND ROCK MASS WEATHERING, HARDNESS, SMOOTHNESS, COKING RAILE AND SMOOTHNESS, COK
SU	SER	R	FR	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS DROPS, TEST RESULTS, ETC.
-71.8					°.°.	
-			1	115.5' - Mechanical break	╁	\ 115.0-115.3' - yellowish gray and
-					仜	to coarse grained, strong HCl
-					╂┰	reaction reaction
-	D0 110					Limestone
	R9-HQ 5 ft	10			╀	115.3-116.0' - Same as 110.0-111.9' except yellowish gray, (5Y 7/2)
	20%		NR		oxdot	No Recovery 116.0-120.0'
			INIX			
1 7					\vdash	-
1 7						R9: 3 minutes
100	400.0				\vdash	-t I
120 <u> </u>	120.0			_	╫	Sandy Silt (ML) Driller's Remark: 120.0-
-			N/A		$\ \ $	- 120.0-121.5" - yellowish gray, (5Y 125.0' rod dropped entire
-					4	7/2), soft, strong HCl reaction, interval
			N/A		Ш	weakly competent limestone fragments at bottom of section,
					⊬	carbonate derived
	R10-HQ					No Recovery 121.5-125.0'
1 7	5 ft 30%	0			┰	-[
-			NR			1
-					╁	†
-					╓	R10: Runtime not recorded
-						- Trio. Rantime not resorted
125_ -81.8	125.0			405 0 400 0 405 0 406 0! Freetures or	╀	-
-01.0			>10	125.0-128.3, 125.8-126.2' - Fractures or mechanical break (2), no visible orientation		Limestone 125.0-126.4' - Same as 110.0-111.9'
					⊬	except poorly competent, trace black,
			>10			staining throughout core
			/10	126.4, 126.6, 127.5' - Mechanical break (3)	\vdash	126.4-128.5' - light gray, (N7), strong HCl reaction, very weak (R1), voids
1 7	R11-HQ					(1/16") over 70% of surface, cavities
-	5 ft 70%	52	1		╚	up to 3/4"x1-9/16") over 5% of
-	7070		0		\vdash	surface, very fossiliferous (mold and casts)
-			U		士	No Recovery 128.5-130.0'
-			, ,_		\vdash	_ <u>_</u>
			NR		片	R11: 4 minutes
130	130.0			_	H	
-86.8			>10			Sandy Silt (ML) 130.0-131.3' - grayish orange to light
]			10			olive gray, (10YR 7/6 to 5Y 5/2),
1					Щ	strong HCl reaction, fine sand-sized
-			>10	104 7 100 01 F	╨	
-	R12-HQ			131.7-132.0' - Fracture zone	仜	131.3-132.2'
-	5 ft	8	>10	132.4-134.6' - Fracture zone, most are	╁	Limestone
-	92%			probable mechanical breaks	F	131.3-132.2' - very pale orange to
			>10		世	light olive gray, (10YR 8/2 to 5Y 5/2), fine grained, strong HCl reaction,
					${oldsymbol{arPsi}}$	medium strong (R3), laminated
			>10		ፗ	bedding (<1/16" thick) below 131.8', transitions gradually to 132.2-134.6'
135	135.0		NR		\vdash	Lianomono gradually to 132.2-134.0
					Τ	



PROJECT NUMBER:

338884.FL BORING NUMBER:

GSC-08 SHEET 8 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723365.5 N, 457759.0 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: R. Haire, T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

			2011 11	IENT: CME 550X S/N 340253, mud rotary, HQ tools, HV	v casi	ng	ORIENTATION : Vertical					
WATER	LEVELS: 13.	8 ft b	gs on (04/22/07 START : 4/21/2007 END : 4/	23/20	D7 LOGGER : C. Dougherty						
300	~			DISCONTINUITIES	(J	LITHOLOGY	COMMENTS					
SELOW SE AND SE AND SON (ft)	UN, I, AND ERY (%	(9	IRES OT	DESCRIPTION	IC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,					
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.					
-91.8			4.0	135.0-136.0' - Fracture zone, fragments	\blacksquare	Limestone						
			>10		上	 132.3-134.6' - very pale orange to yellowish gray, (10YR 8/2 to 5Y 7/2), fine grained, extremely weak to very 						
			3	136.3, 136.6, 136.95' - Mechanical break (3)	H	weak (R0 to R1), trace intervals of laminated bedding						
	R13-HQ 5 ft	47	1	137.4-137.7' - Fracture zone or mechanical		No Recovery 134.6-135.0' Limestone						
-	82%		. 10	break 138.2-138.5' - Fractures (5), smooth, planar,		135.0-137.9' - Same as 132.3-134.6' except zone of light olive gray (5YR 5/2) 137.9-139.1' - light olive gray, (5YR 5/2), fine grained, strong HCI						
			>10	fractures along bedding planes, probably mechanical breaks	F		R13: 5 minutes					
140	140.0		NR		臣	 reaction, weak (R2), voids (1/16") over 60% of surface, oriented along 	1013. 3 minutes					
-96. 8			2	– 140.4' - Mechanical break	H	bedding planes (laminated bedding), zone of medium gray (N5) limestone, medium strong (R3) from						
-			>10	140.6-140.9' - Fracture zone, no visible orientation	片	137.9-138.1' No Recovery 139.1-140.0'						
]	R14-HQ		- 10	142.2-142.3' - Fracture zone or mechanical break, rough, undulating	上	Limestone 140.0-143.0' - Same as 137.9-139.1']					
	5 ft 66%	13	>10			 laminated bedding only in top foot of core 	<u>-</u>					
					H	143.0-143.3' - Same as 140-143.0' - except mottled medium gray (n5), with few voids	-					
			NR		臣	No Recovery 143.3-145.0'	R14: 5 minutes					
	145.0			_	上	L ,	_					
-101 <u>.8</u>			0		+	Limestone - 145.0-147.8' - medium light gray to yellowish gray, (N6 to 5Y 7/2), fine						
			>10	146.1-146.5' - Fracture zone	I	grained, strong to moderate HCl reaction, strong to very strong (R4 to						
-	R15-HQ			146.6' - Mechanical break 147' - Fracture, horizontal, rough, undulating,	士	R5), voids over 25% of surface, one cavity (3/4"x3/4") passes through						
	5 ft 86%	68	3	black staining on surface 147.3' - Mechanical break 147.6' - Fracture, horizontal, smooth,	 -	core at 145.5'147.8-149.3' - yellowish gray, (5Y						
-			2	undulating, black staining on surfaces 148.3' - Mechanical break	H	7/2), very fine grained, strong to very strong HCl reaction, very strong (R5), laminated to thinly bedded, voids						
450	450.0		0 NR		上	(1/16") occur in some bedding planes but not others, overall in about 20%	R15: 9 minutes					
150_ -106.8	150.0		1	150.0-150.3' - Fracture zone	上	— of surface No Recovery 149.3-150.0'						
				151.1, 151.2' - Fractures (2), horizontal,	H	Limestone 150.0-150.4' - dusky yellow, (5Y 6/4), fine to medium grained, moderately						
	DAGLIO		4	rough, undulating, probable mechanical breaks but surfaces don't match	臣	HCl reaction, very weak (R1), voids (1/16") over 90% of surface						
-	R16-HQ 5 ft 76%	45	3	151.3, 151.6' - Mechanical break (2) 152.1' - Fracture, horizontal, smooth, undulating, probable mechanical breaks, but	臣	150.4-151.0' - very pale orange to yellowish brown, (10YR 8/2 to 10YR 6/2), fine grained, strong HCI	-					
			1	surfaces don't match 152.2-153.8' - Fracture, horizontal, smooth,		reaction, very strong (R5) 151.0-152.2' - Same as 150-150.4']					
-			NR	undulating, black, probable mechanical breaks, but surfaces don't match	except with slight	_ 152.2-153.8' - Same as 150.4-151' except with slight increase in voids - (1/16") over 5-10% (mostly in	R16: Runtime not recorded					
155	155.0				H	browner rock)						



338884.FL GSC-08

ROCK CORE LOG

SHEET 9 OF 10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723365.5 N, 457759.0 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: R. Haire, T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

00111110			2011 11	MENT . CIVIE 330X 3/N 340233, Mud Totally, Fig tools, Fiv		9	ORIENTATION . Vertical
WATER	LEVELS: 13	.8 ft b	qs on	04/22/07 START : 4/21/2007 END : 4/	23/200	7 LOGGER : C. Dougherty	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	DOCK TYPE COLOR	1
H N N N N	N. A. Y.		FRACTURES PER FOOT	BECOMI HOW	_ □	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
HASE	IN THE	(%) _Q	E S	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	g	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
- HR 유년	SINGE	Ø	A R	PLANARITY, INFILLING MATERIAL AND	Į₹	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
20 20 E	CC RE	ď	H H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	
-111.8				155.1' - Fracture or mechanical break	Ш	No Recovery 153.8-155.0'	
-			3	155.1-155.7' - Fracture, vertical, rough,	╁┼┼	Limestone	-
-				undulating, some staining on surface	世	155.0-156.1' - Same as 152.2-153.8'	-
l _			2	155.7' - Fracture, 5 deg, smooth, planar,	Щ	156.1-157.3' - yellowish gray, (5Y	_
			_	coating of olive gray (5Y 3/2), carbonate derived silt and fine sand on faces	Н	7/2), fine grained, strong HCl reaction, weak (R2), voids (1/16")	
-	R17-HQ			156.1' - Fracture, horizontal, smooth,	\Box	over 35% of surface	-
-	5 ft	47	2	undulating, probable mechanical break, but	╁┼┼	157.3-158.9' - yellowish gray, (5Y	-
-	78%			faces don't match up	╁┼┼	7/2), fine grained, strong HCl	_
_			1	156.8' - Mechanical break	耳	reaction, very weak (R1), voids	
				156.8-157.2' - Fracture, 70 deg, rough, planar, some black staining on surface	Н	(1/16") of over 85% of surface, large (3/8") voids over 5%	
-				157.2' - Mechanical break	$\dagger \dagger \dagger$	No Recovery 158.9-160.0'	R17: 9 minutes
-			NR	157.5' - Fracture or mechanical break, rough,	口	-	-
160	160.0			undulating	₽₩		_
-116.8			>10	160.0-160.8' - Fracture zone	Ш	Limestone	
Ι -			. 10		\sqcap	- 160.0-160.4' - Same as 157.3-158.9' 160.4-160.7' - yellowish gray, (5Y	1
I -					╁┼┼	7/2), fine grained, strong HCl	1
-					╨	reaction, very weak (R1), voids	_
l _					\mathbb{H}	(1/16") over 80% of surface	_
	R18-HQ				Н	No Recovery 160.8-165.0'	
-	5 ft 16%	0			ш	-	1 7
-	1070		NR		╁┼┼	-	-
-					╀┼	-	-
l _					Щ]
1					Н		R18: 2 minutes
165	165.0			·	Ħ	-	1 7
-121.8	105.0			_	╀┴┼	Limestone	-
-			2	165.4-165.7' - Fracture or mechanical break,	╆	- 165.0-168.7' - light olive gray, (5YR	_
l _				60 deg, rough, undulating	П	5/2), fine grained, strong HCl	_
				165.9' - Fracture, 30 deg, rough, undulating	Н	reaction, weak (R2), trace laminated	
-			4	166.1-166.5' - Fracture or mechanical break,	ш	- bedding 166.7-167.5', voids (1/16"-3/16") over 5% of surface	-
-	R19-HQ			70 deg, rough, undulating	╂┯╂	165.0-166.0'	-
_	5 ft	47	>10	166.6, 166.8' - Mechanical break (2) 167.3-167.8' - Fracture zone	₽₩	-	_
I	78%			.57.5 157.5 11401416 20116	Ш	_	1
Ι -			. 40	168.2' - Fracture, horizontal, smooth, planar,	H		1
I -			>10	iron oxide			-
-				168.3-168.9' - Fracture zone, probable	╓	168.7-168.9' - moderate olive brown,	R19: 8 minutes
l -			NR	mechanical break, but faces don't match up	╀	(5Y 4/4), fine to medium grained, moderate to strong HCl reaction,	1719. O Illillutes
170	170.0				口	very weak to weak (R1 to R2), voids	
-126.8				170.0-175.0' - Fracture, vertical, rough,	ш	(1/16") over 80% of surface.	
-			2	undulating, black, staining on 10% of surface	++	No Recovery 168.9-170.0	
-				170.2' - Fracture, horizontal, probable mechanical break but faces don't match up	口	Limestone 170.0-170.3' - Same as 168.7-168.9'	-
-			>10	171.4-171.9' - Mechanical break	₽₩	- 170.3-174.7' - light olive gray, (5YR	_
					Ш	5/2), fine grained, strong HCl	
Ι -	R20-HQ			171.9-172.9' - Fracture, vertical, rough,	\Box	reaction, weak (R2)]
-	5 ft	52	4	undulating 172.2' - Mechanical break	╁┼┼	-	
-	94%			172.2 - Mechanical break 172.2-172.6' - Fractures or mechanical break	口	-	-
I -			4	(2), rough, undulating	H	-	
				172.6' - Mechanical break	Н		
I -			4	173' - Fracture, horizontal, smooth, planar,	口	-	R20: 9 minutes
l			1	slight black staining on surfaces	╂┼┼	-	-
175	175.0		NR		Ħ	No Recovery 174.7-175.0'	

APPENDIX 2BB-947 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-08

SHEET 10 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723365.5 N, 457759.0 E (NAD83)

ELEVATION: 43.2 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: R. Haire, T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

CORING	NETHOD A	ND EC	ZUIFIV	IENT: CME 550X S/N 340253, mud rotary, HQ tools, HV	v cas	siriy		ORIENTATION : Vertical
WATER	LEVELS: 13	.8 ft b	gs on (04/22/07 START : 4/21/2007 END : 4/	23/2	007	LOGGER : C. Dougherty	
	_			DISCONTINUITIES	ניז		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	- PS	Г	ROCK TYPE, COLOR,	
HH H	ZUN H, A	(%) Q	FRACTURES PER FOOT	DEDTIL TVDE ODJENE TO TO TO TO TO TO TO TO TO TO TO TO TO	SYMBOLIC		MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
YFA YFA	Ze F	0	ACT R FC	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	1 BG	ı	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SUI	S HE S	A Q	FR/ PE	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	ı	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-131.8				173.4-173.9' - Fractures or mechanical break	\Box	$^{+}$	Limestone	
-			2	(2), horizontal and 50 deg, rough, undulating	╁	╂	175.0-180.0' - Same as 170.3-174.7'	-
-				173.9, 174.3' - Fractures (2), horizontal, smooth, undulating, some dark staining on	世	╊	except laminated bedding from 175.9-176.5' and 179.3-180.0'	_
_			2	surface	₽	╁	173.3-170.5 and 173.3-100.0	-
_				175.6' - Fracture, horizontal, smooth, planar,	П	1		_
	R21-HQ	55	1	dark staining on surfaces 176.4' - Fracture, horizontal, smooth, planar,	\vdash	-		
	5 ft 100%	55	'	coating of carbonate derived silt	Ľ	T		
-				177' - Fracture or mechanical break,	╨	╁		_
-			>10	horizontal, rough, undulating 177.0-177.3' - Fracture or mechanical break,	世	1		-
-				70 deg, rough, undulating	╁	╁		R21: 9 minutes
-			>10	178.3' - Fracture, horizontal, smooth,	岸	1		-
180 <u></u> -136.8	180.0			undulating, coating of carbonate derived silt	╀	╁	190 0 191 91 duplo vellov (EV 6/4)	
-130.8			2	179.6, 179.7' - Mechanical break (2)	Ш	1	180.0-181.8' - dusky yellow, (5Y 6/4), moderate HCl reaction, weak (R2),	_
_				180.3' - Fracture, horizontal, rough,	Ш	1	voids over 75% of surface. Below	_
1			>10	undulating, dark staining 180.9' - Mechanical break	F	Ł	180.6', limestone appears to interfinger (possible infilling) and	
1 7			/10		Ľ	1	then laminated bedding as in	_
-	R22-HQ			182.0-182.4' - Fracture or mechanical break,	╙	╀	175.0-180.0'	-
-	5 ft	57	2	vertical, rough, undulating	世	†	181.8-185.0' - Same as 175-180.0' except zone from 182.5-183.5' with	-
-	100%			182.5' - Fracture, horizontal, smooth, undulating, coating of carbonate derived silt,	╁	╁	voids (3/8"x3/4") <5% of surface	Plugging borehole on
-			3	trace of dark staining	片	1	,	4/24/07 -
-				183.7, 183.9, 184.0' - Fracture or mechanical	╀	╁		P22: 6 minutes
-			2	break (3), 45 deg, rough, undulating 184' - Fracture or mechanical break, 45 deg,	П	1		R22: 6 minutes
185	185.0			rough, undulating	Н	┶		
-141.8				\ \ 184.4' - Fracture, horizontal, smooth, \ undulating, dark staining on 70% of surface		L	Bottom of Boring at 185.0 ft bgs on 4/23/2007	_
				184.4-184.7' - Fracture or mechanical break,	ı	ı	4/23/2007	
-				vertical, rough, undulating	1	Г		_
-					1	r		-
-					1	H		-
-					1	F		-
-					-	F		-
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PROJECT NUMBER:

33884.FL

BORING NUMBER:

GSC-08A

SHEET 1 OF 8

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723362.2 N, 457763.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

WATER	LEVELS :	4.9 ft bo	s on 6/17	7/07 S	START : 6/14/2007 END : 6/16/2007	LOGGER	: J.	Schaeffer, D. Thomas
				STANDARD	SOIL DESCRIPTION			COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	OOII NAME HOOG OPGUR OVAROU SECON		SYMBOLIC LOG	DEDTILOS CACINO CONTINO DATE
A CE		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOF MOISTURE CONTENT, RELATIVE DENSITY C	R, R	OLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
EPT URF.			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALC	OGY	YME	INSTRUMENTATION
43.1				(N)			0)	Blind drill to 25.0' to begin split spoon
-	-					-		sampling -
-						-		Boring GSC-08A is 5.0' offset from GSC-08 toward E-6 (southeast)
- - - - 5 38.1 - - -								Cuttings from 5.0-10.0' appear to be fine sands
- 10_ 33.1 - - -						- - - - -		Cuttings from 10.0-15.0' appear to be sand and clayey sands
- - - - - - - - - - - - - -								Drilling mud is Quick Gel bentonite
20								



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-08A	SHEET	2	OF	8	

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723362.2 N, 457763.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

						y, auto nammer, NVV 1008			ORIENTATION : VERICAL
WATER	LEVELS	: 4.9 ft bo	us on 6/1		START : 6/14/2007	END: 6/16/2007 SOIL DESCRIPTION	LOGGER	(: J. \	Schaeffer, D. Thomas COMMENTS
30₽				STANDARD PENETRATION		SOIL DESCRIPTION		90	COIVIIVIEN 15
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOIL NAME	E, USCS GROUP SYMBO	OL COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
ACE		RECOVE	ERY (ft)		MOISTURE	CONTENT, RELATIVE D	ENSITY OR	30	DRILLING FLUID LOSS, TESTS, AND
FR F			#TYPE	6"-6"-6"	CONSISTENC	CY, SOIL STRUCTURE, I	MINERALOGY	₹	INSTRUMENTATION
23.1				(N)				S	
25.1							_		_
l -							-		_
l _							_		_
_							_		
-	1						_	1	1
-	1						-	1	_
-	1						-	1	-
-	1						-		-
-	05.0						-		-
25 <u> </u>	25.0				Silty Sand (SM)		1111	_
-			00.4	2-2-2	25.0-26.1' - ligh	it brownish gray, (5YR 6	6/1), wet, very -		-
-		1.1	SS-1	(4)	loose, nonplasti	ic, no HCl reaction, ver 25% fines, silica sand	y fine to fine	Ш	-
l -	26.5				grained sand, 2	25% IIIles, silica sariu			_
l -									_
l _							_		_
-	1						-	1	1
-	1						-	1	1
-							-	1	-
							-	1	-
30 <u> </u>	30.0				Silty Sand (SM))			-
-		44	SS-2	5-5-6	30.0-31.1' - Sar	me as 25.0-26.1' excep	t medium dense -		-
-		1.1	33-2	(11)				Ш	-
-	31.5						-		-
-							-		_
-							_		_
l _	[_		_
-							-]
-	1						-	1]
35	35.0						-	1	
8.1	33.0				Fat Clay With S	Sand (CH)		///	
-		1.5	SS-3	2-3-5	35.0-36.5' - brov	wnish gray and olive gr	ay, (5YR 4/1 -		-
-		1.5	00-0	(8)	and 5Y 4/1), mo	ottled, moist, no HCl reacity, 20% very fine to fir	action, medium _ ne silica sand		-
-	36.5				can, mgn place	= 0.0 . 31 j iii 10 10 iii		///	-
-							-		-
I -							-		_
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I -							_		
Ι -							_]
40	1						-]
								Г	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-08A

SHEET 3 OF 8

SOIL BORING LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723362.2 N, 457763.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 75 S/N 252437, mud rotary, auto hammer, NW rods, 4-7/8" tri-cone bit ORIENTATION: Vertical WATER LEVELS: 4.9 ft bgs on 6/17/07 START: 6/14/2007 END: 6/16/2007 LOGGER: J. Schaeffer, D. Thomas SOIL DESCRIPTION COMMENTS STANDARD P06 DEPTH BELOW SURFACE AND ELEVATION (ft) PENETRATION TEST RESULTS SAMPLE INTERVAL (ft) SYMBOLIC SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND CONSISTENCY, SOIL STRUCTURE, MINERALOGY INSTRUMENTATION 6"-6"-6" #TYPF (N) Fat Clay With Sand (CH) Finish drilling for the day 6/14/07, at 18:00 40.0 40.0-40.8' - pale yellowish brown, (10YR 6/2), mottled, 3-5-2 1.5 SS-4 moist, no HCl reaction, medium stiff, 15-25% fine Resume drilling 07:45 on 6/15/07; advance (7) sand, 10-15% coarse rounded sand, medium HW casing from 15' to 40' 41.5 plasticity, no dilatancy Fat Clay With Sand (CH) 40.8-41.0' - Same as 35.0-36.5' Fat Clay (CH) 41.0-41.05' - medium dark gray, (N4), medium stiff, high plasticity, 10% fine sand, 20% coarse sand-sized gray material (possible pyrite), angular Silty Sand (SM) 41.05-41.5' - moderate yellowish brown, (10YR 5/4), mottled, wet, loose, very fine to fine grained, no HCl 45 45.0 reaction, 25% nonplastic fines -1 9 Clayey Sand (SC) 45.0-45.5' - pale yellowish brown, (10YR 6/2), wet, 0 - 2 - 41.5 SS-5 (6) very loose, no HCl reaction, mottled and streaked with medium dark gray (N4), very fine to fine grained sand, 46.5 35-40% high plastic fines Silty Sand (SM) 45.5-46.1' - pale yellowish brown, (10YR 6/3), wet, very loose, very fine to fine sand, 20-25% low plastic fines Clayey Sand (SC) 46.1-46.5' - Same as 45.0-45.5' except no HCI reaction, more clay with depth, with organic soil and 1/2" peat lenses 46.3' and 1.5" thick lens of organic soil/peat from 46.4-46.5', organic soil/peat is grayish 50 50.0 black (N2), moist, medium stiff, very high plasticity, no -6.9 dilatancy, appears to be pyrite grains to sand-sized Clayey Sand (SC) 6-5-7 1.4 SS-6 (12)50.0-51.4' - similar to 40.5-45.5' and 46.1-46.6', moderate yellowish brown with gray streaking, (10YR 51.5 5/4), wet, medium dense, very fine to fine grained, no HCl reaction, very fine to fine grained sand, 30-35% high plastic fines, 1/4" thick organic soil/peat (OH/PT) lens at 50.0', same as 46.1-46.5' 55 55.0 -11.9 Silty Sand With Organic Soil/ Peat Lenses (SM) Driller's Remark: 25% circulation loss 55.0-56.5' - pale yellowish brown to moderate starting at 55.0 0-1-1 SS-7 1.5 vellowish brown. (10YR 6/2 to 10YR 5/4), mottled. (2) wet, very loose, no HCl reaction, very fine to fine 56.5 grained sand, 20-25% low plastic fines, organic soil/peat (OH/PT) lenses at 55.0-55.1', 56.1-56.15', \and 56.3-56.5'; same as 50.0-51.4' 60



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-08A SHEET 4 OF 8

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723362.2 N, 457763.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

						auto hammer, NW rods, 4			ORIENTATION : Vertical
WATER	LEVELS	: 4.9 π Β	gs on 6/1		START : 6/14/2007	END: 6/16/2007 SOIL DESCRIPTION	LOGGE	:R : J.	Schaeffer, D. Thomas COMMENTS
<u></u> ≥9€1	CAMPIE	INTERVA	\1 (4 \	STANDARD PENETRATION		GOIL DEGONIF HON		8	OCIVIIVILIALO
E AN ON (SAMPLE			TEST RESULTS	SOIL NAME,	USCS GROUP SYMBOL,	COLOR,	일	DEPTH OF CASING, DRILLING RATE,
H B		RECOVI			MOISTURE C	CONTENT, RELATIVE DEN	ISITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	CONSISTENC	Y, SOIL STRUCTURE, MIN	IERALOGY	SYMBOLIC LOG	INSTRUMENTATION
-16.9 - - - -	61.5	1.5	SS-8	4-4-5 (9)	reaction, interbed interbedded in le slickenside appe	Sand (SM-SC) e as 55.0-56.5' except no dded peat/organic soil (P inses 1/16"-2" thick, mos arance in organic soil/pe /peat and 40% silty to cla	T/OH), tly irregular, at, sample is	-	- - - - -
- - - 65_ -21.9	65.0	1.3	SS-9	7-4-9 (13)	stiff, nonplastic, r	wish gray, (5Y 8/1), mois rapid dilatancy, moderate	HCI		Driller's Remark: Harder at 64.0' Driller's Remark: Circulation loss continues at 25% Driller's Remark: Material from 64.0-70.0' drills hard and soft in layers
- - - - -	66.5				at top and botton above Poorly Graded S (SP-SM) 65.2-66.25' - pale	ate material, organic soil/ n, 1/4" thick, laminated, s Sand With Silt To Silty S e yellowish brown, (10YR no HCl reaction, fine sand me as 65.0-65.2'	ame as and and and and	- - - - -	Will switch to rock coring after 70.0' sample
70	70.0								_
-26.9 - - - - - -	70.8	0.8	SS-10	39-50/4 (89/10")	very dense, mild coarse sand, 35° gravel-sized lime Begin Rock Cori	yellowish brown, (10YR) to moderate HCl reaction monplastic fines, trace estone, carbonate material at 72.0 ft bgs eet for the rock core log	n, fine to fine /	-	- - - - -
-75 -31.9 80							-		- - - - - - - - -
							-	\top	



FRACTURES PER FOOT

N/A

4

>10

3

1

1

0

1

NR

2

2

1

1

NR

3

1

1

NR

58 2

78.3-78.5'

fracture

healed

of clay to silt

underlying rock

cavities

end of core

RQD(%)

15 | 1

WATER LEVELS: 4.9 ft bgs on 6/17/07

CORE RUN, LENGTH, AND RECOVERY (%)

> R1-HQ 5 ft

100%

R2-HQ

5 ft 83

84%

R3-HQ

5 ft | 67 | 1

R4-HQ

5 ft

80%

DEPTH BELOW SURFACE AND ELEVATION (ft)

-31.9

80

-36.9

85

-41.9

90

-46.9

77.0

82 0

87.0

92.0

PROJECT NUMBER: BORING NUMBER: 338884.FL GSC-08A

END: 6/16/2007

90

 $\underline{\circ}$

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723362.2 N, 457763.1 E (NAD83)

START: 6/14/2007

DESCRIPTION

DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND

THICKNESS, SURFACE STAINING, AND TIGHTNESS

73.2, 73.5, 74.0' - Fractures (3), rough,

undulating, between two horizontal fractures

75.0-76.1' - multiple Fractures to fragments,

many vertical fractures with 3-4" fragments,

banded at top by 40 deg rough, undulating

undulating fracture
76.9-77.0' - Fractures or mechanical break

77.15' - Fracture, smooth, planar, horizontal

78.4' - Fracture, 20 deg, rough, undulating, at

80.6' - Fracture, 20 deg, rough, some crumble, open, gray infill at cavity included in

Fractures (7), open to tight, mostly horizontal

83.9-84.5' - softer, bounded by fractures, infill

85.3' - Fracture, 45 deg, rough, undulating,

87.1' - Fracture, open, horizontal fracture to

87.5' - Fracture, 45 deg, roughly stepped, also a discontinuity, overlying and underlying rock are different, though fracture mostly in

87.8' - Fracture, open, horizontal, roughly

different material with additional voids and

89.9, 90.0' - Mechanical break (2), 0-20 deg

90.9' - Fracture, 50 deg, rough, undulating, at

stepped, several small 1/2" fragments 88.6' - similar to fracture at 87.8', but in

small fragments with two 1" fragments

healed or mechanical break

82.1, 82.8, 83.3, 83.9, 84.3, 86.1, 86.6' -

fractures, substantial voids, gray infill at

fracture, possible drilling mud, possibly

zone of increased voids and cavities from

74.4' - Fracture, 75 deg, rough, undulating

73.3' - Fractures (2), 50 deg, rough,

fracture, at bottom by 20 deg rough

DISCONTINUITIES

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, HQ tools, HW casing

undulating, horizontal

ORIENTATION: Vertical LOGGER: J. Schaeffer, D. Thomas LITHOLOGY COMMENTS ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS Poorly Graded Sand With Silt (SP-SM) 72.0-72.7' - yellowish gray, (5Y 7/2), wet, mild HCl reaction, 85% fine grained subangular silica sand, 5% coarse silica sand, 10% silt-sized carbonate material Organic Soil (OL) Box break at 74.5', just 72.7-72.8' - olive black, (5Y 2/1), below or at near-vertical medium stiff, medium plasticity, mild fracture HCI reaction Limestone R1:6 minutes 72.8-77.0' - light olive gray to moderate olive brown, (5Y 5/2 to 5Y 4/4), fine grained, extremely weak (R)0 from 72.8-74.2', weak to medium strong elsewhere (R2 to R3) 77.0-81.2' - light olive gray, (5Y 5/2), fine grained, mild to moderate HCI Driller's Remark: Drilling reaction, weak (R2), with trace soft intermittently at about darker gray banding variably throughout, several 1/2"-1" cavities. voids (1/16 to 1/8") varying 5-20% coverage, increased voids and cavities near 77.7, 78.4, 80.4, 80.7, 81.2', subtle organic band at 81.25' with slight darker color shift and less voids below (20% above, 5% below), R2:5 minutes gray cavity infill at 80.4' with strong HCÍ reaction No Recovery 81.2-82.0' Limestone 82.0-86.8' - Same as 77.0-81.2' except weak to medium strong (R2 to R3), increased voids to 25% and numerous cavities and dissolutions up to 2" with gray infill at 82.0-83.3 and 85.8-86.8, very weak (R1) at 83.9-84.5', some cavities reach almost across the core R3:4 minutes No Recovery 86.8-87.0' Limestone 87.0-87.3' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, weak (R2), 40% small (1/16") voids, several cavities up to 1/2" (fossils), friable 87.3-88.25' - pale yellowish brown, (10YR 6/2), fine grained, mild to moderate HCI reaction, weak (R2), <3% voids, several fossil cavities up to 1/2", less friable than above R4:5 minutes

SHEET 5 OF 8



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-08A

SHEET 6 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723362.2 N, 457763.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

				IENT . CIVIE 73 3/N 232437, ITIUU TOLATY, FIQ LOOIS, FIVY C			ORIENTATION : Vertical
WATER	LEVELS : 4.9	ft bg	s on 6		16/20		
>	<u>.</u>			DISCONTINUITIES	υ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		Ś	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
HH	N. A.	(%)	FRACTURES PER FOOT		음	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
FAT A	E R OVE	(%) Q	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOI	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
F S S	SNIN	Ø	RAC	PLANARITÝ, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Z	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	038	ď	ᇤ룝	THICKNESS, SORFACE STAINING, AND HOTTINESS	Ś	CHARACTERISTICS	
				92.0-92.4' - Fracture zone, angular 1/4"-1" of	\Box	Limestone	Driller's Remark: May have
-			<10	over and underlying material	╁	- 88.25-91.0' - Same as 87.0-87.3'	lost circulation at 91' -
I -				92.5' - Fracture, rough, undulating, horizontal,	-	except with 20% voids and increased	-
			3	end of rock fragments 92.6' - Fracture, 70 deg, rough, undulating,		elongate fossils, transition from overlying paler-colored material,	
			٥	ioins with horizontal fracture at 92.5'	Ъ	material has several filled voids, thin	1
-	R5-HQ			93.0' - rough, planar, discontinuity, horizontal,	╂╵╴	(up to 1/4" thick) layers of silt-sized	-
I -	5 ft	13	2	open, faces do not match	\blacksquare	- material at 89.5' with moderate HCI	-
95	54%			93.15' - Fracture, 45 deg, planar, healed,		reaction, organics at 90.8'	
-51.9				<1/16" relief	╨	No Recovery 91.0-92.0'	-
-				93.9, 94.0' - Fracture (2), rough, undulating,	+	- Limestone	-
l -			NR	horizontal, more open at 93.9, healed at		92.0-92.4' - Same as 87.3-88.25'	
				94.0' 94.4, 94.5' - Fracture (2), 0-30 deg, rough,	\vdash	except pale yellowish brown and moderate yellowish brown, (10YR 6/2	R5:5 minutes
	07.0			stepped, open, fragments		and 10YR 5/4), up to 2" angular color	Driller's Remark: No
-	97.0					blocks co-mingled	circulation while drilling 92-
-			1	,	igspace	92.4-92.7' - Same as 87.3-88.25'	97'
				97.6' - discontinuity between overlying	\vdash	92.7-93.0' - Same as 87.0-87.3'	
				unconsolidated material and underlying rock,		93.0-93.3' - Same as 87.3-88.25'	1
-			1	some rock fragments above	╨	except transitions to material below	-
I _				98.3' - Fracture, 40 deg, rough, undulating,	┢	at 70 degree angle	
	R6-HQ			healed	\vdash	93.3-94.1' - Same as 87.0-87.3' 94.1-94.6' - Same as 87.3-88.25'	
400	5 ft 100%	73	1			except becoming softer with depth,	1
100 <u> </u>	100%			99.8, 100.2' - Fractures (2), 10 deg, rough, —	╁	very weak rock (R1) in the last 2" of	-
50.9_			2	undulating, transition from overlying	╨	interval, fractures at 94.5' and 94.6'	_
			-	limestone with voids to yellow limestone at		in very weak rock	
-				99.8', then to weaker limestone, both have silt-sized infill	1_	94.6-94.7' - unconsolidated pale	R6:5 minutes
-			2	100.7' - Fracture, 70 deg, rough, undulating	₽	yellowish brown and black organics No Recovery 94.7-97.0'	-
I _	102.0			101.3' - Mechanical break, or fracture, healed		Limestone	
			NR	101.7' - Fracture, 40 deg, rough, undulating,		97.0-97.6' - dark yellowish gray	Core loss interpreted to be
-			<10	fragments	1	grading to pale greenish yellow with	at beginning of core run - based on drill time
-			10	102.6-103.4' - fragments, unconsolidated	1111	depth, (10YR 4/2 to 10YR 8/2), fine	based on drill time
I _			<10	103.4-103.8' - Fracture zone	4111	grained, strong HCl reaction, angular	
			''	103.4-103.6 - Flacture 2011e	Ш	blocks of color	
-	R7-HQ					97.6-99.8' - pale yellowish brown, (10YR 6/2), strong HCl reaction,	1 1
-	5 ft	60	0	104.3, 107.35' - Fractures (2), horizontal,	1-	(101R 6/2), strong HCrreaction, weak (R2), fossil cavities up to 1/4"	-
105	88%		<u> </u>	infill, upper fracture is open, lower is tight and	╀	and up to 1" elongated	_
-61.9				similar in color, calcareous infill, silt-sized		99.8-100.7' - pale greenish yellow,	
]			0	104.5' - horizontal discontinuity 105.2' - 10 deg, healed or mechanical break	1—	(10Y 8/2), strong HCl reaction,	1
-				100.2 To dog, ficulad of fileditation bleak	1	medium strong to very weak (R3 to	R7:4 minutes
-			0			R1), <5% voids on core surface,	- 17.4 Illilates
	107.0						
]					1	100.7-102.0' - Same as 97.6-99.8' except with fragments at the last 0.2'] 1
-			2		+	of interval	-
_						No Recovery 102.0-102.6'	-
			,	108.1' - Fracture, tight, horizontal or	\vdash	Silt (ML)	
			1	mechanical break	1 -	102.6-103.6' - light olive gray, (5Y	1
-	R8-HQ					- 5/2), very soft, fine grained,	-
-	5 ft	90	0		igspace	moderate HCl reaction, carbonate	-
110	100%					derived 	
-66.9				– 110.1' - Fracture, 10 deg, mechanical, healed		except with a 1" thick fragment of	
-			2	i ractaro, ro dog, moditamodi, nodicu	屽	limestone (yellowish gray (5Y 7/2),	-
-				110.9, 111.0' - Fractures (2), horizontal, very	+	very weak [R1], 10% coverage of	l
				similar to fractures and zone at 107.3',		1/16" voids)	R8:4 minutes
]	112.0		1	calcareous infill, open	oxdappi] 1
	114.0			· · ·	1		-
					1		



PROJECT NUMBER: BORING NUMBER: 338884.FL GSC-08A

ROCK CORE LOG

SHEET 7 OF 8

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723362.2 N, 457763.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, HQ tools, HW casing

				1211 . GIVIE 73 3/14 232+37, Illud Totally, Fig. 10013, FIVE		3		ORIENTATION: Vertical
WATER	LEVELS: 4.9	ft bg	s on 6		16/2	00	·	
≥O.⊋	(%			DISCONTINUITIES	ي ا	Ļ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A A CE	LE HE	(%) Q	F.00	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	٦į		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
무유의	ORE	Ø	ZAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	₹MB		AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	0,35	ď		THICKNESS, SURFACE STAINING, AND HIGHTINESS	Ś	4	CHARACTERISTICS	· ·
-			_1_	112.15' - Fracture, 10 deg, open, unconsolidated sediments beneath	$\ $	l	Limestone 104.0-107.0' - pale greenish yellow, (10Y 8/2), fine grained, strong HCl	-
					Ш	П	reaction, weak (R2), 20% voids, fossils 1/4"-1" size	
					Ш	П	Limestone	Driller's Remark: 3.5' of
	R9-HQ				$\parallel \parallel$	П	107.0-112.0' - Same as 104.0-107.0' except extremely weak (R0) at	void at 113.5-117' -
115	5 ft 6%	0	NR		1	ı	fracture zones (intervals 1"-2" in	1
-71.9				_	1	I	length) at 107.3' and 110.0', very	_
-					1	lt	consistent color, texture and voids Limestone	1
-					1	lt	112.0-112.15' - Same as	R9:1 minute
-	117.0				1		- [107.0-112.0' Silt (ML)	
-	. 17.0				1	$\ \mathbf{f}\ $	112.15-112.3' - pale greenish yellow,	
-					1	lt	 (10Y 8/2), fine grained, strong HCI reaction, carbonate derived 	-
-					1	╟	No Recovery 112.3-123.5'	
-					1	l	-	-
-	R10-HQ				1	lŀ	-	Driller's Remark: Rods
100	5 ft 0%	0	NR		1	╟	-	lowered without drilling to -
120 <u>-</u> 76.9	0 /6			_	╢	╟		120' (about 3 feet)
-					1	╟	-	-
-					$\parallel \parallel$	╟	-	R10:1 minute
-	100.0				$\parallel \parallel$	╟	-	Driller's Remark: Felt like -
-	122.0				$\parallel \parallel$	╟	-	drilling sediment at 120- 122'; drilling fluid was
-			NR		1	lŀ	-	coffee color – Driller's Remark: Rods
-			' ' '		1	╟	-	pushed 122.0-123.0',
-			N/A	123.5' - interpret no recovery before due to	╂╁┧	Н	Elastic Silt (MH)	definitely sediments, not a - void; then troubles getting
-	R11-HQ		IVA	R10, drill rates, and competent material at	╢╟	╟	- 123.5-126.0 - yellowish gray to light	core barrel to set
-	5 ft	0	N/A	126.0'	╢╟	╟	olive gray, (5Y 7/2 to 5Y 5/2), wet, soft to medium stiff, low plasticity, no	-
125_ -81.9	58%			_	╢╟	╟	— to slow dilatancy, strong HCl	_
-			N/A		╢	╟	reaction, trace organics (1/16" fragments and one 1" chunk)	-
-			4	126.0, 126.15, 126.2' - Fractures (3), smooth,	#	#	Limestone	R11:3 minutes
1 -	127.0		NR	planar, horizontal, numerous other planes every 1/16"	口	1	- 126.0-126.4' - light olive gray, (5Y 5/2), fine to very fine grained, strong	Last foot had slow and fast - sections (likely 6" of void)
			_	126.3' - Fractures, above horizontal fractures	Ъ	Ⅎ	(R4), horizontal laminations and	` ´
			5	and with partial vertical fractures 126.4' - no recovery	\vdash	┨	 fractures, no voids No Recovery 126.4-127.0']
1 -			. 40	127.1' - Fracture, overlying large fragment to horizontal fracture, with debris	T	#	Limestone	1
			>10	127.1-128.6' - Fracture, vertical, open to tight,	1#	1	 127.0-131.8' - yellowish gray to grayish orange, (5Y 7/2 to 10YR 7/4),]
1	R12-HQ			gray discolorations along fracture faces, other vertical and horizontal fractures starting	世	Ⅎ	fine grained, strong HCl reaction, weak (R2), 3% coverage of voids]
130	5 ft 96%	45	0	from main fracture, but most are short and	\mathbb{H}	1	(1/16"), several fossils (casts/molds]
-86.9			_	tight — tight 128.6-128.9' - fragment, terminated below by	ightarrow	1	[elongate (1/4"-1/2")]), shallow (1/4") - cavities though very intact looking, at	
1 -			1	a 60 deg rough and undulating fracture at	世	Ⅎ	131.4-131.8' increased voids and	
			3	129.0' 130.1' - Fracture, rough, undulating,	1	╁	cavities, infilled elongate cavities with hard gray limestone	R12:4 minutes
-	132.0			horizontal, open	F	7	- nara gray iiniestone	
					Τ	Ī		
			ı !					ı



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-08A

SHEET 8 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723362.2 N, 457763.1 E (NAD83)

ELEVATION: 43.1 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 4.9	ft bgs	s on 6/	17/07 START : 6/14/2007 END : 6	/16/20	07 LOGGER: J. Schaeffer, D. Thom	nas
≥0.€	<u>(</u>			DISCONTINUITIES	ا ا	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
13591.9	R13-HQ 5 ft 76%	22	NR) 3 >10 5 4 NR	fragments mostly elongate, all roughly stepped to undulating, possible multiple vertical fractures 132.3-132.4' - Fractures, horizontal, smooth, planar, Fragments bounded by smooth, planar fractures, flat 1/4" triangles 133.4-133.95' - Fracture, 40 deg, rough, stepped, leading into fragments with angular block with vertical and horizontal fractures, transition between limestone within fragments 133.95, 134.05, 134.4, 134.6, 134.9' - Fractures (5), horizontal to 10 deg fractures along visible horizontal laminations/planes, roughly to smoothly planar 135.2', 135.2', 135.5' - Fractures (3), 20 deg, rough, undulating, tight, open 135.65' - Fracture, sealed fracture plane with light gray silt-sized infill 1/4" thick		No Recovery 131.8-132.0' Limestone 132.0-132.1' - Same as 127.0-131.8' except pale greenish yellow, (10Y 8/2) 132.1-132.55' - Same as 126.0-126.4 except moderate to strong HCI reaction, strong (R4), horizontal bedding planes with breaks and fragments broken along horizontal planes 132.55-133.75' - Same as 132.0-132.1' except strong HCI reaction, weak to very weak (R2 to R1), weakening and becoming friable with depth 133.75-135.8' - Same as 132.1-132.55' except weak to medium strong (R2 to R3), banding/layering with grayer and greener bands No Recovery 135.8-137.0' Bottom of Boring at 137.0 ft bgs on 6/16/2007	R13:5 minutes Total depth of boring 137.0' Hole open to 97.0' after removing casing Water level at 4.9' below ground surface at 08:50 on 6/17/07



	PROJECT NUMBER:	BORING NUMBER:					
ı	338884.FL	GSC-09	SHEET	1	OF	10	

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723154.0 N, 457653.4 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER	LEVELS	: 2.0 ft bo	gs on 04/0	05/07	START : 4/5/2007
300				STANDARD	SOIL DESCRIPTION g COMMENTS
AND (f	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
H BE		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
41.3	0.0				Topsoil
-		1.2	SS-1	1-2-3 (5)	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\
	1.5			(0)	Poorly Graded Sand With Organics (SP) 0.2-1.2' - medium gray to medium dark gray, (N5 to
					N4), moist, loose, fine silica sand, trace nonplastic
-	-				fines, 10-15% fine organics, increasing to 20% at 0.9'
-	-				
-	-				
-	-				
5	5.0				
36.3	3.0				Silty Sand (SM)
-	1	1.1	SS-2	1-2-2 (4)	5.0-6.1' - light olive brown to moderate olive brown, (5Y 5/6 to 5Y 4/1), wet, very loose, very fine silica
	6.5			(· /	sand, 15-20% nonplastic fines, trace organics
]]
-	-				1 1
-	-				Driller's Remark: Light chattering at 8.0'
-	-				- Initial 3 Normanic. Eight Ghattering at 6.0
-	-				
10	10.0				
31.3	10.0			10.00.50/0	Silt (ML)
		0.8	SS-3	10-22-50/3 (72/9")	10.0-10.75' - grayish yellow to moderate yellow, (5Y 8/4 to 5Y 7/6), wet, hard, nonplastic, rapid dilatancy,
	11.3				\moderate HCl reaction, carbonate material, 3/8" thick \left\ \left\ \left\ \left\ \left\ \reaction, \text{carbonate material}, 3/8" thick \left\ \left\ \left\ \reaction \text{carbonate material}, 3/8" thick \left\ \reaction \reaction \text{carbonate material}, 3/8" thick \left\ \reaction \reaction \text{carbonate material}, 3/8" thick \left\ \reaction \reaction \text{carbonate material}, 3/8" thick \left\ \reaction \reaction \text{carbonate material}, 3/8" thick \left\ \reaction \reaction \text{carbonate material}, 3/8" thick \left\ \reaction \reaction \reaction \text{carbonate material}, 3/8" thick \left\ \reaction \reaction \text{carbonate material}, 3/8" thick \left\ \reaction
					fine silica sand, medium plastic fines
-	-				1 1
-	-				-
-	-				
-	1				Driller's Remark: Very slow rate of
15	15.0				penetration (27 minutes)
26.3		0.8	SS-4	42-50/3	Silt (ML)
	15.8	0.0		(92/9")	15.0-15.8' - Same as 10.0-10.75' except grayish yellow, (5Y 8/4), mild HCl reaction
-	-				
-	-				1 1
-	-				1 1
-	+				1 1
-	1				1 1
20	†				



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-09

SHEET 2 OF 10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723154.0 N, 457653.4 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

	LEVELS				START : 4/5/2007 END : 4/7/2007 LOGGER : R. McComb
				STANDARD	SOIL DESCRIPTION O COMMENTS
A P S S	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	
A P B E A T T O		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY
21.3	20.0			32-50	Silt (ML)
-	21.0	1.0	SS-5	(82")	20.0-21.0' - Same as 15.0-15.8' except 5-10% very -
'	21.0				The to line surid
'	1				1
'	1				1
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]
					<u> </u>
					<u> </u>
25_ 16.3	25.0				C:14 (ML)
10.3	-	1.2	SS-6	45-47-50/4	Silt (ML) 25.0-26.2' - Same as 20.0-21.0' except very fine to
	26.3	1.2	00-0	(97/10")	medium sand-sized material increasing to 15% with depth
	20.0				-
-	-				
-	1				-
-	1				
	1				
'	1				Driller's Remark: Hard drilling at 29.0'
30	30.0				1
11.3	30.3	0.2	SS-7	50/4 (50/4") /	Silt And Limestone Fragments (ML) 30.0-30.2' - Same as 25.0-26.2' except 30% coarse
				(50/4)	sand-sized limestone fragments, dark gray (N3)
					fragments (non-calcareous), with black calcareous -
	-				
	-				
	-				
.	-				
- ا	-				
35_ 6.3	35.0				Sandy Silt (ML)
-	1	1.4	SS-8	42-27-40	35.0-36.4' - light olive gray, (5Y 5/2), wet, hard, nonplastic, rapid dilatancy, mild HCl reaction, 30-35%
-	36.5			(67)	fine to coarse sand-sized limestone fragments, trace
'	55.0				fine gravel-sized limestone fragments, carbonate / -
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-09

SHEET 3 OF 10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723154.0 N, 457653.4 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

						rotary, auto nammer, Avvu rot			ORIENTATION : Vertical
WATER	LEVELS	: 2.0 ft b	gs on 04/0	U5/U <i>f</i> S	START : 4/5/2007	END : 4/7/2007	LOGGE	K : R.	McComb
200				STANDARD		SOIL DESCRIPTION		چ ا	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		45 H000 0D0HD 01/5	20.100	SYMBOLIC LOG	DEDTH OF GACING SOURCE SATE
H H H		RECOVE	ERY (ft)		SOIL NAN	ME, USCS GROUP SYMBOL RE CONTENT, RELATIVE DE	, CULUK, NSITY OR	l Ĕ	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
H A A A			#TYPE	6"-6"-6"		NCY, SOIL STRUCTURE, MI		Μ̈́B	INSTRUMENTATION
SC				(N)				λ	
1.3	40.0				Silty Sand (SI	M)	(5) (5 (0) 5 (0)		Driller's Remark: Lost circulation at 40.0'
-		1.5	SS-9	1-2-4	40.0-41.5' - lig	ght olive gray to olive gray, se, mild HCl reaction, fine to	(5Y 5/2 to 5Y	1111	1
-				(6)	sand-sized lim	nestone fragments, 30% lo	w plastic	1] -
-	41.5				¬ fines, 5% fine	gravel-sized limestone fra	gments, /	-111	-
-					\carbonate ma	terials	/	-	-
I _								1	
								J	
								1	1
-								1	1
45 -	44.7		00.40	F0/4	Lime-t	resuments And Otto		+	Colit ansen comple CC 40 - strette stress
45 -3.7		0.3	SS-10	50/4 (50/4")	Limestone Fr	ragments And Silt ellowish gray, (5Y 7/2), mild	HCI 7	+	Split spoon sample SS-10 actually advanced/
" -				(55/4)	reaction, carbo	onate material, 80% fine to	coarse	-	
-					gravel-sized li	imestone fragments; 20% \$	Silt (ML): wet,	4]
I _					nonplastic, rap	oring at 45.0 ft bgs		1	_
					See the next s	sheet for the rock core log		1	
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-09

SHEET 4 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723154.0 N, 457653.4 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

WATER	LEVELS : 2.0) ft bgs	s on 04	4/05/07 START : 4/5/2007 END : 4/7	7/200	7 LOGGER : R. McComb	
>00	(5)			DISCONTINUITIES	ß	LITHOLOGY	COMMENTS
N AND	74N 2N 2N 2N 2N 2N		ES	DESCRIPTION) Lo	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EV.	ORE	Ø	ZAC.	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
		ď	# 5	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	
-3.7	45.0			-		No Recovery 45.0-49.0'	Began rock coring at 45.0'
-				-		_	-
l -				-	.	=	_
_			NR	-	.	<u>-</u>	_
_	R1-HQ 5 ft	0		<u>-</u>	.	<u>-</u>	_
_	20%	-		_	.	_	_
_				<u>-</u>	.	_	_
_				-	Ш		<u> </u>
_			>10	49.0-50.0' - Fracture zone, various orientations -	H	Limestone - 49.0-49.5' - yellowish gray, (5Y 7/2),	R1:4 minutes
50	50.0			49.5' - 0-60 deg, smooth, planar, open	dash	fine grained, mild HCl reaction,	
-8.7			0	50.0' - Fracture, 60 deg, rough, undulating	H	extremely weak (R0), friable, voids over 50-60% of surface	Driller's Remark: Last 1.0' is harder than above; no
-					Щ	49.5-50.0' - yellowish gray to light	circulation
-			2	51.05' - Fracture, 60 deg, rough, stepped, tight	団	olive gray, (5Y 7/2 to 5Y 8/2), very fine grained, mild to moderate HCl	_
-	50.110			51.75' - Fracture, horizontal, rough,	\vdash	reaction, very weak (R1), presence of micro fractures inclined 60-70 deg,	Dellada Danadu Varia ef
-	R2-HQ 5 ft	35		undulating, open	H	 voids over less than 1% of surface, 	Driller's Remark: Very soft from 52.0-55.0'
-	43%		NR	-	Ħ	3/4"-1-3/16" size cavities over less than 9% of the surface	-
-				-	H	50.0-51.75' - yellowish gray, (5Y 7/2),	-
-				-	Н	very fine grained, moderate HCl reaction, very weak to weak (R1 to	
-			2	-	\square	R2), voids over 1-3% of surface,	R2:7 minutes
55_ -13.7	55.0		-	54.6' - Fracture, <5 deg, rough, undulating,	H	3/4"-3/16" cavities over up to 10% of the surface, trace fossil cast and	-
-13.7			>1	54.8' - Fracture, 80 deg, rough, stepped	╙	molds, trace cavity infilling	-
-			-	-	H	No Recovery 51.75-54.6' □ Limestone	-
-				-	F	_ 54.6-55.0' - Same as 50.0-51.75'	-
-	R3-HQ			56.8' - Fracture, 60 deg, rough, stepped to	H	except yellowish gray, (5Y 7/2), voids over less than 3% of the surface, few	-
-	5 ft	14		undulating, open	H	_ cavities	-
-	26%		NR	-	世	Limestone 55.0-56.3' - dusky yellow to light olive	-
-				-	H	gray, (5Y 6/4 to 5Y 6/1), fine grained, mild HCl reaction, very weak (R1),	-
-				-	H	voids over 15-30% of surface,	R3:7 minutes
				-	団	cavities are 3/4"-1-3/16" long and 1/8"-3/16" wide, fossiliferous	-
60 <u> </u>	60.0		>10		団	— (molds/casts)	-
-			- 10	-	Н	No Recovery 56.3-60.0' Limestone	-
-				-	H	- 60.0-60.4' - light olive brown, (5Y	Driller's Remark: Very soft
-				-	Ħ	5/6), fine grained, mild HCl reaction, extremely weak (R0), voids over 25%	from 61.0-64.0'
-	R4-HQ		NR	-	H	 of the surface, fossiliferous (possible 	-
-	5 ft	20	INIX	-	Н	shark tooth), molds and casts No Recovery 60.4-64.0'	-
-	30%			-	$oxplus_{}$	-	-
-				-	囯	-	-
-			\vdash	64.0' - Fracture, 0-50 deg, rough, stepped	団	-	R4:7 minutes
65	65.0		1	-		-	-
65	65.0		\vdash		\vdash		-
				<u> </u>			



338884.FL GSC-09

SHEET 5 OF 10

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723154.0 N, 457653.4 E (NAD83)

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER LEVELS: 2.0 ft bgs on 04/05/07 START: 4/5/2007 END: 4/7/2007 LOGGER: R. McComb DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE RQD(%) SYMBOL DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -23.7 Limestone N/A 64.0-65.0' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine grained, mild HCI reaction, extremely N/A weak (R0), voids up to 1/16" over 40-50% of surface, 3/4"-1-3/16" size cavities over 1-3% of surface, Driller's Remark: Hard spot R5-HQ 16 N/A fossiliferous (molds/casts) at 67.0' 5 ft 100% Carbonate Sand (SP) 65.0-69.2' - moderately yellowish brown to pale yellowish brown, N/A (10YR 5/4 to 10YR 6/2), wet, loose, fine to very fine grained, moderate R5:4 minutes 69.2' - Fracture, 40 deg, smooth, stepped to HCI reaction >1 undulating, black coating over 5% of the joint 70 70.0 Limestone surface 69.2-70.0' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/4), fine -28.7 0 grained, mild HCl reaction, very weak (R1), voids up to 1/16" over 15-20% of the surface, 1/16-1/8" size voids >3 71.1' - Fracture, 0-60 deg, rough, stepped, open becoming more abundant with depth, 71.35' - Fracture, horizontal, rough, stepped, Driller's Remark: No return slightly fossiliferous (molds and R6-HO open 22 of circulation continues 5 ft casts) 71.4' - Fracture, horizontal, smooth, stepped. 36% 70.0-71.55' - Same as 69.2-70.0' ever since 45.0 open NR except mottled No Recovery 71.55-74.75' R6:9 minutes 75 75.0 >1 74.75' - Fracture, 50 deg, rough, undulating, Limestone -33 7 74.75-75.0' - moderate vellow. (5Y open 7/6), fine to very fine grained, moderate HCI reaction, extremely weak (R0), friable, slightly NR fossiliferous (molds/casts), mottled with very fine grained lamination with R7-HQ fewer voids, few cavities up to 5 ft 36 3/16"x3/16" 44% No Recovery 75.0-77.8' Driller's Remark: Recovery Limestone from bottom (77.8-80.0') 1 77.8-79.0' - yellowish gray, (5Y 7/2), mottled, very fine grained, mild HCI 78.8' - Fracture, 30 deg, smooth, undulating, reaction, weak (R2), voids up to R7:8 minutes black stain over 5% of surface 2 1/16" over 15-25% of surface, few 79.0' - Fracture, <5 deg, smooth, undulating, cavities up to 3/16", slightly 80 80.0 tiaht -38.7fossiliferous (casts and molds), up to 79.35' - Fracture, <5-30 deg, rough, stepped 3 1" cavities with secondary infill of to undulating, open limestone with voids (1/16") over 80.4' - Fracture, <5 deg and 50 deg, rough, 40% of surface undulating, open 1 79.0-80.0' - yellowish gray, (5Y 7/2), 80.8' - Fracture, <5 deg, smooth, undulating, very fine grained, moderate HCI open reaction, weak (R2), voids up to R8-HO 81.0' - Fracture, 0-70 deg, rough, stepped, 38 4 1/16" over 3% of surface. 5 ft open interspaced with cavities with 2% 68% 81.1' - Fracture, 40 deg, rough, undulating, infill of very weak lamination with open voids over 50-60%, trace fossil 82.05' - Fracture, <5-50 deg, rough, stepped (mold/cast) to undulating, open NR R8:Runtime not recorded 82.3' - Fracture, 40 deg, rough, stepped, open 85 85.0



338884.FL GSC-09

SHEET 6 OF 10

ORIENTATION: Vertical

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723154.0 N, 457653.4 E (NAD83)

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

WATER LEVELS: 2.0 ft bgs on 04/05/07 START: 4/5/2007 END: 4/7/2007 LOGGER: R. McComb DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -43.7 On 4/5/07 at 85.0', 82.5' - Fracture, 40 deg, rough, stepped, Limestone 80.0-83.4' - yellowish gray, (5Y 7/2), advanced HW casing to open fine to very fine grained, mild to 86.0' from 45.0' due to 82.6' - Fracture, <5-70 deg, rough, stepped, moderate HCl reaction, very weak to open sand interval above a weak (R1 to R2), voids (up to 1/16") slipping casing, very soft at over 15-25% of surface, many 86.0', able to hammer 3/16"x1/16" cavities, few cavities up casing easily several feet. R9-HQ to 3/8"x3/16", fossiliferous able to get the circulation 5 ft 0 NR (molds/casts) **0%** hack No Recovery 83.4-90.0' Lost circulation at 87.0' R9.5 minutes Driller's Remark: Pulled 90 90.0 core barrel but no -48 7 90' - limestone fragments of 6" core Limestone Fragments 0 recovery, tagged the bottom of borehole at 90.0', 90.0-90.5' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, suspect 85.0-90.0' is sand very weak (R1), voids over 50-60% 90.0-90.5' firm drilling of surface with cavities up to 3/16", 90.5-93.0' very soft NR fossiliferous (infill/casts) 93.0-94.0' some what No Recovery 90.5-93.0' R10-H0 harder 0 5 ft 94.0-95.0 very soft 20% Limestone 0 93.0-93.5' - yellowish gray, (5Y 7/2), very fine grained, mild HCl reaction, weak (R2), voids over up to 5-10% of R10: No run time recorded NR surface, carbonate black coating on 5% of the surface, cavities 95 95.0 No Recovery 93.5-95.0' -53 7 Driller's Remark: HW 0 Limestone casing continue to drop, 95.0-95.8' - light olive gray, (5Y 5/2), advancing HW to 95.0 very fine grained, mild HCl reaction, weak (R2), voids over 13% of SPT from 95.0-96.5 to surface, with sand and silt-sized determine the lithology, NR carbonate grains, clayey R11-HQ recorded 0.8' limestone No Recovery 95.8-98.2 36 5 ft gravel; will switch back to 52% HW coring (17, 50/3', 67/9") Limestone 1 98.2-100.0' - yellowish gray, (5Y 7/2), 98.5' - Fracture, 60 deg, rough, stepped, tight, inclined fine to very fine grained, mild HCI R11:8 minutes 99.0' - Fracture, horizontal, rough, undulating, reaction, weak (R2), up to 1/16" 1 voids over 15-20% of surface, few 100 100.0 cavities up to 9/16"x3/4"on the 100.0-100.3' - Fracture zone, <5 deg and 60 surface, mottled, interspaced with >10 deg, rough, undulating, open very fine grained limestone with 100.75-101.0' - Fracture zone, <5 deg, rough, fewer voids, fossiliferous (molds and undulating, open 4 101.3-101.55' - Fracture zone, <5-60 deg, 100.0-101.4' - moderate olive brown, rough, stepped, open (5Y 4/4), fine grained, mild HCI 101.9' - Fracture, horizontal, smooth, planar, R12-HC reaction, weak (R2), gravel-sized >10 20 5 ft clay infilling fragments, voids up to 1/8" over 58% 102.05' - Fracture, <5 deg, rough, undulating, 25-30% of surface, few 3/8"x3/16" open cavities on surface, fossiliferous 102.5-102.9' - Fracture zone, 0-90 deg, (molds/casts) rough, stepped, open NR R12:11 minutes 105 105.0



338884.FL GSC-09

SHEET 7 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723154.0 N, 457653.4 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

WATER LEVELS : 2.0 ft bgs on 04/05/07 START : 4/5/2007 END : 4/7/2007 LOGGER : R. McComb

DISCONTINUITIES LITHOLOGY COMMENTS

OF THE COMMENTS SIZE AND DEPTH OF CASING, MINERALOGY, TEXTURE, FLUID LOSS, CORING RATE AND TEXTURE OF THE CORD CONTINUENCE OF THE CO

	<u> </u>			DISCONTINUITIES	ני	LITHOLOGY	COMMENTS
SSE	- Q%		S	DESCRIPTION	9	ROCK TYPE, COLOR,	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-63.7				105.0-106.0' - Fracture zone, 0 to inclined	ш	Limestone	
-			10	60-70 deg, rough, undulating, open	Ш	- 101.4-101.9' - pale greenish yellow to yellowish gray, (10Y 8/2 to 5Y 7/2),	1
-	-		Н		H	very fine grained, moderate to strong	1
-			10	106.45' - Fracture, <5 deg, rough, undulating,	Ħ	- HCl reaction, weak to medium strong (R2 to R3)	1
-	R13-HQ] }	>10	open 106.45-107.4' - Fracture zone, rough,	Ш	Clay With Limestone (CL)	1
-	5 ft	23		stepped, various orientations, open	₽	- 101.9-102.2' - black to very dark	1 -
-	48%			·	団	gray, (N1 to N3), wet, soft, black carbonate coated gravel-sized	-
-			NR	-	Ш	fragments	1
-			````	-	╁┼	Limestone 102.2-102.9' - Same as 100.0-101.4'	R13:7 minutes
-				-	H	except yellowish gray to grayish	-
110_ -68.7	110.0		\vdash	_	H	yellow, (5Y 7/2 to 5Y 8/4), cavity infilling up to 1-3/16"-3/4", fossil	-
-			4	110.2' - Fracture, 70 deg, rough, stepped,	₽	molds and casts	-
-			\vdash	open 110.5' - Fracture, 0-90 deg, rough, stepped,	口	No Recovery 102.9-105.0'	-
-			>10	open	団	Limestone - 105.0-107.4' - yellowish gray, (5Y	1 -
-				110.6' - Fracture, 70 deg, rough, stepped 110.8' - Fracture, <5 deg, rough, stepped,	H	_ 7/2), fine to very fine grained, mild to	-
-	R14-HQ 5 ft	23	1	joins with fracture at 110.6'	Ħ	moderate HCl reaction, weak to medium strong (R2 to R3), fossil	-
-	49%			111.3- 111.9' - Fracture zone, various orientations	Ш	molds and casts, voids up to 1/16"	_
-				112.45' - Fracture zone, 0-90 deg, rough,	Н	over 30-40% of surface, few cavities up to 3/16"x3/16" exist on the rock]
l .			NR	stepped, open	囯	surface]
l _					Ш	No Recovery 107.4-110.0' Limestone	R14:4 minutes
115	115.0			_	Н	110.0-112.45' - Same as	
-73.7			3	115.2' - Fracture, 0-60 deg, rough, undulating	H	105.0-107.4' - No Recovery 112.45-115.0 '	
				to stepped, open	H	Limestone	1
-				115.4' - Fracture, 40 deg, rough, undulating, tight	Н	115.0-116.0' - yellowish gray, (5Y - 7/2), fine grained, mild HCl reaction,	1
				115.85' - Fracture, 50 deg, rough, undulating,	Ш	very weak (R1), friable, voids up to	1
-	R15-HQ			open -	囯	1/16" over 25-30% of surface, 3/4"-1-3/16" cavities rarely exist on	1
-	5 ft 20%	7	, , , ,	-	Ш	surface, rare fossiliferous	1
-	1		NR		H	(casts/molds) No Recovery 116.0-125.0'	1
-	1				Ħ	No Necovery 110.0-123.0	1
-					Ш	-	R15:4 minutes
120	120.0			-	₩	-	1
-78.7	.20.0			_	囯		
-					団	-	1
-				·	H	-	Driller's Remark: Retrieved
-				-	H	-	a handful of material – consisting of loose sand,
-	R16-HQ])			Ħ	-	carbonate material,
-	5 ft 0%	0	NR		버	-	moderate to high HCl - reaction, silty to sandy,
-	U 70				円	-	light gray
-					団	-	-
-				-	団	-	R16:3 minutes
					\square	-	-
125	125.0		$\vdash\vdash$		H		
					Ιl		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-09

SHEET 8 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723154.0 N, 457653.4 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS : 2.0	ft bgs	s on 04	4/05/07 START : 4/5/2007 END : 4/	7/200	7 LOGGER : R. McComb	
≥∩ ∵	_ (;			DISCONTINUITIES	ڻِ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)		LES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ATIC	TH,	(%) O	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	Ğ	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
LEV.	ENGE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-83.7	Olk	α.	шФ	125.0-126.0' - Fracture (>10), <5 deg and	S I	Carbonate Sand With Silt (SP-SM)	Stop drilling 04/06/2007
-00.7			>10	horizontal, rough, undulating to stepped,		125.0-125.5' - pale olive to yellowish	Resume on 04/07/07; –
-				inclined (40-50 deg), open	H	gray, (10Y 6/2 to 5Y 7/2), wet, loose, fine grained, rapid dilatancy.	water level 6.0' below
-			>10	126.0-127.0' - Fracture (>10)	Н	- \moderate HCl reaction, trace	ground surface
-	D.1=110				H	limestone fragments	
	R17-HQ 5 ft	0			Ш	Limestone - 125.5-126.5' - yellowish gray, (5Y	-
	34%			_	Ш	_ 7/2), fine grained, mild to moderate]
			NR	_	Н	HCl reaction, extremely weak (R0), voids over 10-15% of surface	
				_	Ħ	_ 126.5-126.7' - light olive gray, (5Y	
				_	H	5/2), mild HCl reaction, very weak (R1), voids up to 1/16" over 5-10% of	R17:3 minutes
	130.0				븬	surface, cavities up to 3/16"x3/16"] _
-88.7			>10	130.0-131.0' - Fracture (>10), vertical and horizontal, rough, stepped to undulating,	\square	No Recovery 126.7-130.0' - Limestone] _
				open	Д	130.0-131.0' - pale yellowish brown] _
					Ш	to yellowish gray, (10YR 6/2 to 5Y 7/2), fine to very fine grained, mild	
				_	Н	HCl reaction, very weak (R1), voids	
	R18-HQ 5 ft	0		_	Ħ	up to 1/16" over 10-15% of surface, fossil molds and cast are rare, some	
	20%	0	NR	_	H	solution cavities up to 1"x3/16"	<u> </u>
			1411	_	Н	No Recovery 131.0-135.0'	
					Н	_	_
					Щ	_	R18:7 minutes
	135.0				Ш		
-93.7			3	125 4! Fracture 20 deg amonth undulating	Н	Limestone - 135.0-136.75' - yellowish gray, (5Y	
				135.4' - Fracture, 30 deg, smooth, undulating, open	H	7/2), very fine grained, moderate to	_
			>10	135.6' - Fracture, 0-90 deg, smooth, stepped,		strong HCl reaction, very weak to - weak (R1 to R2), 1/16" voids over	_
				open 2"-3" 135.95' - Fracture, rough, planar to stepped,	Н	1-3% of surface, many]
	R19-HQ 5 ft	35		open	Н	2"-2-3/8"x3/4"-1-3/16" cavities on rock surface, fossil molds and casts]
	64%	55	NR		Ш	No Recovery 136.75-138.6'	_
					Щ		
			>1	138.6' - Fracture, horizontal, smooth, planar,	Н	Limestone	
			2	open, tan to black stain over 100% of surface (20% black, 1/16" thick)	\mathbb{H}	138.6-139.05' - light olive gray, (5Y 5/2), very fine grained, moderate HCl	R19:10 minutes
140_	140.0			139.05' - Fracture, <5 deg, rough, stepped to	H	reaction, weak (R2), voids up to	
-98.7			10	undulating, open 139.15' - Fracture, <5 deg, rough, undulating,	H	1/16" over 1-3% of surface 139.05-139.15' - yellowish gray, (5Y	
			NR	open	Н	7/2), very fine grained, very weak	
			INIX	140.2' - Fracture, horizontal, smooth, planar, open	П	(R1), voids up to 1/16" over 10% of surface, trace fossil casts and molds]
			>10	140.5' - Fracture, horizontal, smooth,	囯	139.15-140.0' - Same as	
	R20-HQ 5 ft	29	3	undulating, open 141.5-141.9' - Fracture zone, 0-90 deg,	Ш	138.6-139.05' except mottled with brownish limestone	
	78%	23	5	rough, undulating to stepped, various	Н		
			3	orientations 141.9-142.3' - Fracture, vertical, rough,	F		
			ى 	undulating, tight	H]
			2	142.3' - Fracture, <5 deg, rough, stepped, open	Ш		R20:11 minutes
145	145.0				Н		
					1		I

APPENDIX 2BB-964 Rev. 7



338884.FL GSC-09

SHEET 9 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723154.0 N, 457653.4 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT: CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION: Vertical

WATER	LEVELS : 2.0	ft bg	s on 04	4/05/07 START : 4/5/2007	END : 4/7	/2007	LOGGER : R. McComb	
>∩≎	(%)			DISCONTINUITIES		ပ္မ	LITHOLOGY	COMMENTS
ELO N (f	Ñ, AND 3Y (9	_	ZES T	DESCRIPTION		O LC	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING.
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNE		SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SUR!	COR	RQI	FRAC	PLANARITY, INFILLING MATERIAL ANI THICKNESS, SURFACE STAINING, AND TIGH		Ŋ. N.	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-103.7	014			142.9' - Fracture, horizontal, rough, step	ped.		Limestone	
-			2	open	· -	\dashv	140.0-140.5' - light olive gray, (5Y	-
-				143.2' - Fracture, horizontal, smooth, pla open	1	\dashv	5/2), very fine grained, moderate HCI reaction, weak (R2), voids up to	-
-			3	143.3' - Fracture, 15 deg, smooth, plana open	ır, -	⇉	1/16" over 1% of surface (concentrated along break).	-
-	R21-HQ			143.9' - Fracture, <5 deg, rough, undulat	ting,	廿	1-3/16"x3/8" cavity, some infilling in	-
-	5 ft 94%	60	4	open 144.1' - Fracture, <5 deg, rough, undulat	tina –	┵	cavity No Recovery 140.5-141.5'	-
-	3470			open	7	ᄑᆘ	Limestone	-
-			0	144.25' - Fracture, 60 deg, rough, steppe tight	ed, –	耳	141.5-144.1' - light olive gray, (5Y 5/2), very fine grained, mild HCl	-
-			1	145.5' - Fracture, 20 deg, rough, undulat	ting,	耳	reaction, very weak to weak (R1 to	R21:7 minutes
150	150.0		NR	tight 145.65' - Fracture, 60 deg, rough, steppe	ed.	┰╏	R2), friable from 141.5-142.5', cavities up to 1/8"-3/16" over 40-50%	-
-108.7	150.0			tight	\neg	十	of surface, 3/8"x3/16" cavities over	-
-			2	145.45' - Fracture, 10 deg, rough, planar open	ſ, –	\dashv	1-3% of surface, cavities and voids mostly present in 142.3-143.2',	_
-				146.5' - Fractures, horizontal, rough,	1	井	laminated with very fine grained	
-			3	undulating, open 146.85' - Fracture, 10 deg, smooth,	1	┵	limestone, less than 1% voids from 143.6-143.8'	
-	R22-HQ			undulating, tight 147.0' - Fracture, vertical, rough, undula	ting	┵┠	144.1-144.5' - light olive gray, (5Y 5/2), very fine grained, mild to	
-	5 ft 100%	72	2	tight	·	耳	moderate HCI reaction, weak (R2),	
-				147.1' - Fracture, horizontal, rough, plan- open	ar,	耳	voids up to 3/16" over less than 1% surface, two 3/16"x3/16" cavities.	
-			2	147.4' - Fracture, 15 deg, smooth, plana	ır, 🗍		trace fossil casts and molds	-
-				open, silt/clay lens (<1/16" thick) 147.55' - Fracture, 10 deg, rough, steppe	ed T	\dashv	No Recovery 144.5-146.1' Limestone	R22:7 minutes
155	155.0		1	<1/16" thick silty clay lenses	1	\dashv	146.1-147.1' - light olive gray with	_
-113.7				149.6' - Fracture, 0-50 deg, rough, stepp 150.45' - Fracture, <5 deg, rough, undula	ped T		yellowish gray mottling, (5Y 5/2 with 5Y 7/2), fine grained, mild to	
-				open	·]	- [moderate HCl reaction, weak (R2),]
				150.75' - Fracture, horizontal, rough, pla	nar,		voids over 5-15% of the surface, several 3/16"x3/16" cavities, trace	
_				151.35' - Fracture, <5 deg, rough, steppe	ed,	Γ	fossil molds and casts	
				open 151.7' - Fracture, horizontal, smooth, pla	anar,	Γ	147.0-146.1' - Same as 144.1-144.5' 147.1-147.4' - light olive gray with	
				open 151.85' - Fracture, horizontal, rough,		Γ	yellowish gray mottling, (5Y 5/2 with 5Y 7/2), fine grained, mild HCl	
				stepped, open		Γ	reaction, very weak (R1), thinly	
				152.6' - Fracture, <5 deg, rough, undulat	ting,		cemented, 1-3/16"-1-9/16"x1/8" cavities, occasional clay bedding	
				153.0' - Fracture, smooth, planar, 1/16" s	silty		parallel to bedding plane, voids up to	
				clay liner covers 100% of surface 153.3' - Fracture, <5 deg, rough, undulat	ting 🔲		1/16" over 1-3% of the surface 147.4-147.6' - dark yellowish brown,	
				open			(10YR 4/2), fine grained, mild HCI	
				153.55' - Fracture, rough, undulating, op 154.15' - Fracture, horizontal, smooth, pl	en Janar		reaction, extremely weak (R0), small voids over 40-50% of surface, friable	
				tight	iariar,		with depth	
						Γ	147.6-149.7' - pale yellowish brown, (10YR 6/2), fine grained, mild to]
					7	Γ	moderate HCl reaction, weak (R2),]
					7	Γ	voids over 5-10% of surface, cavities (3/16"x3/8") over 1-2% of the]
					7	Γ	surface, trace fossil molds and casts,]
							cavities No Recovery 149.7-150.0']
						T		
								l



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	GSC-09	SHEET	10	OF	10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723154.0 N, 457653.4 E (NAD83)

ELEVATION: 41.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: T. Williams

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

DISCONTINUITIES OUNT OF THE PROPERTY OF THE P		LEVELS : 2.0			4/05/07 START : 4/5/2007 END : 4/7	/2007	7 LOGGER : R. McComb	Ordert / troit : Voldodi
Limestone 150.0-154.15' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCI reaction, weak to extremely weak (R2 to R0), voids up to 1/16' over 25-30% of surface, cavities (3/8"x3/16" and up to 3/4"x3/8") over 1-2% of surface, slightly fossiliferous, fossil casts and molds with some original fossil material from 152.0153.0' 154.15-155.0' - very light gray to white, (N8 to N9), very fine grained, strong HCI reaction, very weak to extremely weak (R1 to R0), small voids over 25-30% of surface, voids more prominent in the lower half of the limestone (chalk-like material) Bottom of Boring at 155.0 ft bgs on								COMMENTS
Limestone 150.0-154.15' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCI reaction, weak to extremely weak (R2 to R0), voids up to 1/16' over 25-30% of surface, cavities (3/8"x3/16" and up to 3/4"x3/8") over 1-2% of surface, slightly fossiliferous, fossil casts and molds with some original fossil material from 152.0153.0' 154.15-155.0' - very light gray to white, (N8 to N9), very fine grained, strong HCI reaction, very weak to extremely weak (R1 to R0), small voids over 25-30% of surface, voids more prominent in the lower half of the limestone (chalk-like material) Bottom of Boring at 155.0 ft bgs on	DEPTH BELOW SURFACE AND ELEVATION (ft)	SORE RUN, ENGTH, AND RECOVERY (%	Ø	RACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
			α	H H H H H H H H H H H H H H H H H H H	THE STATE OF A PART OF THE STATE OF THE STAT		Limestone 150.0-154.15' - moderate yellowish brown, (10YR 5/4), fine grained, mild to moderate HCl reaction, weak to extremely weak (R2 to R0), voids up to 1/16" over 25-30% of surface, cavities (3/8"x3/16" and up to 3/4"x3/8") over 1-2% of surface, slightly fossiliferous, fossil casts and molds with some original fossil material from 152.0153.0' 154.15-155.0' - very light gray to white, (N8 to N9), very fine grained, strong HCl reaction, very weak to extremely weak (R1 to R0), small voids over 25-30% of surface, voids more prominent in the lower half of the limestone (chalk-like material) Bottom of Boring at 155.0 ft bgs on	



PROJECT NUMBER: BORING NUMBER: 338884.FL GSC-10

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SHEET 1 OF 10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722899.7 N, 457706.1 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

WATER	LEVELS				START : 4/19/2007	END: 4/22/2007		R : A.	Erickson
				STANDARD		SOIL DESCRIPTION			COMMENTS
AND (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS) io	
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE	ERY (ft)		SOIL NAME MOISTURE	E, USCS GROUP SYMBOL, (CONTENT, RELATIVE DEN	COLOR, SITY OR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
EPTH URF/ LEV#			#TYPE	6"-6"-6"		CY, SOIL STRUCTURE, MINI		YMB	INSTRUMENTATION
42.3	0.0			(N)	Topsoil Gradin	ng To Poorly Graded Sand	With	0)	
-		1.3	SS-1	1-2-2	Organics (SP)	sh black, (N2), moist, very lo	ooso fino	1	-
-	1.5		00 .	(4)	grained, silica s	sand, 50% organics decrea	sing with		Water level is based on Ground Water
-	1.5				depth, trace nor	nplastic fines	/ .	1	Monitoring at LNP site (FSAR Table - 2.4.12.08)
-								1	Water levels not recorded during drilling
-								1	-
							•		
_									_
5 37.3	5.0				0:11 0 1/014	n		76.1715	
37.3				3-3-3	Silty Sand (SM) 5.0-5.9' - light b	prown, (5Y 5/6), moist, loose	e, fine silica		-
_		0.9	SS-2	(6)	sand, 15-20% n	nonplastic fines, trace organ	nics		-
_	6.5							┨	-
-								1	-
_								┨	-
-								1	-
_								1	-
-								1	-
10	10.0							1	_
32.3					Silty Sand (SM)		loogo fino	Ш	Weight of hammer enough to drive of SS-3 first 12"
		0.7	SS-3	0-0-1 (1)	\bigcap to medium grair	e orange, (10YR 8/2), wet, ned, strong HCI reaction, 2	0% low	111	ilist 12
	11.5			, ,	\plastic fines, for	ssiliferous, carbonate mate	rial /		_
_								1	_
-								4	_
_								1	-
_								┨	-
-								1	-
4.5	15.0							1	-
15 <u> </u>	15.0		00.4	40-50/3	Silt (ML)			Ш	Driller's Remark: Feels like hard material
_	15.8	0.8	SS-4	(90/9")	15.0-15.8' - gray	yish orange, (10YR 7/4), m d dilatancy, mild HCl reacti	oist, hard,	1	-
-					very fine sand-s	sized, carbonate materials	011, 0 1070	T	-
-								1	7
								1	7
]	_
								1	
								1	_
20									
								1	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	GSC-10	SHEET	2	OF	10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722899.7 N, 457706.1 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

WATER	LEVELS	: 1.61 ft l	ogs on 6/	14/07 S	START : 4/19/2007 END : 4/22/2007 LOGGE	R:	A.	Erickson
				STANDARD	SOIL DESCRIPTION	J	g	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COLL NAME TIGOG OBOLID OVARDOL COLOR	1	SYMBOLIC LOG	DEDTIL OF CACING PRILLING PATE
ASE 136		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	1	SOLIC SOLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
EV.			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	1	3.VME	INSTRUMENTATION
22.3	20.0			(14)	Silt (ML)	╁	П	
-		1.4	SS-5	28-45-43	20.0-21.4' - Same as 15.0-15.9'	\parallel		-
-	21.5	'''		(88)		1		-
-	21.0					Ŧ		-
-						1		-
-						1		-
]		
_								_
_						1		_
25 <u> </u>	25.0				C:IA (BALL)	4	П	
''.3 -			00.0	35-44-33	Silt (ML) 25.0-26.5' - Same as 15.0-15.9'	\parallel		-
-		1.5	SS-6	(77)		\parallel		-
-	26.5					┦	Ш	-
-						+		-
-						1		-
-						1		Driller's Remark: Water loss at 28.0'
-						1		-
-						1		-
30	30.0					1		-
12.3				47.00.00	Sandy Silt (ML) 30.0-31.3' - Same as 15.0-15.9' except grayish		П	
l _		1.3	SS-7	17-32-32 (64)	orange, 20-25% fine to coarse sand-sized, trace fine	\parallel		_
_	31.5			, ,	gravel-sized limestone, carbonate materials	╬	Ш	_
_						4		-
_						4		Driller's Remark: Hard drilling at 32.5'
-						+		Driller's Herifark. Hard drilling at 32.3
-						+		-
-						+		-
35	35.0					1		-
7.3	33.0				Silt With Sand (ML)	\dagger	П	_
-		1.2	SS-8	31-26-24 (50)	35.0-36.2' - yellowish gray, (5Y 7/2), moist, hard, nonplastic, rapid dilatancy, mild HCl reaction, very	1		-
_	36.5			(50)	$\vdash_{\!$	┦┛	Ш	-
					carbonate	1		
]		
_						1		_
-						1		_
-						1		-
-						-		-
40						+		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	GSC-10	SHEET	3	OF	10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722899.7 N, 457706.1 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

,						ry, auto nammer, Avvo rous,			ONIENTATION: Vertical
WATER	LEVELS	: 1.61 ft l	ogs on 6/	14/07 S	START : 4/19/2007 I		LOGGEF	: A.	
> 0 0				STANDARD		SOIL DESCRIPTION		g	COMMENTS
O A S	SAMPLE	INTERVA	AL (ft)	PENETRATION TEST RESULTS				S	
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE	ERY (ft)		SOIL NAM	ME, USCS GROUP SYMBOL, E CONTENT, RELATIVE DEN	COLOR,	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
YFA(#TYPE	6"-6"-6"		ICY, SOIL STRUCTURE, MIN		MBC	INSTRUMENTATION
			#117	(N)	00.10.012.1	.0., 00.2 011.00.01.2, 11		SY	
2.3	40.0			. ,	Sandy Silt (ML	L)		Ш	
-		, -	000	10-17-27	40.0-41.5' - Sa	ame as 35.0-36.2' except 30	0-35% fine to -		-
_		1.5	SS-9	(44)	coarse sand-si	ized and trace organics	_		_
I _	41.5							Ш	
-							_	1	_
-							-	l	-
-							_	l	-
-							=		_
							_		
]							_		
45	45.0						_	1	1
-2.7	45.0				Silty Sand (SM	M)		777	Driller's Remark: Will set casing to 45.0'
-]	00.15	23-52-50	45.0-46.1' - Sa	ame as 40.0-41.5'	-		below ground surface
-		1.1	SS-10	(102)	<u></u>		<u> </u>		_
	46.5								
_							_	1	Driller's Remark: Hard drilling at 47.0',
-							-	l	sample was slough in sand-sized limestone -
-							-		fragments
_							_		_
							_	1	
F0 -	50.0 50.2								-
50 <u> </u>	_50.2_	0.0	SS-11	50/2	No Recovery 5	50.0-50.2'		┢	
-				(50/2")	Begin Rock Co	oring at 50.0 ft bgs sheet for the rock core log	-	l	-
_					See the next si	meet for the rock core log	_		_
								1	
-							=	i	-
-							=	l	-
-							-	l	_
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55							-	1	1
-12.7								l	
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PROJECT NUMBER:

33884.FL

BORING NUMBER:

GSC-10

SHEET 4 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722899.7 N, 457706.1 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER LEVELS : 1.61 ft bgs on 6/14/07 START : 4/19/2007 END : 4/22/2007 LOGGER : A. Erickson								
≥0≥	- (°)			DISCONTINUITIES	ဖွ	LITHOLOGY	COMMENTS	
ANI (#	Ä AND ≪ (%		LES	DESCRIPTION		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) _Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND	
SURF SURF SUEV	SORE	A D	FRAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	3×ME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.	
	50.0 R1-NQ	ш.	2		100	Limestone	R1:3 minutes	
	1 ft	0	NR	50.2' - Fracture, 80 deg, smooth, undulating, second face of fracture has been fragmented	井	 50.0-50.4' - light olive gray, (5Y 5/2), 	-	
-	51.0 40%			into at least two subangular to subrounded	岸	fine grained, mild to moderate HCl reaction, medium strong (R3), voids	-	
-				elongate fragments, trace coatings/infill on all fragments	世	 (1/16") over 10-40% of surface, thin 	-	
-					╫	elongate fossil molds mostly 1/4" and up to 1/2", moderately fossiliferous	-	
-					尸	- No Recovery 50.4-56.0'	-	
-	R2-NQ				世	-	=	
-	5 ft 0%	0	NR		士	-	-	
-	076				╁	-	_	
					\vdash	-	-	
55 <u> </u>				_	广	-	R2:8 minutes	
-	56.0				世	_	=	
-	55.0		0		廿	Limestone	-	
-					╨	 56.0-56.3' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, 	_	
_					╨	weak to medium strong (R2 to R3),	Core stuck in HW casing	
_					口	 voids (1/16") over 25% of surface, 1/8" thin elongate fossil molds some 	-	
_	R3-NQ				世	larger 1/4"-1/2" cavities and fossil	-	
_	5 ft 7%	7	NR		士	moldsNo Recovery 56.3-61.0'	_	
-					Ή		_	
60					F		_	
-17.7				_	岸		R3: Run time not recorded	
	61.0				片		_	
_			>10	61.35' - Fracture, horizontal, rough,	H	Limestone - 61.0-62.45' - moderate yellowish	_	
_			- 10	undulating, tight to healed	世	brown, (10YR 5/4), fine grained, mild	_	
_			>10	61.5-61.7 - Fractures, horizontal, multiple fractures with fine bedding planes and		to moderate HCl reaction, very weak	_	
_				organic laminations, nearly crush, very open		1/16"-3/16" voids, thick black	=	
_	R4-NQ 5 ft	13	1	62.0, 62.2, 62.35' - Fractures (3), horizontal, smooth, planar, open	411	horizontal bedding plane laminations, elongate 1/4" long fossil molds and	_	
-	70%			62.7-63.8' - Fracture, angular black sediment	出	casts throughout, moderately fossiliferous	_	
-			0	63.8' - Fracture, 10 deg, rough, undulating	士	Silty Sand (SM)	-	
65 -22.7			N-	_	+	62.45-63.8' - moderate yellowish brown, (10YR 5/4), nonplastic, mild	R4:7 minutes	
			NR		井	to moderate HCl reaction, 60% fine	TATA TIMULOS	
-	66.0				井	sand, 30% fines, 10% limestone fragments, non-cohesive, massive,	-	
-			1	GG G! Fracture harizental recent micro-	世	easily friable and ground to fine	-	
-			-	66.6' - Fracture, horizontal, rough, planar, followed by non to weak sediment/rock	世	sand, calcareous Limestone	-	
-			0	66.6-70.5' - Fractures, 0-20 deg, occasionally more of a fracture zone. silt-sized fragments	+	63.8-64.5' - moderate yellowish	-	
-	R5-NQ		_	more or a fracture zone, sitt-sized fragitients	ፗ	brown, (10YR 5/4), fine grained, moderate HCl reaction, medium	-	
-	5 ft	10	0		世	strong (R3), voids (1/16") over	-	
-	90%				世	20-25% of surface, trace larger up to 3/16" voids and fossil molds, trace	=	
70			0		士	 organic black beds No Recovery 64.5-66.0' 	-	
10_						110 110001019 0-110-00.0		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-10

SHEET 5 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722899.7 N, 457706.1 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 1.6	1 ft bg	gs on (6/14/07 START : 4/19/2007 END : 4/	22/20	D7 LOGGER : A. Erickson	
≥∩ <i>⊊</i>	, ©			DISCONTINUITIES	၂ ၂	LITHOLOGY	COMMENTS
ELO N (fi	CORE RUN, LENGTH, AND RECOVERY (%)		SES ⊢	DESCRIPTION	OLO CLO	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)		D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP' SURI ELE\	COR	RQI	FRA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-27.7			0			Limestone	R5:6 minutes
-	71.0		NR	-	丗	- 66.0-66.6' - moderate yellowish brown, (10YR 5/4), fine grained,	-
-	71.0			71.0-72.9' - Fractures, several horizontal	Н	extremely weak to medium strong	1
-			0	breaks -	П	 (R0 to R3), no voids where extremely weak rock (R0), voids (1/16") over 	1
-	1		1		H	5% of surface where medium strong (R3), trace organics, strong HCl	1
			ı	70 Ol Frankura karinaratal massak sundsulatina a	片	reaction where extremely weak rock]
	R6-NQ 5 ft	18	2	72.9' - Fracture, horizontal, rough, undulating	H	(R0) at the top, moderate HCl reaction where medium strong (R3)	
_	78%	10	1 NR	73.5, 73.6' - Fractures (2), horizontal, smooth to rough, planar, open	H	at the bottom	
_				74.1' - Fracture, horizontal, smooth, planar, open -	H	66.6-70.5' - dark yellowish orange, (10YR 6/6), fine grained, strong HCI reaction, very weak (R1), fine voids over 0-3% of surface, friable	_
75_ -32.7					H		End of core at 74.9',
-32.1					円	 No Recovery 70.5-71.0' 	matches/mates with next
-	76.0				H	Limestone 71.0-72.9' - dark yellowish orange to	core at 76.0' R6:6 minutes
-			0		口	grayish orange, (10YR 6/6 to 10YR 7/4), fine grained, strong HCl	-
-				77.05' - Fracture, 10 deg, rough, undulating	団	reaction, extremely weak to very	-
-			>10	77.2' - Fracture, horizontal, rough, planar,	丗	weak (R0 to R1), friable 72.9-74.1' - Same as 71.0-72.9'	-
-	R7-NQ			healed 77.65, 77.9' - Fractures (2), horizontal,	丗	except very weak (R1)	-
-	5 ft 96%	60		smooth, planar, tight to open 78.0-78.8' - Fractures, horizontal, multiple	\vdash	_ 74.1-74.9' - moderate yellowish brown, (10YR 5/4), fine grained,	-
-				breaks	Ħ	moderate to strong HCl reaction, weak to medium strong (R2 to R3),	1
80				79.05' - Mechanical break, 10 deg, rough, undulating	Ħ	voids (1/16"-1/8") over 25-30% of	1
-37.7			1	79.5' - Fracture, horizontal, rough, stepped, open, missing portion of fracture		surface, trace organics, 1/16" fossils/molds, highly fossiliferous	R7:7 minutes
	81.0		NR	80.05' - Fracture, 10 deg, rough, planar, tight	H	No Recovery 74.9-76.0' Limestone	
_			2	81.25' - Fracture, 10 deg, rough, planar,	H	_ 76.0-77.05' - moderate yellowish	Core essentially alternates between the two rock types
_				healed 81.75' - Fracture, 10 deg, rough, planar, open	H	brown, (10YR 5/4), fine grained, – moderate HCl reaction, medium	in 81.0-81.75' and 81.75-
-			2	82.35' - Fracture, horizontal, rough, planar,	H	strong (R3), voids (1/16"-1/8") over	84.2'
-	Do NO			open with 1/4" infill on each face (coating is same as lithology described for 81.0-81.75')	幵	25% at top reducing to 0% voids with depth (transition sharpest at 76.6')	-
-	R8-NQ 5 ft 100%	67	0		H	77.05-79.55' - moderate yellowish brown, (10YR 5/4), fine grained,	-
-		}	\vdash	83.75' - Fracture, horizontal, rough, undulating, tight	囯	 moderate to strong HCl reaction, 	-
			3	84.2-84.4' - Fractures, horizontal, rough,	囯	very weak to extremely weak (R1 to R0), 0% to trace voids, friable	
85 -42.7				undulating, filled with material as described for 81.0-81.75'	Ħ	— 79.55-80.8' - moderate yellowish brown, (10YR 5/4), moderate to	R8:15 minutes —
-	86.0		>10	84.75' - Fracture, 10 deg, rough, planar, tight to open with fine coating of infill similar to	Ш	strong HCl reaction, medium strong	
-	00.0			82.35'	\blacksquare	to very weak (R3 to R1), voids (1/16"-3/8") over 30% of surface from	1
-			8	85.2' - Fracture, horizontal, rough, stepped, very open, with fragments	\mathbb{H}	76.0'-77.05', decrease in voids (1/16") to 3% of surface	1
-	R9-NQ 5 ft 78%			85.3' - Fracture, horizontal, smooth, planar	\mathbb{H}	No Recovery 80.8-81.0'	1
				85.3-86.0' - Fractures, several horizontal and vertical, angular (1/2"-3") fragments	Ħ	Limestone 81.0-81.75' - moderate yellowish]
_		13	>10	86.1' - Fracture, 10 deg, smooth, stepped, tight to open, subangular to subrounded	H	brown to pale yellowish brown, (10YR 5/4 to 10YR 6/2), fine grained,]
-		'0	. 10	fragments	H	strong HCl reaction, very weak (R1)]
_			>10	86.25, 86.35, 86.4, 86.5' - Fractures (4), horizontal, rough, planar to undulating, tight	H	-]
90			\vdash	3,13,11	H		_



PROJECT NUMBER: BORING NUMBER: 338884.FL GSC-10

ROCK CORE LOG

SHEET 6 OF 10

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722899.7 N, 457706.1 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing

WATER	WATER LEVELS : 1.61 ft bgs on 6/14/07								
				DISCONTINUITIES	ر ن	LITHOLOGY	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.		
-47.7			NR	87.15' - Fracture, horizontal and 30 deg, rough, planar, open		Limestone - 81.75-84.2' - moderate yellowish	R9:9 minutes		
-	91.0 R10-NQ 5 ft 88%	38	5	87.3, 87.4, 87.55' - Fractures (3), horizontal, smooth, rounded rock fragments 87.9, 88.25, 88.35, 88.6, 88.8, 89.2, 89.4' - Fractures (7), horizontal, significant fragmentation in places 89.45-89.9' - Fracture zone, 30 deg 91.0-91.4' - Fracture zone, several large		brown, (10YR 5/4), fine grained, moderate to strong HCl reaction, - strong (R4), voids (<1/16") over]		
-			3			5-15% of surface, except for 1" interval at 83.4' with 25% voids on surface 84.2-84.4' - Same as 81.0-81.75'			
-			5	subangular fragments with weathered appearance, very open 91.7' - Fracture, 20 deg, rough, planar, tight		except extremely weak (R0) - 84.4-85.3' - Same as 81.75-84.2' except weak (R2), voids over 3% of			
95			1	92.5' - Fracture, horizontal, rough, undulating, fragmentation 92.6' - Fracture, 60 deg, rough, undulating,		surface, this material more of a transition between the two types from 81.0-84.2'	-		
-52. 7			0 NR	tight 92.8' - Fracture, 60 deg, rough, planar, tight 93.3' - Fracture, 45 deg, rough, planar, tight		85.3-86.0' - Same as 81.0-81.75' except strong HCl reaction, very weak (R1)	R10:8 minutes		
-	R11-NQ 5 ft 94%		0	93.7' - Fracture, horizontal, rough, planar, very open, material beneath is discontinuous and somewhat fragmented 93.9' - Fracture, horizontal, rough, stepped,		86.0-86.5' - moderately yellowish brown, (10YR 5/4), fine grained, moderate to strong HCl reaction, weak (R2), fine organic inclusions,]		
-		Q 78	0	very open with fragmentation, subangular 95.0' - Fracture, horizontal, rough, stepped, with missing fragments		no voids 86.5-87.1' - Same as 86.0-86.5' except fine (<1/16") voids over 30%			
-			1	98.75' - Fracture, horizontal, rough, stepped, tight		of surface (up to 40% at 86.6'), few larger 1/4" cavities/fossil molds 87.1-88.9' - Same as 86.0-86.5']		
100 -57.7			0	99.05, 99.15' - Fractures (2), horizontal, rough, undulating, very open with weathered appearance in zone of increased	Ħ	except very weak to weak (R1 to R2), voids vary over 10-30% of surface 88.9-89.9' - Same as 86.0-86.5'	R11:7 minutes		
-	101.0		NR	voids/cavities 99.75' - Fracture, horizontal, rough, undulating, tight		except weak to medium strong (R2 to R3), 10% voids (<1/16"), few larger (1/4") cavities/fossil molds No Recovery 89.9-91.0']		
-	R12-NQ 5 ft 74%	Q 47	6	99.95' - Fracture, horizontal, smooth, planar, very open with apparent change of rock type abruptly at fracture		Limestone 91.0-91.4' - dark yellowish orange, (10YR 6/6), fine grained, moderate to]		
- - - 105 -62.7			5	100.0-103.5' - 3 to 4 large 1-1/2" fragments, primarily horizontal breaks along lignite lamination 100.55' - Fracture, horizontal, planar, black		strong HCl reaction, very weak (R1), fine voids over 10% of surface, 1/4" rounded gray inclusions	Driller's Remark: 20% water loss at 103.0'		
			5	bedding plane/lamination, tight 101.8' - Fracture, horizontal, rough, stepped, open to fragments beneath		91.4-95.4 - moderate yellowish brown, (10YR 5/4), moderate to strong HCl reaction, weak to medium	-		
			NR	101.8-102.0' - subangular rock crush 1" in size 102.15' - Fracture, 70 deg, rough, undulating,		strong (R2 to R3), no voids — 91.5-91.8', voids (1/16") over 10-20% of surface elsewhere, some fossil cavities/molds variably up to 1/2",	R12:7 minutes		
	106.0		2	open to overlying fragments and terminating at 101.8' horizontal fracture and at 102.3' 102.7, 102.75' - Fractures, horizontal, smooth, stepped, tight		 though most smaller, poorly fossiliferous No Recovery 95.4-96.0' 	-		
-	R13-NQ 5 ft 76%	Q 48	0	103.0' - Fracture or mechanical break, 30 deg, rough, undulating, tight 104.1' - Fracture, horizontal, rough, planar,		Limestone 96.0-98.75' - moderate yellowish brown, (10YR 5/4), fine grained, moderate to strong HCl reaction,]		
-			>10	followed by fragments 104.1-104.7' - Fracture zone, contains a large 3" fragment but some subangular vertical and		medium strong (R3), voids (1/16") over 3-10% of surface, few cavities/molds up to 1/2", but most			
110			2	horizontal fragments -		are 1/4"	-		

APPENDIX 2BB-972 Rev. 7



PROJECT NUMBER:

33884.FL BORING NUMBER:

GSC-10 SHEET 7 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722899.7 N, 457706.1 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing

ORIENTATION : Vertical

CORING	NETHOD AL	ND EC	JUIPIV	IENT: CME 55 S/N 252345, mud rotary, NQ tools, HW c	asing		ORIENTATION : Vertical
WATER	LEVELS: 1.6	1 ft bg	gs on (6/14/07 START : 4/19/2007 END : 4/3	22/20	D7 LOGGER : A. Erickson	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		m	DESCRIPTION	SYMBOLIC LOG	DOOK TYPE OOLOD	1
D A D	₹ <u>₹</u> ₹	<u></u>	FRACTURES PER FOOT	DESCRI HOR	$\overline{\circ}$	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
H H H H		Q D (%)	Τ̈́	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	l g	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
말류렛		Ø	ZAC ER	PLANARITY, INFILLING MATERIAL AND	Įξ	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
	225	ď	H H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	, , , , , , , , , , , , , , , , , , , ,
-67.7			NR	106.35, 106.55' - Fractures (2), 10 deg,	ш	98.75-99.95' - Same as 96.0-98.75'	R13:5 minutes
-			INIX	rough, undulating, open, fine calcareous	Н	- except weak (R2), voids from	1
-	111.0			infill/coating 108.25, 108.6' - Fractures (2), 20 deg, rough,		_ 15-40% of surface, increased voids and cavities at 98.75-99.2', with	1 -
Ι.			0	stepped, very open, with dissolved	ш	- fractures	
				appearance	Н	Limestone	
-				108.6-109.1' - Fracture zone, subangular,		99.95-100.7' - Same as 96.0-98.75'	1 7
-			2	primarily 1/2"-3/4" with a few larger fragments	ш	 except weak to medium strong (R2 to 	1
-				109.1' - Fracture, horizontal, rough, stepped,	Н	R3), voids decrease with depth from	-
l _	R14-NQ 5 ft	80	4	terminates fracture zone 112.45' - Fracture, 45 deg, rough, stepped, -		5% to 0% of surface where black - laminations (<1/16" thick each)	
	100%	00	-	nearly healed	Н	become darker brown/gray banded	
-				112.8' - Fracture, horizontal, rough, stepped,	Н	organics	1
-			2	open -	口	No Recovery 100.7-101.0'	1 -
115_				113.5' - Fracture, 30 deg, rough, stepped,	₽₩	Limestone 101.0.101.8' dark vellowish brown	
-72.7			8	open 113.7, 114.0' - Fractures (2), horizontal,	Ш	101.0-101.8' - dark yellowish brown, (10YR 4/2), fine grained, moderate to	R14:6 minutes
Ι -	116.0		Ø	rough, planar, open to tight	\mathbb{H}	strong HCl reaction, strong (R4),	1
-	110.0			113.85' - Fracture, vertical, rough, undulating,	Н	voids over 3% of surface, few 1/4"	1
-			2	tight, bounded by overlying and underlying	口	 elongated fossil casts, banded black 	-
I -				horizontal fractures	Н	organics (lignite) in upper portion	
				114.2' - Fracture, 10 deg, smooth, undulating, very open	Н	turning to minor with depth 101.8-104.7' - moderate yellowish	
-			4	114.95-115.1' - Fractures, rough, stepped,	Ш	brown, (10YR 5/4), fine grained,	1
-	R15-NQ			subangular rock fragments bounded by	Н	moderate to strong HCl reaction,	1
-	5 ft	13	>10	horizontal fractures		strong (R4), voids (1/16") over 25%	-
Ι.	72%			115.3, 115.5' - Fractures (2), 20-30 deg,	Щ	of surface, thin elongated 1/4"-1/2"	
1			3	rough, undulating, tight to open 116.85, 116.95, 117.05, 117.1' - Fractures	Н	fossil molds, few larger cavities up to 3/4", small casts (1/4"), fossiliferous	
120				(4), 0-10 deg, rough to smooth, planar to		No Recovery 104.7-106.0'	1
-77.7				undulating, along bedding planes —	₩	- Limestone	R15:7 minutes
			NR	117.35' - Fracture, horizontal, rough,	H	_ 106.0-109.8' - moderate yellowish	-
l .	121.0			stepped, open 117.6' - Fracture, horizontal, rough, stepped -	П	brown, (10YR 5/4), fine grained, moderate to strong HCl reaction,	
1				118.3' - Fracture, horizontal, rough, stepped,	Н	strong (R4), some short, weaker	Driller's Remark: 100%
-			>10	terminates the fragments	ш	fracture zones, voids (1/16") over	water loss at 120.0'
-				118.45-119.1' - Fracture zone, rock	Н	 25% of surface, many round to oval 	Quite possible no recovery
-			4	fragments, grayer subangular rock fragments	Н	1/4" fossil molds, increased size and	is from fracture zone of
				from 1/2"-1" 119.75' - Fracture, vertical, rough, undulating,	Ш	frequency of cavities (up to 1/2") at - 108.25-109.1'	118.0' (which would shift
Ι -	R16-NQ			from overlying rock fragments to end core at	H	No Recovery 109.8-111.0'	down to 119.6')
I -	5 ft	32	0	119.6' some fragmentation/splitting		Limestone	1
-	70%			121.0-121.9' - Fractures (12), horizontal,	Ш	 111.0-116.0' - moderate yellowish 	1 -
-			2	every 1/2"-1", all tight to open with rounding	Н	brown, (10YR 5/4), fine grained,	1
125				122.05, 122.2, 122.25, 122.3' - Fractures (4), horizontal, smooth, undulating, open to tight —	口	moderate HCl reaction, weak to medium strong (R2 to R3), voids	
-82.7			NR	124.05' - Fracture or mechanical break, 20	Ш	(1/16") over 25-40% of surface,	R16:5 minutes
I -				deg, rough, undulating, healed	H	1/4"-1" areas of lighter-colored infill	1 +
-	126.0			124.3' - Fracture, horizontal, rough,	口	 with strong HCl reaction; infill is 	1 -
I -			8	undulating, tight	Н	clayey in texture often not at	
				126.6' - Fracture, horizontal, smooth,	Ш	fractures 116.0-118.0' - moderate yellowish	
Ι -				stepped, open to fragments/fracture zone	\Box	brown, (10YR 5/4), fine grained,	1
-			>10	below -	Н	moderate HCl reaction, weak (R2),	1
-	B 4= 1:5			126.6-127.5' - Fracture zone, subangular and angular fragments 1/2"-2", browner at top,	口	voids (1/16") voids over 5% of	1 -
I -	R17-NQ 5 ft	53	7	grayer at bottom	H	surface, fine bedding planes	
	78%	55	'	127.5' - Fracture, horizontal, rough, stepped,	Н	particularly from 116.65-117.1', except at 117.6-118.0' where rock is]
1 -	,			fracture terminates fracture zone, gray	団	friable and extremely weak (R0)	1
I			0	fragments above, brown limestone beneath,	H		-
130				abrupt transition at fracture	H		
					Ш		

APPENDIX 2BB-973 Rev. 7



WATER LEVELS: 1.61 ft bgs on 6/14/07

R20-NQ

5 ft 60%

R21-NQ 5 ft | 48 | 1 72% | >10

145

-102.7

150

146.0

3

NR

4

2

25

PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-10 SHEET 8 OF 10

ROCK CORE LOG

LOGGER: A. Erickson

ORIENTATION: Vertical

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1722899.7 N, 457706.1 E (NAD83)

START: 4/19/2007

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

DISCONTINUITIES LITHOLOGY COMMENTS 90 CORE RUN, LENGTH, AND RECOVERY (%) DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -87.7 128.2-128.5' - Fracture, horizontal, rough, 118.0-119.6' - light olive gray, (5Y R17:6 minutes NR stepped, leads into several inches of angular 3/2), fine grained, moderate to strong HCI reaction, medium strong (R3), (1/4"-1/2") fragments 131.0 128.75' - Fracture, horizontal, rough, planar, voids (1/16") over 5-10% of surface No Recovery 119.6-121.0' 1 tight Limestone 131.8' - Fracture, horizontal, rough, planar, 121.0-124.5' - yellowish gray, (5Y tight 8/1), very fine grained, strong HCI 4 reaction, weak (R2), voids (1/16") 132.7' - Fracture, horizontal, smooth, planar, R18-NQ over 5% of surface, trace fossil open 57 7 132.7-133.5' - Fractures, smooth, planar, imprints (mostly on fracture faces), 5 ft 86% after 122.05' inclusion of gray very rock fragments (fragments broken in fine to fine grained particles horizontal plane, then broken again) beginning as very fine particles 1 transition to fine to medium grained 135 134.8' - Fracture, horizontal, smooth, planar, and yellowish gray (5Y 7/2) after -9275 R18:8 minutes open 122.5', less friable NR 135.1' - Fracture, horizontal, smooth, planar, No Recovery 124.5-126.0' 136.0 smooth to planar lower face, open Limestone 135.2, 135.25, 135.3' - Fractures (3), 126.0-127.5' - moderate yellowish >10 horizontal, smooth, planar brown to dark yellowish orange, 135.1-135.3' - Fracture zone, horizontal. (10YR 5/4 to 10YR 6/6), moderate 0 planar HCI reaction, medium strong (R3), 136.0-136.6' - Fractures, horizontal, smooth, some subtle change in color with planar, angular fragments olive gray (5Y 3/2) fragments, R19-NQ 136.6' - Fracture, horizontal, smooth, planar, 127.0-127.5' voids over 5% of 5 ft 7 terminates fragments surface, few 1/4" cavities 22% 136.8' - Fracture, horizontal, rough, planar, NR 127.5-129.9' - moderate yellowish open to tight brown, (10YR 5/4), moderate HCI reaction, medium strong (R3), voids 140 (1/16"-3/8") over 15% of surface, -97.7 R19:4 minutes many 1/8"-1/4" cavities 141.0 >10 >10

END: 4/22/2007

APPENDIX 2BB-974 Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-10

SHEET 9 OF 10

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722899.7 N, 457706.1 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing

				ILINT : ONE 33 3/14 232343, Hidd Totally, TNG tools, TTW C			ONLINIATION: Vertical
WATER	LEVELS : 1.6	31 ft b	gs on (22/20		
≥0≎	(%)			DISCONTINUITIES	ğ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEDTH OF CASING
불병은	RUH, MEN,	(%) Q	H C	DEDTH TYPE OPIENTATION POLICHNESS	1 ặ	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
₽₽¥	20 AGE	٥	ACT 7 F(DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	Æ	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SUB	SE	R Q	FR/	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-107.7				147.65' - Fracture, horizontal, smooth,	\vdash	Limestone	R21:6 minutes
-			NR	rounded on upper grayer surface, sharp,		 141.0-144.0' - light olive gray 	-
-	151.0			smooth to planar, 0 deg on bottom	₽	transitioning to pale yellowish brown	_
			0	148.75' - Fracture, 30 deg, smooth, planar, tight to healed		to grayish orange, (5Y 5/2 to 10YR - 6/2 to 10YR 7/4), fine to very fine	
1 7			0	149.25' - Fracture, horizontal, rough, planar,	Ъ	grained, moderate HCl reaction,	
-				tight to open		strong (R4), 141.0-143.15' voids over	-
-			0	149.95-149.6' - Fracture zone, subangular	╙	- 5% of surface, several 1/4" long and	-
-	500 110			fragments	\vdash	some larger cavities, 143.15-144.0' no voids, no cavities, more brown in	_
l _	R22-NQ 5 ft	58	7	153.0' - Fracture, horizontal, rough, planar, zone of increased voids with some bedding		- color with turbid-looking laminations,	
	84%	00	'	planes and laminar features	\vdash	black organic inclusions and	
-				153.25, 153.3' - Fractures (2), horizontal,		laminations (milky/blurred	
1==			1	rough, undulating, open with some very minor	╁	laminations)No Recovery 144.0-146.0'	-
155 <u></u> -112.7			0	fragmentation 153.5' - Bedding plane, horizontal, rough to		Limestone	R22:8 minutes
1 ''-''-			NR	smooth, planar, open 1/8"	\vdash	 146.0-147.65' - light olive gray, (5Y 	1.22.0 1111110105
1 -	156.0		INIX	153.7, 153.8, 153.9' - Bedding plane (3),	\Box	5/2), fine to very fine grained,	
1				horizontal, rough, planar, open, bedding planes ridged and 1/8"-1/4" thick, no bedding	H	moderate HCl reaction, medium strong to strong (R3 to R4), voids	
-			1	planes after last fracture	┰	(1/16") over 0-3% of surface but 1"	
-				154.8' - Fracture, horizontal, rough,	П	bands of 10% with 1/4" elongate	-
-			2	undulating, open	+	_ fossil molds	-
-				156.85' - Fracture, horizontal, rough, planar, open		Limestone 147.65-149.6' - dark yellowish	_
l _	R23-NQ 5 ft	53	4	157.25' - Fracture, horizontal, smooth, planar,	₽	orange, (10YR 6/6), moderate HCl	
	76%	00		tight		reaction, medium strong (R3), voids	
-				157.8' - Fracture, 70 deg, rough, planar,	Ъ	(1/16") over 30% of surface at top to voids (1/16"-3/8") increasing	
400			3	completely healed, closed, but broken open by load testing, surface is nearly 100% dark		gradually by end of core to 50% of	-
160 <u></u> -117.7				gray gray	╙	surface, very few larger cavities,	R23:8 minutes
'''-			NR	158.65, 158.75, 158.85' - Fractures (3),	H	though few elongated very thin up to	-
l _	161.0			horizontal, smooth, planar, tight to open,		1/2" long, some organic inclusions and secondary recrystallization	
				159.1' - Fracture, horizontal, rough to	l	No Recovery 149.6-151.0'	Total depth of boring is
1 -				smooth, stepped to planar, open	1	Limestone	161.0'
1 -				159.4, 159.5' - Fractures, 10 deg, rough,	1	- 151.0-152.6' - moderate yellowish	
-				undulating, tight, weathered	1	brown to light olive gray, (10YR 5/4 to 5Y 5/2), fine to very fine grained,	-
1 -				-	1	moderate HCl reaction, strong (R4),	-
1 -					1	voids (1/16") over 3% of surface,	
						inclusion of fine (1/16") black organics, few 1/4" infilled cavities	
1					1	152.6-155.2' - moderate yellowish	
1 -				·	1	brown, (10YR 5/4), fine grained, mild	1
1 -				_	1	to moderate HCl reaction, medium	
-				-	1	strong to strong (R3 to R4), voids (1/16") over 5-10% of surface, but	-
1 -				-	1	some variability along core, few 1/4"	_
1]	cavities, trace organic inclusions, few	
1					1	laminar features at 153.0-153.9'	
1 -				·	1	No Recovery 155.2-156.0'	1
1 -				-	1	156.0-157.65' - moderate yellowish	-
1 -				-	1	brown, (10YR 5/4), fine grained,	-
1 -					1	moderate HCl reaction, medium	
1					1	strong (R3), voids over 5% of surface to 156.9' increasing to 10-30% to	
1 -					1	157.65', few 1/4" cavities increasing	1
1 -				-	1	at 156.8-157.2'	-
—					\vdash		_
1					1		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-10	SHEET	10	OF	10	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722899.7 N, 457706.1 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 55 S/N 252345, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER LEVELS: 1.61 ft bgs on 6/14/07			gs on 6	6/14/07 START : 4/19/2007	END : 4/2	2/200	7 LOGGER : A. Erickson				
>00				DISCONTINUITIES		O	LITHOLOGY	COMMENTS			
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION		SYMBOLIC LOG	ROCK TYPE, COLOR,	OIZE AND DEDTH OF OAGUS			
HU	Z H.	(%) _Q	NA TO	DEDTH TYPE OPIENTATION POLICE	LINECO	CIC	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND			
PTH EVA	NGT CO	0 D	ACT R F(DEPTH, TYPE, ORIENTATION, ROUG PLANARITY, INFILLING MATERIAL	AND	MBC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD			
SS	잉필盟	R	F. H	THICKNESS, SURFACE STAINING, AND	TIGHTNESS	SΥ	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.			
							Limestone				
1 1					-		- 157.65-158.5' - dusky yellow to grayish orange, (5Y 6/4 to 10YR 7/4),	1			
1 -					-		very fine grained, moderate HCl	-			
1 -					-		reaction, strong (R4), no voids or	-			
-					-		cavities except one 1/2" discrete band with 10% voids	-			
-					-		- 158.5-159.8' - Same as	-			
1 4					_		156.0-157.65' except voids (1/16") over 10-20% of surface, few bands	_			
					_		- (1/2") of lighter and darker brown	_			
							oriented 20 deg from horizontal				
							No Recovery 159.8-161.0' Bottom of Boring at 161.0 ft bgs on				
7					_		4/22/2007]			
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PROJECT NUMBER:	BORING NUMBER:

338884.FL GSC-11

SOIL BORING LOG

SHEET 1 OF 10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722723.7 N, 457915.1 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten

						Stary, auto riammer, Av	·			OniENTATION : Vertical
WATER	LEVELS	: 1./ tt bo	gs on 2/1		START : 2/7/2007	END : 2/12/200		JGGER I	: 1. 8	Stewart, C. Sump
302				STANDARD		SOIL DESCRIPTION	N	\longrightarrow	ဗ္ဂ	COMMENTS
N (†	SAMPLE	INTERVA		PENETRATION TEST RESULTS	TEST RESULTS SOIL NAME, USCS GROUP SYMBOL, COLOR,			CLC	DEPTH OF CASING, DRILLING RATE,	
DEPTH BELOW SURFACE AND ELEVATION (ft)		RECOVE	ERY (ft)	MOISTURE CONTENT, RELATIVE DENSITY OR		MOISTURE CONTENT, RELATIVE DENSITY OR			SYMBOLIC LOG	DRILLING FLUID LOSS, TESTS, AND
L HEV			#TYPE	6"-6"-6"	CONSISTEN	ICY, SOIL STRUCTURE	E, MINERALOGY	′	YME	INSTRUMENTATION
42.9				(N)					Ś	Desire dellines et 45.00
42.9								4		Begin drilling at 15:00
_										_
								J		24" split spoon
								1		1
-								1		1
-	3.5							- 1		1
-	3.3				Silty Sand (SI	/ I)			П	1
-		0.8	SS-1	1-2-1	3.5-4.25' - gray	yish orange, (10YR 7/ nplastic fines, fine gra	4), wet, very	<u> </u>		-
		0.6	33-1	(3)	non-calcareou	nplastic fines, fine gra s, very fine grained to	avel tragment, cemented silt	Я		-
5 37.9	5.0				silica sand	s, very mie gramea te	ocmenica sin,	H		-
37.9								_		-
_								4		_
_										_
								J		
								1		1
-	8.5							1		1
-	0.0				Poorly Gradeo	d Sand With Organic	s (SP)			1
-		1.1	SS-2	1-1-3	8.5-9.6' - dusk	y yellowish brown, (10)YR 2/2), wet, v	ery -		†
		1	00-2	(4)	100Se, 15-20%	fine organics, fine sil	ica sano			-
10 32.9	10.0							-		
-										-
-								4		-
_								4		-
_								4		_
_										_
								J		
	13.5							1	_	
]					Silty Sand (SN	A)	0\/D c/0\ ···		\prod	SS-3 taken at 15:12
]		1.1	SS-3	5-6-8	13.5-14.6' - pa medium dense	le yellowish brown, (1 e, 20-25% nonplastic t	บาห 6/2), wet, ines. trace verv	, 1		1
15	15.0			(14)	fine sand-sized	d black particles, fine	silica sand	/‡	TIF	1
27.9	10.0							ㅋ	ı	7
-								Ⅎ	ı	-
-										-
-								4		-
-										-
-								4		-
-										_
	18.5								,,,	
				7 10 0						SS-4 taken at 15:11
		1.5	SS-4	7-10-9 (19)						
20	20.0			(10)				1		1



PROJECT NUMBER: BORING NUMBER:

338884.FL GSC-11

SHEET 2 OF 10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722723.7 N, 457915.1 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten

WATER	LEVELS	: 1.7 ft bo	s on 2/1	1/07 S	TART : 2/7/2007 END : 2/12/2007 LOGGE	R :	т. :	Stewart, C. Sump
				STANDARD	SOIL DESCRIPTION	\int_{0}^{∞}	g	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COIL NAME LICOS OPOLID CVARDOL COLOS		SYMBOLIC LOG	DEDTH OF CACING DRIVE INC. DATE
H BE ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		30LI	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
EPT URF			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		SYME	INSTRUMENTATION
22.9				(14)	Silty Sand (SM)	T	<u> </u>	
-					18.5-20.0' - medium dark gray mottled with pale yellowish brown, (N4 with 10YR 6/2), wet, medium	1		-
-					dense, trace fine sand-sized black particles, 15-20%	1		7
-					nonplastic fines, fine silica sand	1		-
-						1		-
						1		
	23.5					1		
				555	Silty Sand (SM) 23.5-25.0' - pale yellowish brown, (10YR 6/2), wet,			SS-5 taken at 15:25
_		1.5	SS-5	5-5-5 (10)	loose, 20-25% nonplastic fines, trace very fine			_
25 <u> </u>	25.0				sand-sized black particles, fine silica sand			
17.9						-		-
_						+		-
-						+		-
_						1		-
-						1		-
_	28.5					1		-
-	20.0				Silty Sand (SM)	1	П	SS-6 taken at 15:43
-		1.5	SS-6	6-5-3 (8)	28.5-30.0' - Same as 23.5-25.0' except trace black laminae	1		-
30	30.0			(0)				_
12.9								_
_						1		_
_						4		-
-						4		-
_						+		-
-	00.5					+		-
-	33.5				Silty Sand (SM)	1	П	SS-7 taken at 15:49
-		1.5	SS-7	3-2-2	33.5-35.0' - pale yellowish brown, (10YR 6/2), wet, very loose, 20% nonplastic fines, fine silica sand,	1		<u> </u>
35	35.0			(4)	trace fine black particles	1		-
7.9						Ţ		
]		
-						1		_
-						1		_
-						+		-
-	38.5				Silty Sand (SM)	+	11	
-		1.5	SS-8	4-5-3	38.5-40.0' - Same as 33.5-35.0' except loose	-		
	40.0	1.5	33-0	(8)		+		-
40	40.0					+	41	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-11 SHEET 3 OF 10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722723.7 N, 457915.1 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten

WATER	LEVELS	: 1.7 ft bo	s on 2/1	1/07 S	TART : 2/7/2007 END : 2/12/2007 LOGGE	R:	T. Stewart, C. Sump		
				STANDARD	SOIL DESCRIPTION	\int_{0}^{∞}	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COIL NAME LICOS OPOLID CVARDOL COLOR	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION			
H BE ACE ATIO		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
EPT URF LEV			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		INSTRUMENTATION		
<u>2.9</u>				(14)		+			
-						1	1		
-						1	1		
-					•	1	1		
-						1	1		
]			
	43.5]			
				6-6-8	Clayey Sand (SC) 43.5-44.5' - light bluish gray to light gray mottled with		SS-9 taken at 16:01		
_		1.0	SS-9	(14)	yellowish gray, (5B 7/1 to N7 with 5Y 8/1), wet,				
45 -2.1	45.0				medium dense, 35-40% high plastic fines, trace fine black particles, very fine to fine silica sand	4	-		
-2.1						┨	-		
_						┨	-		
-						┨			
-						1	1		
_						1	1		
-	48.5				•	1	1		
_					Silty Sand (SM)	1	SS-10 taken at 16:09		
		1.3	SS-10	2-2-3 (5)	\ very loose, 30% low plastic fines, very fine to fine				
50	50.0			(-)	\silica sand \classification Clayey Sand (SC)	¥			
-7.1					\49.0-49.75' - dark gray, (N3), wet, loose, 30-35%	1	_		
_					medium plastic fines, very fine to fine silica sand	4	-		
-						1	-		
_						┨	1		
_						┨	Driller's Remark: 16:15 - 52.5' light rig		
-	53.5					+	chatter of drag bit -		
-					Silty Gravel With Sand (GM)	1	S-11 taken at 16:19		
		1.3	SS-11	8-13-11 (24)	53.5-54.8' - medium dark gray, (N4), wet, medium dense, no HCl reaction, fine to coarse angular gravel,]			
55	55.0			(►7)	appears to be calcite cemented, fine silica sands, 10-15% nonplastic fines, 20% very fine to fine silica	1			
-12.1					sand	1	Driller's Remark: 16:27 switch to 3-7/8" tricone roller bit to continue drilling		
-						1	-		
-						1	1		
-						+	-		
-						+			
-	-c-					+	1		
-	58.5					+	SS-12 taken at 16:35		
-		1.5	SS-12	3-2-3		1	-		
60	60.0			(5)		1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
	- 55.5					†	"		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-11 SHEET 4 OF 10

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722723.7 N, 457915.1 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten

WATER	LEVELS	: 1.7 ft b	gs on 2/11	1/07	START: 2/7/2007 END: 2/12/2007 LOGGER: T. Stewart, C. Sump
				STANDARD	SOIL DESCRIPTION COMMENTS
N (#)	SAMPLE	INTERVA	AL (ft)	PENETRATION TEST RESULTS	O DEPTH OF CACING PRILLING PATE
H BE ACE ATIO		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
-17.1				()	Silty Sand (SM)
-					\ 58.5-60.0' - grayish black to black, (N2 to N1), wet, - loose, 15-20% low plastic fines, organic soil (OH)
					lenses 9/16" thick (black [N1] high plasticity, slow dilatancy), very fine to fine silica sands
l _					unatarity), very fine to fine sinca sarius
-					
-					
-	63.5				Interbedded Silty Sand And Organic Soil (SM-OH)
-		1.3	SS-13	2-2-2	63.5-64.8' - Same as 58.5-60' except 80% silty sand
-	05.0	1.3	33-13	(4)	and 20% organics
65 <u> </u>	65.0				End drilling for 2/07/07 at 17:12 at 65.0'
-					below ground surface
-					1 1
] [
_]
_					-
_	68.5				Start drilling on 2/8/07 at 08:30 Organic Soil (OH) >>>> Driller's Remark: slightly firmer, but no
-		4.5	00.44	8-18-35	68.5-69.0' - brownish black, (5YR 2/1), wet, stiff,
		1.5	SS-14	(53)	\medium plasticity, slow dilatancy, laminated in sharp \ \ _ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \
70 <u> </u>	70.0				Silt (ML)
-					69.0-70.0' - grayish orange, (10YR 7/4), wet, hard, nonplastic to low plasticity, moderate HCl reaction,
-					\laminated over entire interval with black organic beds - (up to 1/16" thick), carbonate
					(sp to 1710 thisty), salsonate
] [
_					
-	73.5				Silt (ML) SS-15 taken at 08:55
-		4.5	SS-15	28-26-42	73.5-75.0' - Same as 69.0-70.0' except yellowish gray
		1.5	55-15	(68)	(5Y 7/2), wet, hard, low plasticity, rapid dilatancy, mild HCI reaction, 5-10% thinly bedded (3/16"-1-3/16"),
75 <u> </u>	75.0				black (N1) organic layers, trace fine black (N1)
-					organic particles in slit, carbonate
-					
-					1
] [
-] [
-	78.5				THE 00 40 to 10 to
-	79.3	0.8	SS-16	24-50/3 (74/9")	SS-16 taken at 09:13
	7 3.3				[<u></u>
80					



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	GSC-11	SHEET	5	OF	10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722723.7 N, 457915.1 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten

NAVATED.						Totally, auto hammer, AVV3 10			ON LOGO
WATER	LEVELS	: 1./ ft b	gs on 2/1		START : 2/7/2007	END: 2/12/2007 SOIL DESCRIPTION	LOGGEF	1 : I.	Stewart, C. Sump COMMENTS
≥ 0€	CANED! -	INTERNI	1 (6)	STANDARD PENETRATION		JOIL DEJUNIF HUN		00	O IVIIVILINI 3
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		TEST BESTILTS I				DEPTH OF CASING, DRILLING RATE,	
H BI ATIC		RECOVE	ERY (ft)		MOISTURI	RE CONTENT, RELATIVE DI	ENSITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND
			#TYPE	6"-6"-6" (N)	CONSISTEN	NCY, SOIL STRUCTURE, M	INERALOGY	SYM	INSTRUMENTATION
-37.1				(14)	Silty Sand Wi	ith Limestone (SM)	1	0,	
-					\ 78.5-79.3' - ye	ellowish gray, (5Y 7/2), we	t, very dense,	1	-
-					mild HCl react	tion, fine to coarse sand-s 25% fine to coarse gravel-	ized, 25% low	1	-
-					limestone frag	gments, 5% organics, carb	onate -	1	-
-							-		-
-							-	1	_
_							-		_
_	83. <u>5</u> 83.7								
_	00.7	0.0	SS-17	50/2 (50/2")	Limestone Fra	ragments noderate yellowish brown,	(10YR 5/4)		SS-17 taken at 09:33
_				(50/2)	mild to modera	rate HCI reaction, two 1/4"	thick		Driller's Remark: Advised driller to begin coring, will use HQ coring assembly -
85	85.0				limestone frag	gments recovered			09:44 begin setting casing using 'devils head'
-42.1					No Recovery	85.0-90.0'			bit for 4" casing
-							-	1	Resume drilling at 16:40
-							-	1	1
-							-	1	1
-			D4 110				-	1	 P4 N
-		0.0	R1-HQ				-	1	R1: No run time recorded
-							-	1	-
-							-	1	-
-							-	1	-
	90.0 90.2						-	┨	-
90 <u> </u>	90.2	0.2	SS-18	50/2	Limestone Fra	ragments	" (5) (7) T	H	SS-18 taken at 16:45
-				(50/2")	1 \ 90.0-90.2' - ye	ellowish gray to moderate Id HCI reaction	yellow, (5Y $7/2$)	┨	-
-					Begin Rock Co	Coring at 90.0 ft bgs		1	-
-					See the next s	sheet for the rock core log	-	1	-
-							·-		-
-							-	1	_
-							-		_
_							-	1	_
-							-		_
I -							-		
95							_]	
-52.1									
]
							-		1
							-		1
							-		1
-							-	1	
-							-	1	1
-							-	1	7
-							-	1	-
100							-	1	
100								\vdash	
L				<u> </u>					



PROJECT NUMBER: BORING NUMBER:

338884.FL GSC-11

ROCK CORE LOG

SHEET 6 OF 11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722723.7 N, 457915.1 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ/NQ tools, HW casing ORIENTATION : Vertical

CORING	IVIL IT IOD AI	ND LC	ZOIFIV	IENT: CME 550X S/N 340253, mud rotary, HQ/NQ tools	, 🗆 ۷ ۷	Casing	ORIENTATION : Vertical
WATER	LEVELS: 1.7	ft bgs	s on 2	/11/07 START : 2/7/2007 END : 2/	12/20	D7 LOGGER: T. Stewart, C. Sump	
	_			DISCONTINUITIES	T.,	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		· ·		SYMBOLIC LOG		
	ĭÃ≿	_	FRACTURES PER FOOT	DESCRIPTION		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
# # # # # # # # # # # # # # # # # # #	N 독표	Q D (%)	<u> </u> 28	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	9	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	LUID LOSS, CORING RATE AND
E 문항	문항	Ω Ω	AC.	PLANARITY, INFILLING MATERIAL AND	₩	AND BOOK MASS	SMOOTHNESS, CAVING ROD
SCE	855	8	FR.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-47.1	90.0					Limestone And Limestone	Start drilling R2-HQ with
¬'''-	00.0		>10		Н		core barrel at 18:00
1					Ш	90.0-91.0' - dusky yellow to light olive	
-					1—		Oriller will flush hole, then
I -					₽	grained, weak to medium strong (R2	attempt to core again, the
1					ш	to R3), 40-50% voids (<1/16") over r	next core run will be R2-
	R2-HQ						HQ
I -	5 ft	0			╨	- dissolution cavities up to 3/8", highly	
I -	20%		NR		₽		The order of samples is as
1							follows: SS-17, R1-HQ,
-					Ш		SS-18, R2-HQ - Driller's Remark: Very little,
-					+		f any circulation loss
1 -					H		R2:3 minutes
95	95.0				Ш		18:15, last run of 2/8/07
-52.1				_	1		Start coring with NQ
-			>10		╂╨┤	 95.0-95.7' - yellowish gray to light 	assembly at 15:50 on
I					Н	olive gray, (5Y 7/2 to 5Y 5/2), fine	2/9/07
1							Oriller's Remark: Hard
-	R3-NQ				Ш		drilling over 95.0-96.0'
-	4 ft	0			HH		nterval
I	18%	-	NR				Recovery for R3-NQ is only
-					Ш		imestone core fragments - rom 1-1/2"-2-1/2", last
-					+		core run of 2/9/07, end
I _					Н		drilling for 2/9/07 at 16:45
1	99.0				Ш		R3:15 minutes
1 -	00.0					- '	Start coring R4-NQ at
I -			>10		₽		09:05 on 2/10/07
100				_	Ш	olive gray, (5Y 7/2 to 5Y 5/2),	
-57.1							nitial recovery from R4-NQ
I -					ш		sample barrel is one 1" -
I -					₽		core fragment, recovery
1	R4-NQ	0			Н		rom NQ drill bit and casing
-	5 ft 20%	U			Ш		s two larger fragments of core and gravel-sized
-	20 /0		NR		╂┼┤		pieces of limestone
1 -					┲╜		Driller's Remark: Switch of
1							drill bit to NQ wireline bit
1 -						No Recovery 100.0-104.0'	Oriller's Remark: It was
I -					₽₽	- c	discovered that a
I _	104.0				\mathbb{H}		conventional NQ drill bit
1 -						is no recie yenermen gray to ngm	nad been in use for the
			1	104.5' - Fracture or bedding plane, horizontal,	Ш	onvo gray, motiou ongritty dantor,	orevious runs –
105_				rough, undulating, tight —	H	(0: :/= 10 0: 0/=),ou.u gruou,	R4:10 minutes
-62.1			1	104.85, 105.0' - Mechanical break (2)	H	strong HCl reaction, weak to medium	l
1 -				105.5' - Fracture, 30 deg, rough, undulating,	\Box	 strong (R2 to R3), highly competent rock, voids up to 1/8" over 25-35% of 	1
-	R5-NQ			dissolution cavities on the surface	\Box	surface, few increasing with depth,	-1
I -	5 ft	28			₽₩	- many dissolution cavities up to	
	40%	20	NR		H	3/8"x3/4", oval-shaped, filled cavities	
1 -	,		INE		\Box	- " ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '	Oriller's Remark: Soft zone
I -					Ш	- filling, fossiliferous (moderately)	at 107.0' for 1.0-1.5'
					\mathbb{H}	molds and casts, trace organics as	l
1 -					$\vdash \vdash$	medium grained black particles	R5:11 minutes
-			3	108.3' - Fracture, 20 deg, rough, undulating,	田	No Recovery 105.5-108.3'	
-	109.0		بنا	open, assumed not a mechanical break	\square	_	_
1				108.45' - Fracture, horizontal, rough, undulating	H		l
110			1	undulating 108.5' - Fracture, 20 deg, rough, undulating			1
110				100.0 - Fracture, 20 deg, rough, unduidting	\sqcap		
							l



PROJECT NUMBER: BORING NUMBER:

338884.FL GSC-11

ROCK CORE LOG

SHEET 7 OF 11

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722723.7 N, 457915.1 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ/NQ tools, HW casing ORIENTATION : Vertical

CORING	NETHOD A	ND EC	אורווטג	MENT: CME 550X S/N 340253, mud rotary, HQ/NQ tools,	Πνν	casing	ORIENTATION : Vertical
WATER	LEVELS: 1.7	ft bgs	s on 2	/11/07 START : 2/7/2007 END : 2/	12/20	D7 LOGGER : T. Stewart, C. Sump	
	_			DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		(C)	DESCRIPTION	SYMBOLIC LOG		
ON A	Z, Z, Z	_	FRACTURES PER FOOT	DESCRIPTION	<u></u>	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
A ACI	SET N	Q D (%)	128	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	9	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
무주짓	RSS:	O C	A P	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
E S E	8필뿝	æ	E E	THICKNESS, SURFACE STAINING, AND TIGHTNESS	S	CHARACTERISTICS	DROFS, TEST RESOLTS, ETC.
-67.1				109.15' - Fracture, horizontal, smooth,	ш	Limestone	
-			>10	undulating, open 1/2"	Н	- 109.0-113.1' - Same as 104.0-109.0'	-
-				110.0-110.3' - Fracture zone, vertical and	₽₩	except many dissolution cavities	l
	R6-NQ	- C	>10	horizontal, tight		1/8"x3/8", 15% voids <1/16" over - surface, light olive color (5Y 5/2)	Driller's Remark: Loose
	5 ft 82%	56	1-10	110.55' - Fracture, <5 deg, rough, undulating, tight	Н	transitions to dusky yellow gray (5Y	drilling at 111.0'
-	0270			111.0-111.4' - Fracture zone, rock fragments	╂╵┤	6/4) mottled with light olive gray (5Y	1
-			1	111.9' - Fracture, 20 deg, black stain, tight -	Ͳ	– 5/2)	1 -
l _				112.85' - Fracture, 10 deg, smooth,	H	_]
				undulating, no infill, black staining	Н	No Recovery 113.1-114.0'	R6:4 minutes
-	4440		NR	and diaming, no minin, black staining	ш	-	1
-	114.0			-	╂┼	Limestone	1 -
-			3		\vdash	- 114.0-119.0' - mottled pale yellowish	4
115			Ĺ	114.5' - Mechanical break, horizontal,	Щ	orange and light olive gray, (10YR	
-72.1				smooth, undulating, tight — 114.6' - Fracture, <5 deg, smooth,	$\vdash\vdash\vdash$	8/6 and 5Y 5/2), fine to medium	7
1 -			>10	undulating, black staining, open 1/2"		grained, moderate HCl reaction,	1 1
-	D7 NO		<u> </u>	114.8' - Fracture, 40 deg, rough, undulating, -	Щ	weak to medium strong (R2 to R3), strongly cemented, 40-50% voids up	-
Ι -	R7-NQ 5 ft	30	3	no staining, open, top of fractured zone at	Н	to 1/16" over rock surface, poorly]
	100%	50		114.8-115.7'		fossiliferous (casts), <1% fine to	
-				116.0' - Mechanical break, horizontal, rough, undulating, tight	Ш	medium grained black particles	1 1
-			4	116.2' - Fracture, vertical, rough, undulating,	H	-	1
-				black staining, open		<u>-</u>	l
			4	116.55' - Fracture, <5 deg, rough, undulating,	ш		R7:6 minutes
-	119.0		1	stains over 1/4"	Н		1
-	113.0			116.8' - Mechanical break, horizontal, - smooth, planar, open 1/8"		119.0-121.4' - mottled pale yellowish	1
-			1	117.0, 117.25, 117.45' - Mechanical break (3)	Н	orange and medium gray and light	1
120_				117.85' - Fracture, 70 deg, rough, undulating —	H	olive gray, (10YR 8/6 and N5 and 5Y	
-77.1				118.1' - Fracture, horizontal, smooth,		5/2), fine to medium grained, weak to	
-			>10	undulating, open	₽₩	 medium strong (R2 to R3), strong HCl reaction on light colored areas, 	1 1
-	R8-NQ			118.2' - Fracture, <5 deg, rough, undulating, open 3/8"	Ш	moderate HCl reaction on darker	Driller's Remark: 121.0-
-	5 ft	20	_	118.6-118.7' - Fracture zone or mechanical	\Box	- colored areas, strongly competent,	122.5' soft
	48%			break	Н	20-30% voids 1/16"x1/16", 5-10%	
1				119.1' - Mechanical break, along bedding	Ш	dissolution cavities 1/8"x1/16", poorly	1
-			NR	plane from drilling	H	- to moderately fossiliferous, casts, 1"	Driller's Remark: Slightly
-			' ' ' `	119.5, 119.6' - Fracture (2), horizontal, rough,	╀┤	section at top is moderate olive brown (5Y 4/4) and moderately to	harder drilling at 122.5'
Ι -				undulating, open 119.9' - Fracture, horizontal, rough, planar,	Ш	- highly fossiliferous (casts)	R8:6 minutes
	124.0			open	$\vdash\vdash$	No Recovery 121.4-124.0'	Driller's Remark: 123.5'
1 -				120.05-121.0' - Fracture zone, rough,	╚	Limestone	slipped down - Started R9-NQ at 14:27
			>10	undulating, open	Ш	124.0-124.6' - yellowish gray, (5Y	- Clarico 113-110 at 14.27
125_				124.0-124.6' - Fracture zone	H	7/2), medium grained, strong HCl	Drillaria Damani Caff at
-82.1			1	124.6' - Mechanical break, horizontal 125.1' - Fracture, <5 deg, rough, undulating, -		reaction, very weak (R1), weakly to moderately competent, voids	Driller's Remark: Soft at 124.0-127.0'
			'	open	Щ	(<1/16") over 75% of surface, 40%	127.0-127.0
-	R9-NQ		3	'	H	fine to medium grained black (N1)	1 1
-	5 ft	31	<u> </u>	126.15' - Bedding plane, rough, stepped, open 1/4"		– particles	1
I -	48%			126.25' - Fracture, horizontal, rough,	ш	124.6-126.4' - light olive brown and	
				undulating, open 1/4"	Н	moderate olive brown, (5Y 5/6 and 5Y 4/4), fine grained, moderate HCl	
1 -			NR	126.4' - Fracture, horizontal, rough,		reaction, weak to medium strong (R2	1
1 -				undulating, open -	ш	to R3), moderately to highly	R9:3 minutes
I -				-	H	fossiliferous (many casts, trace	-
I _	129.0			_		molds), white crystal as partial infill in	l J
				129.0-130.8' - Fracture zone	Ш	cavities (with mild to moderate HCl	
120			>10	-	Ш	<pre>reaction) No Recovery 126.4-129.0'</pre>	1 1
130			<u> </u>		П		_
					\Box		

APPENDIX 2BB-983 Rev. 7



PROJECT NUMBER:

33884.FL BORING NUMBER:

GSC-11 SHEET 8 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722723.7 N, 457915.1 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ/NQ tools, HW casing ORIENTATION : Vertical

CORING	METHODA	ND LC	ZOIFIV	MENT: CME 550X S/N 340253, mud rotary, HQ/NQ tools,	, HVV	casing	ORIENTATION : Vertical
WATER	LEVELS: 1.7	ft bgs	s on 2	/11/07 START : 2/7/2007 END : 2/	12/20	D7 LOGGER : T. Stewart, C. Sump	
	_			DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		m	DESCRIPTION	SYMBOLIC LOG		
O A A	₹ ₹ Z	~	FRACTURES PER FOOT	DESCRIPTION	<u></u>	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
A TIC	SE E, A	Q D (%)	[<u>₹</u> 8	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	9	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
FRE	888	a	AC R	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
SE	898	Ř	E H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	ιχ	CHARACTERISTICS	BROLO, TEOL REGGETO, ETO.
-87.1					ш	Limestone	Consistent medium drilling
-			>10	-	╂┼┤	129.0-132.7' - Same as 124.6-126.4'	-
-				130.8' - Fracture, horizontal, rough,	₽	_	_
	R10-NQ		0	undulating, tight			
	5 ft 74%	26	"	131.0' - Fracture, 60 deg, rough, undulating,	Н		_
-	7 170			tight - 131.65' - Fracture, 40 deg, rough, undulating,	╂╵┤	-	R10:4 minutes
-			0	tight	◫	-	-
l _				132.3' - Fracture, <5 deg, rough, undulating,	H	No Recovery 132.72-134.0'	
			NR	open, fractured from 132.3-132.7'	Н	-	
_	1010		' ' ' '		ш		_
-	134.0			-	╂┼	_ Limestone	-
-			1	134.1' - Fracture, <5 deg, rough, undulating,		- 134.0-137.3' - Same as 124.6-126.4'	_
135			.	open 1-1/2"	Ш	except 25% oblong-shaped	
-92.1				135.0' - Fracture, horizontal, rough,	$\vdash\vdash\vdash$	dissolution cavities (up to 1/4"x1/8"),]
-			>10	undulating, open	ш	- stronger rock at 135.0-135.5' and	
-	D44 NO			- 135.0-135.4' - Mechanical break	ш	_ 136.3-137.3'	-
_	R11-NQ 5 ft	30	>10		Н	_]
	66%	50	' '	top of fractured zone 136.15-136.8',			
_			0	mechanical breaks to 1-1/2" fragments	111		Driller's Remark: Soft at
-				136.8' - Mechanical break, horizontal -	╂┼┤	 No Recovery 137.3-139.0' 	137.0-138.0' -
_				136.9' - Mechanical break		<u>-</u>	
			NR	137.05' - Fracture, vertical, slickensided, stepped -	ш		R11:4 minutes
	139.0			137.3' - Fracture, <5 deg, rough, undulating,	Н		
-	100.0			open		_ Limestone	_
-			>10		Н	- 139.0-139.9' - dusky yellow to light	-
140_				planar, open 1/8", top of fractured zone of	H	olive gray, (5Y 6/4 to 5Y 5/2), fine	
-97.1			1	more friable material, 139.25-139.9' mechanical breaks		grained, mild to moderate HCl	Driller's Remark: Very soft
-				139.25, 139.9' - Mechanical break (2)	₽₩	 reaction, medium strong (R3), trace bedding, voids <1/16" over 10-15% 	from 141.5-143.5' -
-	R12-NQ			140.1' - Fracture, 50 deg, smooth, undulating	Ш	surface on stronger intervals, up to	-
_	5 ft	0		140.3' - Fracture, <5 deg, rough, undulating -		- 45% on more friable intervals,	_
	30%				Н	10-15% black possible organics	
_			NR		Ш	139.9-140.5' - very pale orange	
-				-	H	 mottled medium gray, (10YR 8/2 mottled N5), very fine grained, strong 	-
-				-	╀┤	HCl reaction, weak to medium strong	B12:3 minutos
_				_	Ш	(R2 to R3), bioturbated, moderately	R12:3 minutes
	144.0				\vdash	to highly fossiliferous (mostly casts,	
				·	╚	many molds) up to 1-3/8"	Start R13-NQ at 16:09,
			3	144.4' - Fracture, 10 deg, rough, undulating,	Ш	No Recovery 140.5-144.0' Limestone	ended at 16:14
145_			<u> </u>	open	H	144.0-146.2' - Same as 139.9-140.5'	Drillaria Damari : 440.5
-102.1			>10	144.6, 144.9' - Fracture (2), <5 deg, rough,		except less mottling, highly	Driller's Remark: 146.5- 147.5' were alternating soft
			10	undulating, open 145.2, 145.4' - Fracture (2), horizontal, rough,	Ш	bioturbated, trace very fine to fine	to medium drilling
-	R13-NQ			undulating, open 1/4"	1	organic particles in bioturbated zones	_
-	5 ft	40	4	145.6' - Fracture, <5 deg, grayish brown	世	_ 146.2-148.3' - yellowish gray, (5Y	-
_	86%			(5YR 3/2) stain, tight, 1/8"	ш	7/2), very fine grained, strong HCl reaction, weak to medium strong (R2	
				145.75-146.2' - Fracture zone, limestone	Н	to R3), laminated light olive gray (5Y	
1 7			2	gravel up to 1"x1/2" - 146.2' - Mechanical break, tight	\square	5/2), bioturbated zone at 147.2' (1/2"	Driller's Remark: Hard at
-			2	146.4' - Bedding plane, horizontal, smooth,	Ш	thick) with voids <1/16"	147.5' -
-				undulating, organic infill, tight	H	- No Recovery 148.3-149.0'	R13:5 minutes
	149.0		NR	146.65, 146.8' - Mechanical break (2)		_	
				147.1, 147.35' - Fracture (2), horizontal,	ш	Limestone]
150			>10	smooth, planar, open 1/2"	Ш	- 149.0-149.5' - Same as 146.2-148.3'	1
150					П		_

APPENDIX 2BB-984 Rev. 7



PROJECT NUMBER: BORING NUMBER:

338884.FL GSC-11

SHEET 9 OF 11

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722723.7 N, 457915.1 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ/NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 1.7	ft bgs	s on 2	/11/07 START : 2/7/2007 END : 2/	12/20	D7 LOGGER : T. Stewart, C. Sump	
				DISCONTINUITIES	ß	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A B B B B B B B B B B B B B B B B B B B	JA F. F. F. F. F. F. F. F. F. F. F. F. F.	(%) O	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	5	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
ERY	ORE	Ø	SAC ER F	PLANARITY, INFILLING MATERIAL AND	/MB	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	222	ď	E E	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	,
-107.1			3	148.3' - Fracture, horizontal, rough, undulating, open	Н	Limestone - 149.5-151.9' - light olive brown to	Measured depth of water at 1.7' below ground surface -
Ι.				149.0-149.35' - Fracture zone, limestone	Д	light olive gray, (5Y 5/6 to 5Y 5/2),	on 2/11/07 at 08:30
	R14-NQ		_	gravel-sized fragments to 3/4"x1" 149.35' - Fracture, horizontal, rough,	Ш	fine grained, moderate HCl reaction,	
-	5 ft 86%	37	5	undulating, open	Н	 weak to medium strong (R2 to R3), poorly fossiliferous (casts), trace 	1
-				149.5' - Fracture, horizontal, rough,	Н	voids up to 1/8"	1
-			0	undulating, open 3/16" 149.75' - Fracture, horizontal, rough,	Н	- 151.9-153.3' - Same as 146.2-148.3'	1 1
-			1	undulating, tight	Ш	-	R14:7 minutes
-	4540		NR	149.9' - Fracture, horizontal, rough, undulating, open, top of fracture zone	世	- No Recovery 153.3-154.0'	1
-	154.0			149.9-150.2' - Fracture zone, rock fragments	Н	Limestone	-
			1	to 1"x 1"	Ħ	 154.0-157.2' - moderate yellow to 	-
155 <u> </u>				150.2' - Fracture, horizontal, rough, undulating, tight to open 1/8"		dusky yellow, (5Y 7/6 to 5Y 6/4), fine to medium grained, strong HCl	-
			1	150.3, 150.35, 150.72, 151.0, 151.25, 151.6,	₽	 reaction, weak to medium strong (R2 	-
-	D45 NO			151.75, 151.9' - Fractures (8), horizontal, rough, undulating, tight	П	to R3), ripple laminated in light olive gray (5Y 5/2), alternating parallel	-
-	R15-NQ 5 ft	18	1	153.3' - Fracture, horizontal, rough,	Ш	 intervals of bioturbation, voids up to] -
-	76%			undulating 154.5' - Fracture, horizontal, rough, planar,	Н	1/16" over 5-10% of surface	_
			2	tight	\Box	157.2-157.8' - olive gray, (5Y 3/2),	_
l .				154.6-155.1' - Fracture zone	Н	medium grained, moderate HCI reaction, weak to medium strong (R2	_
			NR	155.5' - Fracture, 80 deg, slickensided, stepped, brown staining, tight	Ш	to R3), voids <1/16" on 50-70% of	R15:5 minutes
	159.0			156.85, 157.0, 157.6' - Fractures (3),	ш	surface, trace dusky yellow (5Y 6/4)	1
-				horizontal, rough, undulating, open	Н	 discoloration No Recovery 157.8-159.0' 	1
160			2	159.4, 159.5' - Fractures (2), rough, undulating, open 1/8"	H	Limestone	1
-117.1				andulating, open 170	ш	— 159.0-162.5' - dusky yellow to moderate olive brown, (5Y 6/4 to 5Y	_
-			1	-	Н	4/4), fine to medium grained,	1 1
-	R16-NQ			160.9, 161.0, 161.1' - Bedding plane (3), <5	Ш	 moderate to strong HCl reaction, weak to medium strong (R2 to R3), 	1
-	5 ft 92%	56	7	deg, rough, undulating, tight 161.2, 161.3' - Fracture or mechanical break	ш	voids (<1/16") over 30-40% of	1
-	. 32/0			(2), horizontal, rough, undulating, tight	Н	 surface, dissolution cavities up to 3/8"x3/4" on 5% of surface, white 	1
-			5	161.5, 161.6, 161.7, 162.0, 162.1, 162.2' - Bedding plane (4), horizontal, rough, planar,	Ħ	mineral infill, some cavities	-
-				tight	Ш	 162.5-163.6' - very pale orange and 	R16: No run time recorded
-			0	162.6' - Bedding plane, horizontal, rough, undulating	H	mottled medium light gray, (10YR 8/2 and N6), strong HCl reaction, weak	-
-	164.0		NR	162.7, 163.0' - Mechanical break (2)	口	 to medium strong (R2 to R3), highly 	Driller's Remark: Driller
-	 R17-HQ			163.45' - Fracture, horizontal, rough, undulating, tight, open 1/8"	\Box	fossiliferous (very small <1/16" molds/casts)	switch to HQ core -
165_ -122.1	2 ft	0	NR	undulating, tigrit, open 1/0 —	H	No Recovery 163.6-164.0'	assembly and used a 2.0' stake on core run
-122.1	0%				H	No Recovery 164.0-166.0'	R17:1 minute –
_	166.0			-	Н	<u></u>]
-			2	_	Щ	Limestone - 166.0-166.9' - moderate olive brown]
_				166.65' - Bedding plane, horizontal, rough,	Д	and light olive gray, (5Y 4/4 and 5Y]
_]		>10	undulating, open 166.9' - Bedding plane, horizontal, smooth,	Н	6/1), fine grained, strong HCI reaction, strong (R4), 30-40%]
				planar, open	F	medium grained medium gray (N5)]
	R18-HQ		>10	166.9-171.0' - Mechanical break, horizontal, smooth, planar, highly competent limestone	H	particles, poorly fossiliferous (few casts), laminations at 166.0']
	5 ft 70%	16	- 10	intervals, related to drilling	Н	– casis), iaitiiilaiiotis at 100.0] 1
-			>10		П		1
170	1			-	囯		1
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					oxed		



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-11 SHEET 10 OF 11

ROCK CORE LOG

ORIENTATION : Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722723.7 N, 457915.1 E (NAD83)

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ/NQ tools, HW casing

				ILIVI . CIVIL 330X 3/14 3-0233, mild rotary, rig/ing tools,				ORIENTATION: Vertical
WATER	LEVELS: 1.7	ft bgs	on 2		12/20	007		,
>	<u> </u>			DISCONTINUITIES	U	L	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	L0G	Г	ROCK TYPE, COLOR,	
照원호	N 4 8	(9)	FRACTURES PER FOOT		SYMBOLIC	П	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
I ∃X¥	SEE	(%) O	FS	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	8	П	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
교공교		Ø	RA(PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	≥	П	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	OIR	ď	шД	THIORNESS, SON AGE STAINING, AND HOTTIVESS	ဟ	上	CHARACTERISTICS	
-127.1			NR		Н	4	Limestone	R18: No run time recorded
-	1,740			-	ҥ	╁	166.9-169.5' - moderate olive brown,	1
-	171.0			-		1	(5Y 4/4), medium to coarse grained, strong HCl reaction, weak (R2),	-
I -			1	_	\vdash	┺	5-10% powder white mineral infill in	
			'	171.7' - Mechanical break, horizontal,	Н	1	voids and cavities, 166.9-167.2' and	
1 -				undulating, 1/4" x 5/16" relief, fossil molds		1	167.6-168.0' is olive gray (5Y 6/1),	1
-			3	exposed on surface -	╙	╁	fine matrix, microlaminated	-
-				172.2' - Fracture, horizontal, smooth,	Н	╁	No Recovery 169.5-171.0'	-
l _	R19-HQ 5 ft		2	undulating		1	Limestone 171.0-171.9' - yellowish gray, (5Y	
-	100%	56		172.4' - Fracture or mechanical break, <5 - deg	ш	-[7/2), medium to coarse grained,	1
-	100,0			172.5, 172.9, 173.6' - Bedding plane (3),	\vdash	+	strong HCl reaction, weak to medium	-
-			2	horizontal, rough, undulating, open 3/16" -	亡	1	strong (R2 to R3), 10-20%	-
175_				174.1' - Mechanical break or fracture, 70 deg,	\vdash	Ł	dissolution cavities up to 9/16"x3/8",	
-132.1			[rough, undulating	\vdash	1	up to 35% medium gray (N5)	R19:8 minutes
1 -	1700		2	175.1' - Mechanical break, horizontal, rough, -	广	1	coarse-sized grains, poorly fossiliferous (trace casts), sharp] - 1
-	176.0			undulating, irregular 175.3' - Mechanical break, horizontal, rough,	Ш	╁	contact	-
I -			2	undulating -	ҥ	╁	171.9-176.0' - yellowish gray, (5Y	
			_	175.4' - Bedding plane, horizontal, rough,		1	7/2), fine to medium grained,	
-				undulating, open 1/8"x3/16"	╙	╌	moderate HCl reaction, weak to	1
-			4	176.4-176.6' - Fracture, horizontal, rough,	Н	╁	medium strong (R2 to R3), very	l -
l -				clay/gravel interbed, clay infill		1	poorly fossiliferous (trace casts), fine bedding laminations (1/16"x3/16")	_
	R20-HQ		4	177.0, 177.1' - Fractures (2), horizontal, rough, undulating, clay infill	ш	-	visible on fresh broken face	
	5 ft 96%	32	1	177.8' - Fracture or mechanical break, 70	h	Т	176.0-180.8' - Same as 171.9-176.0'	1
-	1 00%			deg, rough, undulating, closely spaced -		1	except rippled laminations are visible	1
-			7	fracture _	₽	╀	over 179.0-180.5'	-
180_				178.6' - Fracture, 45 deg, rough, undulating	ь	L	_	
-137.1			5	179.0' - Mechanical break, horizontal, rough, undulating	Ė	1		R20: No run time recorded
1 -	104.0			179.2, 179.3, 179.35' - Bedding plane (3),	╙	╁		1
-	181.0		NR	horizontal, rough, planar to undulating	一	╊	No Recovery 180.8-181.0'	
I -			4	179.6' - Mechanical break, 10-15 deg, clean, _		1	Limestone	
			•	tight	Н	-	181.0-185.0' - Same as 171.9-176.0'	
-				179.7, 179.85' - Fracture (2), horizontal,	H	┲		1
-			3	rough, planar, dark brown staining 180.0' - Mechanical break, 0-5 deg,	F	1		-
-				undulating, clean	₽	╀		-
	R21-HQ	48	0	180.1, 180.3' - Bedding plane (2), horizontal,	厂	1		
1	5 ft 90%	+0	١	rough, brown staining	F	1]
1 -				180.6, 180.7' - Fractures (2), horizontal,	╨	╁		1
-			6	rough, undulating, slight staining, no infill 181.2' - Fracture, fragmented limestone		1		-
185_				181.2 - Fracture, fragmented limestone 181.5, 181.6, 181.7' - Fracture (3), —	F	┺	_	l
-142.1			5	fragmented limestone, horizontal planar	\vdash	1	Limestone	R21: No run time recorded
1	186.0		NR	breaks	Ш	1	Limestone 185.3-185.5' - dark brown,	1
-	100.0			182.0' - Bedding plane, horizontal, rough,		+	fossiliferous surface. voids on >60%	
1 -				planar, slight brown staining on fracture	1	1	of surface, molds and casts	-
				182.5' - Fracture, rough, horizontal partings, cavity-rich limestone breaks (fragmented)			No Recovery 185.5-186.0'	
1 -				182.7' - Fracture, rough, irregular break		Γ	Bottom of Boring at 186.0 ft bgs on	1
1 -				184.0' - Bedding plane, horizontal, smooth	1	H	2/12/2007	-
-				184.05, 184.45, 184.50, 184.6' - Bedding -	1	F		-
I -				plane (4), horizontal, smooth	1	L		l J
1 -				184.95, 185.0, 185.05, 185.1' - Bedding plane		Γ]
1 -				(4), horizontal, smooth, fine spaced (3/8"x7/8")	1	r]
-				- (O/O X//O)	1	F		-
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	GSC-11	SHEET	11	OF	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722723.7 N, 457915.1 E (NAD83)

CORING METHOD AND EQUIPMENT : CME 550X S/N 340253, mud rotary, HQ/NQ tools, HW casing

ELEVATION: 42.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Orlando, FL; Driller: D. Patten

WATER	LEVELS: 1.7	ft bgs	on 2/	11/07 START : 2/7/2007	END : 2/1	2/20	07	LOGGER: T. Stewart, C. Sump	
≥0₽	(%			DISCONTINUITIES		စ္ခ		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION		SYMBOLIC LOG		ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE	E RU STH, OVEF	R Q D (%)	FOOT	DEPTH, TYPE, ORIENTATION, ROUG PLANARITY, INFILLING MATERIA	GHNESS,	30LJ		MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND
LEV.	ORE	g	RAC ER F	PLANARITY, INFILLING MATERIA THICKNESS, SURFACE STAINING, AND	L AND TIGHTNESS	YME		AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ООШ	075	œ	шФ			S	_	OHAIWOTEMOTIOS	
1 -				185.3' - discontinuity with much more void/fossil-rich limestone, dark brow	vn/yellow -		ŀ		-
				color 185.5' - end of run	-		ŀ		-
1 4				185.5 - end of run			L		_
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PROJECT NUMBER: BORING NUMBER: 338884.FL **GSC-12** SHEET 1 OF 10

SOIL BORING LOG

LOGGER: C. Wallested

ORIENTATION: Vertical

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1722835.8 N, 458289.6 E (NAD83)

START: 5/16/2007

ELEVATION: 41.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

END: 5/19/2007

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-7/8" tri-cone bit

WATER LEVELS: 3.5 ft bgs on 05/17/2007 SOIL DESCRIPTION COMMENTS STANDARD LOG DEPTH BELOW SURFACE AND ELEVATION (#) PENETRATION TEST RESULTS SAMPLE INTERVAL (ft) SYMBOLIC SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, RECOVERY (ft) DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY #TYPE 6"-6"-6" (N) 41.0 0.0 Topsoil 0.0 - 0.21-3-3 SS-1 1.2 (6) Poorly Graded Sand (SP) 0.2-1.15' - grayish orange to moderate yellowish 1.5 brown, (10YR 7/4 to 10YR 5/4), moist, loose, 5% nonplastic fines, trace organics, fine silica sand Driller's Remark: Material at 5.0-5.65' started at 3.0' below ground surface 5.0 36.0 Clayey Sand (SC) 5.0-5.65' - light olive gray, (5Y 6/1), moist, loose, very 3-3-3 0.7 SS-2 fine to fine silica sand, 40-45% high plastic fines, (6) trace fine gravel (possible concretion) 6.5 10 10.0 Silty Limestone Gravel With Sand (GM) 31.0 Driller's Remark: Lost circulation at 10.0' 10.0-10.4' - yellowish gray, (5Y 8/4), wet, medium below ground surface 3-13-6 0.4 SS-3 dense, strong HCI reaction, fine to coarse Driller mixed thick mud, regain circulation (19)gravel-sized limestone, composed of mostly (<75%) 11.5 fossil cast and molds (possible shell hash coquina), 35-40% fine to coarse sand sized (similar to limestone), 15% nonplastic to low plastic fines, carbonate material 15 15.0 Silty Limestone Gravel With Sand (GM) 32-50/4.5 SS-4 0.8 15.0-15.8' - Same as 10.0-10.4' except moderately (82/10.5") 15.9 fossiliferous with 3/4"x3/16" size casts over 10-15% of Driller's Remark: Light chattering at 15.8' the rock surface, light olive brown (5Y 5/6) staining on below ground surface some face 20



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	GSC-12	SHEET	2	OF	10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722835.8 N, 458289.6 E (NAD83)

ELEVATION: 41.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-7/8" tri-cone bit

,						y, cathead, NW rods, 4-7/8" t		2.0	ORIENTATION: Vertical
WATER	LEVELS	: 3.5 ft bo	gs on 05/ ⁻		START : 5/16/2007	END: 5/19/2007 SOIL DESCRIPTION	LOGGE	1 : C.	Wallested COMMENTS
≷Q≆ I	CAMPIE	INTERVA	1 (4)	STANDARD PENETRATION		GOIL DEGUNIF HON		00	OCIVIIVILIVIO
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAIVIPLE	INTERVA	` '	TEST RESULTS	SOIL NAME.	, USCS GROUP SYMBOL, C	OLOR,	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H B		RECOVE	RY (ft)		MOISTURE (CONTENT, RELATIVE DENS	SITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND
E-N			#TYPE	6"-6"-6" (N)	CONSISTENC	Y, SOIL STRUCTURE, MINE	:HALUGY	SYM	INSTRUMENTATION
21.0	20.0			(14)	Silty Sand (SM)			ΠĪ	
-		1.2	SS-5	8-12-12	20.0-21.15' - yell	lowish gray, (5Y 8/1), wet,	medium -		-
-	0.4 5	'	000	(24)		to fine silica sand, trace fir 20% nonplastic fines, mod			-
-	21.5					onate material, 1" thick bed	of sandy	ł	-
-					\fat clay at botton	n or sample		┨	-
-							-	┨	-
-							-	ł	-
-							=	1	-
-							-	1	-
							-	1	-
25 16.0	25.0				Sandy Silt (ML)			Ш	
-		1 5	SS-6	5-4-19	25.0-26.15' - yell	lowish gray, (5Y 8/1), wet,		$\ \ $	-
-		1.5	33-6	(23)	low plasticity, rap	pid dilatancy, strong HCl re se carbonate sand, 1" thicl	eaction, k dark —	Ш	-
-	26.5				-∖ greenish gray (5	GY 4/1) and 2-1/2" thick da	ark /_	ш	-
-					yellowish orange and 25.95' respe	e (10YR 6/6) fat clay lenses	s at 25.0'	┨	=
-					Silt (ML)	•		┨	=
-						ry pale orange, (10YR 8/2), ty, rapid dilatancy, moderat		\blacksquare	-
-					HCl reaction, car		e to strong	\mathbf{I}	-
-							-	$\left\{ \right\}$	-
-							-	┨	-
30 11.0	30.0				Sandy Silt With	Limestone Fragments (M		НП	_
-		0.7	SS-7	46-50/5.5 (96/11.5")	30.0-30.7' - gray	rish orange, (10YR 7/4), we	et, hard, -	Ш	-
-	31.0			(00,1110)	nonplastic, rapid	I dilatancy, moderate HCl r se sand sized, 10-15% fine	eaction, /_	\blacksquare	-
-						fragments, carbonate mate		1	-
-							-	\blacksquare	-
-							-	┨	-
-							-	1	-
-							-	$\left\{ \ \ \right\}$	-
-							-	$\left\{ \ \ \right\}$	-
							-	1	-
35 6.0	35.0				Sandy Silt And	l imestone (MI \		\prod	_
5.0 -			SS-8	5-9-16	35.0-35.8' - Sam	ne as 30.0-30.7' except yell	owish gray,	$\ \ $	-
-		8.0	აა-გ	(25)	(5Y 7/2), very sti	iff, 1-1/4" limestone fragme	ents	T '''	-
-	36.5				ł		-	1	Driller's Remark: 36.5' below ground surface:
-							-		hard rock
-							-		-
-							-		-
-							-	-	-
-							-	-	-
-							-	1	-
40								\vdash	
$ldsymbol{le}}}}}}}}$		<u> </u>	l		L				



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	GSC-12	SHEET	3	OF	10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722835.8 N, 458289.6 E (NAD83)

ELEVATION: 41.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT: CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-7/8" tri-cone bit

DITTELLIN	G IVIL II IV	JD AND	LQUIFIVII	_INT . CIVIL 330 3	/N 1000/3, muu rotary	y, cathead, NW rods, 4-7/8				NIATION: Vertical
WATER	LEVELS	: 3.5 ft bo	gs on 05/	17/2007	START : 5/16/2007	END: 5/19/2007	LOGGE	R : 0	Vallested	
>				STANDARD		SOIL DESCRIPTION		_ c	COMMEN	NTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	0011 1111	11000 0D011D 0144D01	001.00	SYMBOLICLOG	DEDTIL OF GAGING	DU 1 110 DATE
품발은		RECOVE	RY (ft)			, USCS GROUP SYMBOL, CONTENT, RELATIVE DEI			DEPTH OF CASING, I DRILLING FLUID LOS	
FPT EVA			#TYPE	6"-6"-6"		Y, SOIL STRUCTURE, MIN		MB	INSTRUMEN	
E SE				(N)				Ć.		
1.0	40.0			15 00 41		And Limestone (ML) xy yellow, (5Y 6/4), moist	hard	411	Driller's Remark: Lost 10 40.0' below ground surfa	
l _		0.9	SS-9	15-22-41 (63)	nonplastic, rapid	dilatancy, moderate HC	I reaction,	Щ	and regained circulation	_
	41.5			` /		oarse sand-sized, 10% f estone fragments, carbor				
					dark (possible or	rganic) 1/4" thick layer at	40.45',	1		
-					vellowish grav (5	SY 8/1) limestone fragme to SS-3 and SS-4)	nt at top of	1		1
-					sample (similar t	10 55-3 and 55-4)		1		_
-								1		-
-								1		-
-								1		=
15	4E 0							1		-
45 -4.0	45.0				Silt With Sand (I	ML)	_	╫		
-		1.2	SS-10	14-15-26	45.0-46.2' - yello	wish gray, (5Y 7/2), wet,				-
-		1.2	33-10	(41)	plasticity, rapid d	dilatancy, moderate to str ne to coarse sand-sized,	ong HCI trace fine	Ш		-
-	46.5				gravel-sized lime	estone fragments, carbor	nate material /	-		-
-								┨		-
-								4		=
_								4		-
_								4		-
-								1		_
_								1		_
50	50.0						_	1		
-9.0				00 10 00	Limestone Frag	ments erate yellowish brown, (1	IOVR 5/4)	丗		
_		1.3	SS-11	22-18-23 (41)	moderate HCl re		101111 3/4),]		
_	51.5			. ,	Silt With Sand (I		IOVD E(4)	╨		
					wet, hard, low pla	erate yellowish brown, (1 asticity, rapid dilatancy, s	strong HCl			
					reaction, 20% fin	ne to coarse sand-sized,	trace fine	1		
_					gravei-sized lime organic), 1/4" thi	estone fragments, dark (p ck laver at 50.8'	possible	1		
-					(5.955),			1		_
								1		7
-								1		-
55	55.0							1		-
-14.0	55.0				Silt With Sand (I			†π		_
-		1.5	SS-12	34-39-49	55.0-56.5' - Sam	e as 50.2-51.3' except in limestone with depth to	ncrease in	1		-
-	56.5			(88)	dark (possible or		10 /0, 11 aut	1		-
-	50.5					<u> </u>		╁	Driller's Remark: End of	
-								1	below ground surface or	5/16/07 at 17:00 -
-								1	On 5/17/07 at 08:03, wat below ground surface; at	er rever is at 3.5" : 08:15, begin
-								1	cleaning hole and circula	
-								-		-
-								-		=
-								-		-
60							_	+		
								\perp		



PROJECT NUMBER:	BORING NUMBER:		
338884 FI	GSC-12	CHEET	4 OF 10

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722835.8 N, 458289.6 E (NAD83)

ELEVATION: 41.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

DRILLING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, cathead, NW rods, 4-7/8" tri-cone bit

					·	END : 5/10/2007			Mallanta d
WATER	LEVELS	. 3.5 II DO	gs on 05/ ⁻		START : 5/16/2007	END: 5/19/2007 SOIL DESCRIPTION	LUGGER	1 : C.	Wallested COMMENTS
30₽				STANDARD PENETRATION		SOIL DESCRIPTION		g	COIVIIVIEN 13
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		PENETRATION TEST RESULTS	SOII NIVA	E, USCS GROUP SYMBOL	COLOR	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
A S S S S S S S S S S S S S S S S S S S		RECOVE	RY (ft)		MOISTURE	CONTENT, RELATIVE DE	NSITY OR	Ω	DRILLING FLUID LOSS, TESTS, AND
PTT PRF			#TYPE	6"-6"-6"	CONSISTEN	CY, SOIL STRUCTURE, MI	NERALOGY	YME	INSTRUMENTATION
-19.0	22.2			(N)	Oile Wiele O	1 /BAL \		Ś	
-19.0	60.0			24-27-38	Silt With Sand 60.0-61.4' - Sar	⊓(ML) .me as 50.2-51.3' except o	dark vellowish -	Ш	_
I _		1.4	SS-13	(65)	orange, (10YR	6/6), dark organic layers	at 60.8',	Ш	_
	61.5			` /	61.15', and 61.2	25'		Ш	_
							-	1]
_							-	1	1
-							-	1	-
-							-	ł	-
-							-	ł	-
-							-	1	-
-							_	4	_
65	65.0							.	_
-24.0				44 47 45	Sandy Silt (ML	-) .me as 50.2-51.3' except (aravich -	Ш	_
		1.3	SS-14	41-47-45 (92)	orange, (10YR	7/4), 30-35% fine to coar	se sand-sized		
	66.5			(02)	limestone, trace	e dárk (possible organic)	mottling	Ш]
-					throughout			1	1
-							-	1	
-							-	1	-
-							-	ł	Driller's Remark: Increase in hardness of
-							-	ł	material at 68.0' below ground surface -
-							-	ł	-
_							-		-
70	70.0 70.3	0.1	00.45	F0/0					_
-29.0	70.3	0.1	SS-15	50/3 \ (50/3") /	Limestone Fra	agments oderate yellowish brown, (10YR 5/4)		
				(00/0)	moderate HCl r	reaction			_
							_	1	
-							-	1	1
-							-	1	1
-							-	1	-
-							-	ł	-
-							-	ł	-
-	75.0						-	ı	-
75 <u> </u>	75.1	0.1	SS-16	50/2	Limestone Fra	gments	7		
-34.0				(50/2")	\75.0-75.05' - Sa	ame as 70.0-70.1'		1]
_					Begin Rock Co See the next sh	oring at 75.0 ft bgs heet for the rock core log	<u>-</u>		_
					000 110 110/110/110	neot for the rook core log	_		_
							_		
1 7							-	1]
1 7							-	1]
-							-	1	
-							-	1	
-							-	1	-
-							-	ł	
80								\vdash	-
								1	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-12

SHEET 5 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722835.8 N, 458289.6 E (NAD83)

ELEVATION: 41.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing

CORING	IVIL IT IOD AI	ND EC	אורוע	MENT: CME 550 S/N 1860/3, mud rotary, NQ tools, HW	casing	<u> </u>	ORIENTATION: Vertical
WATER	LEVELS: 3.5	ft bg	s on 0	5/17/2007 START : 5/16/2007 END : 5/	19/200	7 LOGGER : C. Wallested	
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
		(%	FRACTURES PER FOOT		음	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
TH VAT	1 H 1 H 1 H 1 H 1 H 1 H 1 H 1 H 1 H 1 H	(%) _Q	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BO	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
92,9		S O	RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	75.0	ш	ш. ш	1, 11, 11	0)		Designated assignant 751
-34.0	75.0		4	75.15, 78.15, 78.55, 78.65, 78.8' - Bedding	Ш	Limestone - 75.0-79.4' - moderate yellowish	Begin rock coring at 75'
_			·	plane (5), horizontal, smooth, undulating, tight	Ш	brown, (10YR 5/4), fine to medium	<u> </u>
				75.6' - Bedding plane or mechanical break,	Н	grained, moderate to strong HCl	
-			3	10 deg, smooth, undulating, open 1/2"		 reaction, extremely weak to weak (R0 to R2), up to 1/8" voids cover 	-
-	R1-NQ			75.7' - Fracture, 80 deg, smooth, undulating,	₩	15-40% of surface, up to 3/16"x3/8"	-
-	5 ft	43	2	tight 75.95' - Bedding plane, horizontal, smooth,	ш	 fossil casts, up to 3/16" thick dark 	-
_	88%			planar, tight	Н	(possible organic) lamination, voids	_
			4	76.1' - Fracture, vertical, smooth, undulating,		cover 40% of surface below 78.3' with trace grayish hard infill to 9/16"	
_			4	tight, vertical from 75.6-76.55'	ш	diameter, trace <9/16" cavities]
-	1		0	76.55' - Bedding plane, horizontal, smooth, undulating, tight	ш	throughout the core	R1:7 minutes
-			NR	76.85' - Mechanical break or fracture, 40 deg,	仠	No Recovery 79.4-80.0'	-
-39.0	80.0		1417	smooth, undulating, tight	╂╫	Limentone	_
-39.0			>10	77.2' - Fracture, 70 deg, smooth, undulating,	Щ	Limestone - 80.0-81.25' - Same as 75.0-79.4'	-
			L	tight 77.35' - Fracture, 30 deg, smooth, undulating,	Н	except 3/4" thick brownish black	
_			>1	tight		(5YR 2/1) fat clay at 80.25-80.3'	
_				80.0-80.25' - Fracture zone, fragments to	111	- No Recovery 81.25-85.0'	1
-	R2-NQ			1"x1-1/2" 80.25-80.3' - Clay seam, clay layer or infill	ш	_	-
_	5 ft	10		80.3' - Bedding plane, horizontal, smooth,	+	_	-
_	25%			planar, in contact with clay layer or infill		_	_
			NR	80.55' - Mechanical break or bedding plane,	ш		
_				horizontal, smooth, stepped, tight 81.0-81.25' - Fracture zone, fragments to	Ш	_	
-				1-3/4"x2"	\Box	-	R2:3 minutes
-					Н	_	-
85 <u> </u>	85.0			_	ш	Limestone	_
-			2	85.4, 85.6, 86.3, 86.6, 86.8, 87.0' -	Н	- 85.0-88.7' - moderate yellowish	-
_				Mechanical break (6), rough, undulating,		brown, (10YR 5/4), medium to	_
				associated with cavities, open 1/4"-2"	Н	coarse grained, moderate to strong	
_	1		3		ш	 HCl reaction, extremely weak to weak (R0 to R2), voids (up to 1/8") 	1
-	R3-NQ				Н	cover 25% of surface, moderately	-
-	5 ft	73	1		口	fossiliferous (casts and molds up to	-
-	100%				₽₩	3/16"-3/8"), 2"x1-3/8" cavities over 10% of surface, percentage of voids	-
_			0		Ш	- coverage decreases with depth	
			Ľ		H	88.7-90.0' - moderate yellowish	
_						brown, (10YR 5/4), medium to	R3:6 minutes
90	000		1		144	coarse grained, strong HCl reaction,	1
-49.0	90.0			89.8' - Fracture, 60 deg, smooth, undulating, —		weak to medium strong (R2 to R3), up to 1/8" voids cover 15% of	_
-			0	tight	仠	- surface, up to 3/8"x3/16" trace fossil	-
_					\vdash	_ casts, trace organic matter	_
			4		Щ	90.0-92.5' - Same as 88.7-90.0' - except trace cavities up to	
_			1	91.65' - Bedding plane, horizontal, smooth,	\mathbb{H}	except trace cavities up to 1-3/16"x2", fossiliferous material with	1
_	R4-NQ			planar to stepped, tight	口	casts up to 3/8"x3/4", up to 2"x2-3/4"	1
-	5 ft	85	2	92.05' - Mechanical break, 10 deg, smooth,	╀┦	- trace infill	-
-	97%		<u> </u>	undulating, tight 92.8' - Fracture (2), 85 deg, smooth,	田	92.5-94.85' - grayish orange, (10YR 7/4), fine to medium grained, strong	-
_			1	undulating, intersecting, tight	H	- HCl reaction, weak to medium strong	-
			Ľ.	93.5' - Fracture or mechanical break, 10 deg,		(R2 to R3), voids (up to 1/16") cover	
			>3	smooth, undulating, tight 94.2' - Fracture, 70 deg, smooth, undulating,	Ш	5-15% of surface, trace dark	R4:11 minutes
95	95.0		Ĺ	tight	\Box	 (possible organic) material, carbonate material 	-
95_	90.U				$+ \exists$		_
	ı				\perp		<u> </u>



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-12 SHEET 6 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722835.8 N, 458289.6 E (NAD83)

ELEVATION: 41.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing ORIENTATION : Vertical

WATER	LEVELS: 3.5	ft bgs	s on 0	5/17/2007 START : 5/16/2007 END : 5/	19/2007	7 LOGGER : C. Wallested	
	_			DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
표원한	N 4.8	(%	FRACTURES PER FOOT		음	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
H Ä Ä	1 H 1 H 1 H 1 H 1 H 1 H 1 H 1 H 1 H 1 H	Q D (%)	L F	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	<u>B</u>	WEATHERING, HARDNESS,	SMOOTHNESS, CAVING ROD
92		a	'RA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	ĕ	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-54.0	016	ш.	NR/		0)		
-54.0			1	94.5-94.55' - Fracture zone 95.05' - Bedding plane or mechanical break,	₽	No Recovery 94.85-95.0' Limestone	_
				<10 deg, rough, undulating, tight	Щ	95.0-99.1' - grayish orange, (10YR	
I -					Н	7/4), fine to medium grained, mild to	
-			0		口	moderate HCl reaction, weak (R2), voids (up to 3/16") cover 5-25% of	-
-	R5-NQ			97.0' - Fracture, 80 deg, smooth, undulating,	╁┼┼	the surface, trace dark (possible	Driller's Remark: Very
l -	5 ft	60	>3	tight	毌	organic) mottling, extremely weak	crumbly feeling between -
l _	82%			97.2' - Bedding plane, horizontal, smooth,	₽	(R0) at 97.4-98.05', fossil casts (up	97.0-98.5' below ground
			4	planar, tight 97.75-97.85' - Fracture zone, fragments to 2"		to 3/8") over 5-10% of surface	surface; soft
			4	98.0' - Fracture or mechanical break, 45 deg,	ш		_
_	1		0 /	rough, undulating, open to fracture zone	丗	No Recovery 99.1-100.0'	R5:7 minutes
-			NR	98.15' - Bedding plane, <10 deg, smooth,	╁		-
100 <u> </u>	100.0			undulating, dark stain on one face, open 1/2"	╚	Limestone	
			2	<10 deg, smooth, undulating, tight	₽₽	100.0-104.9' - Same as 95.0-99.1'	_
I _				98.8' - Fracture, 50 deg, rough, undulating	ҥ	except no extremely weak (R0) zone	_
				100.85' - Fracture, 20 deg, smooth, undulating to planar, tight	\Box		
-	1		3	100.95' - Fracture, 70 deg, smooth,	⇈		_
-	R6-NQ			undulating to planar, tight, intersects fracture	団		-
-	5 ft	68	2	at 108.5'	╁┼┼		_
-	98%			101.8' - Fracture, 40 deg, smooth, undulating, tight	₽		_
l _			3	101.9' - Fracture, 70 deg, smooth, undulating,	Н		_
			0	tight	Ш		
-			_	102.0' - Fracture, 20 deg, smooth, undulating,	Н		R6:8 minutes
105	105.0		>2	tight 102.35' - Bedding plane, horizontal, smooth,	⇈		-
105_ -64.0	105.0		NR)	undulating, tight —	╀	No Recovery 104.9-105.0'	
-			>10	103.1' - Fracture, 65 deg, smooth, undulating,	毌	Limestone	Driller's Remark: Soft
_				tight 103.45' - Fracture, 10 deg, smooth,	╀	105.0-108.75' - Same as 95.0-99.1 except moderate HCl reaction,	between 105.5-106.5' and
l _			>2	undulating, tight	Ш	extremely weak (R0) zone at	107.0-108.0'
			/2	103.7' - Fracture, 20 deg, smooth, undulating,	ш	105.3-105.65' and 106.85-107.35'	
-	R7-NQ			tight 104.4-104.55' - Fracture zone, fragments to	\Box		-
-	5 ft	26	>3	1"x2"	╁		-
-	75%			104.55' - Fracture, 30 deg, smooth,	ᡛ╬		-
-			3	undulating, tight, open to fracture zone	₽		_
-				104.8' - Fracture, 80 deg, rough, undulating, tight	₽	No Recovery 108.75-110.0'	
			NR	105.0-105.4' - Fracture zone, fragments to	\square	-	R7:6 minutes
110	110.0			1-1/2"	Щ		End of day on 05/17/2007
-69.0				105.4' - Bedding plane or mechanical break, — 20 deg, smooth, undulating, open to fracture	口	Limestone	at 17:10 — Begin coring on 05/18/2007
-			2	zone	╁┼┼	110.0-115.0' - Same as 95.0-99.1'	at 08:28
-				105.8' - Fracture, 20 deg, smooth, undulating,	₽	except extremely weak (R0) zone at 110.8-111.3', 103.6-104.8' depth	-
_			2	tight	₽	intervals, trace dark (possible	_
_				105.9' - Fracture, 30 deg, smooth, undulating, tight to open 1/2"	Щ	organic) lamination, mild HCl	_
Ι -	R8-NQ			106.45' - Fracture, 20 deg, smooth,	Н	reaction in weak (R2) zone,	
-	5 ft 100%	60	1	undulating, tight to open	⇈	moderate HCl reaction in extremely weak (R0) zone	_
-	100 /0			106.55' - Fracture, 60 deg, rough, undulating, tight to open	╁┼┼	110011 (110) 20110	-
-			3	106.85-107.35' - Fracture zone, fragments to	╁		Driller's Remark: Soft
1				1/2"	\Box		between 113.5-114.5'
-			2	107.75-107.95' - Fracture zone, fragments to	Ш		R8:7 minutes
115	115.0		_	1"x2"	Ш		
115	115.0			1 XZ	H	_	
115	115.0			1 X2	\dag		

Rev. 7



PROJECT NUMBER:

33884.FL

BORING NUMBER:

GSC-12

SHEET 7 OF 10

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722835.8 N, 458289.6 E (NAD83)

ELEVATION: 41.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing

WATER	LEVELS : 3.5	ft bgs	s on 0	5/17/2007 START : 5/16/2007 END : 5/	19/20	07 LOGGER : C. Wallested	
>00	<u></u>			DISCONTINUITIES	ŋ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) Q D	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-74.0 -	038	R	3	108.4' - Fracture, 20 deg, smooth, undulating, tight - 108.6' - Fracture, 80 deg, smooth, undulating,	S	Limestone - 115.0-117.6' - moderate yellowish brown, (10YR 5/4), fine grained, mild	-
-	R9-NQ		>3 >10	tight, intersects fracture at 108.4' 110.05' - Fracture, 80 deg, smooth, undulating, tight, continues same fracture at 108.6'		to moderate HCl reaction, medium strong (R3) rock becoming weak (R2) rock below 117.0', voids (up to 1/16") cover 10% of the surface,	-
-	5 ft 52%	10	NR	110.85' - Bedding plane, horizontal, smooth, undulating, tight 111.15' - Mechanical break 111.2' - Fracture, 10 deg, smooth, undulating, tight 111.25' - Fracture, 50 deg, smooth,		trace cavities up to 1/4", similar to 95.0-99.1' No Recovery 117.6-120.0'	- - - R9:7 minutes
120 -79.0	120.0		3	undulating, tight, intersects fracture at 111.2' - 112.4' - Fracture or mechanical break, 65 — deg, rough, undulating, tight — 113.35' - Fracture, 30 deg, smooth, undulating, tight		Limestone - 120.0-121.5' - Same as 115.0-117.6'	- - -
-	D40 N/C		>3	113.4' - Fracture, 75 deg, smooth, undulating, tight, intersects fracture at 113.35' 113.8' - Bedding plane or mechanical break, deg, smooth, undulating, tight, top of		except extremely weak (R0) zone at 120.4-120.55' 121.5-122.35' - moderate yellowish brown, (10YR 5/4), fine to medium	Driller's Remark: At 121.5', 100% loss of circulation
-	R10-NQ - 5 ft - 68%		3	extremely weak (R0) zone 114.2' - Bedding plane or mechanical break, 10 deg, smooth, undulating, tight, middle of extremely weak (R0) zone 114.7-114.8' - Fracture zone, extremely weak		grained, moderate HCl reaction, medium strong (R3), voids (up to 1/16") cover 5-20% of surface, moderately fossiliferous with up to 3/16"x3/8" echinoid casts, harder fine	- - -
125_ -84.0	125.0		NR	(R0) zone - 115.55' - Fracture, 70 deg, smooth, undulating, tight 115.6' - Fracture, 20 deg, smooth, undulating, —		 grained light colored infill, trace voids in 121.95-122.0' and 122.2-122.35' 122.35-123.4' - moderate yellowish brown, (10YR 5/4), medium grained, 	R10:9 minutes
-04.0			>10	tight, intersects fracture at 115.55' 115.9' - Fracture, 15 deg, smooth, undulating, tight 116.2' - Fracture, 80 deg, smooth, undulating,		moderate HCl reaction, weak to medium strong (R2 to R3), voids (up to 3/16") cover 15% of surface, trace cavities up to 3/8"x2", 3/8"x2" trace	-
-	R11-NC 5 ft 46%	0	2	tight 116.4-116.6' - Fracture zone, fragments to 1"x1-1/2" 116.75' - Fracture, 20 deg, smooth,		fossil casts No Recovery 123.4-125.0' Limestone 125.0-125.6' - Same as 95.0-99.1'	-
-			NR	undulating, tight 117.05-117.6' - Fracture zone, fragments to 1"x1-1/2" 120.4' - Bedding plane or mechanical break, 10 deg, rough, undulating, tight to open 1/4" 120.55' - Fracture, 35 deg, smooth,		 except mild HCI reaction, no extremely weak (R0) zone 125.6-126.4' - Same as 121.5-122.35 except interbedded with hard light colored fine grained rock 126.4-127.3' - Same as 122.35-123.4 	- - R11:6 minutes -
-89.0 -	130.0		>10	undulating, tight — — 120.6' - Fracture, 10 deg, smooth, undulating, tight	H	except weak to medium strong (R2 to R3) No Recovery 127.3-130.0'	
-	R12-NC 5 ft 10%	0	NR	121.2' - Bedding plane, horizontal, smooth, undulating, tight 121.2-121.5' - Fracture zone, fragments to 1"x2" 121.8-121.9' - Fracture zone, 1" fragments 122.35' - Bedding plane, horizontal, smooth, undulating, tight 123.05' - Fracture, 35 deg, smooth, undulating, tight to open 1/4" 123.15' - Fracture, 45 deg, smooth, planar, tight		Limestone 130.0-130.5' - Same as 121.5-122.35 except interbedded No Recovery 130.5-135.0'	Driller's Remark: Very soft between 131.5-134.0' -
135	135.0						

APPENDIX 2BB-994 Rev. 7



PROJECT NUMBER:

33884.FL

BORING NUMBER:

GSC-12

SHEET 8 OF 10

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722835.8 N, 458289.6 E (NAD83)

ELEVATION: 41.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing

				TENT . ONE 330 3/11 100073, Hidd Totally, 11Q tools, 11VV			ONLINIATION: Vertical
WATER	LEVELS: 3.5	ft bg	s on 0	5/17/2007 START : 5/16/2007 END : 5/	19/200	7 LOGGER : C. Wallested	
	(DISCONTINUITIES	(D	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	F06	DOCK TYPE COLOR	
	N E E	(9)	FRACTURES PER FOOT	52001 III 11011	SYMBOLIC	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
H H H	문문	(%) Q	三点	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30 I	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
	SSSS	Ø	¥.K	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Σ	AND ROCK MASS	DROPS, TEST RESULTS, ETC.
	SES	ď	H H	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	1, 1,
-94.0				123.3' - Bedding plane, horizontal, smooth,	ш	Limestone	
-			>10	undulating, tight, voids and cast parallel to	Н	- 135.0-137.8' - dark yellowish orange	1
-				break 125.0-125.3, 125.6-125.7' - Fracture zone		to moderate yellowish brown, (10YR 6/6 to 10YR 5/4), medium grained,	-
l -			>10		ш	- weak to medium strong (R2 to R3),	
			10	126.1-126.4' - Fracture zone, fragments to	Н	voids (up to 3/16") over 5-15% of	
-	R13-NG			1"x2", many parallel horizontal bedding plane	ш	surface, casts (up to 3/16"x3/8")	1
-	5 ft	8	2	breaks	ш	 cover 5% of surface, 1" thick trace 	-
l -	56%			126.65' - Bedding plane, horizontal, smooth,	Н	light gray fine grained infill at the end	
1				undulating, tight		of run, no voids visible at	
-				126.75' - Fracture, 70 deg, smooth, undulating, tight	ш	 136.85-136.95' No Recovery 137.8-140.0' 	1
-			NR	127.0, 127.15' - Fracture (2), 10 deg, smooth,	╂┼┤	-	R13:6 minutes
-				undulating, tight		_	-
140	140.0			130130.5' - Fracture zone, fragments to	ш		
-99.0				1"x2" parallel to horizontal bedding planes in	Н	Limestone	
-			>10	many places 135.0-137.0' - Fracture zone, fragments to		- 140.0-143.3' - pale yellowish brown	-
-				2"x3"	ш	with grayish orange mottling, (10YR	-
l _			2	137.4' - Fracture, 20 deg, smooth, undulating	Н	6/2 with 10YR 7/4), fine to medium grained, moderate HCl reaction,	
			~	137.65' - Bedding plane, horizontal, smooth,	ш	medium strong (R3), voids (up to	
-	R14-NC			undulating, open 1/4"	ш	1/8") cover 5-15% of surface, cavities	1
-	5 ft	27	>10	140.0-140.75' - Fracture zone, fragments to	╂┼┤	 (up to 3/4"x9/16") over 5% of 	-
l _	66%			2"x2"		surface, casts (up to 1-3/16" size)	
			>1	141.85' - Fracture, 80 deg, smooth, undulating, tight	ш	cover 5-10% of surface, cavities filled	
-				142.0' - Fracture, 10 deg, smooth, undulating,	Н	 with pale yellowish brown infill with voids over 30% of the infill; at 	1
-			NR	dark stain, tight		140.0-140.3' darker coarse grained	R14:17 minutes
l -				142.05-142.5' - Fracture zone, fragments to	ш	and high percentage of void	
145	145.0			1"x2"	Н	coverage	
-104.0				142.85-142.95' - Fracture zone, 1" fragments — 143.1-143.3' - Fracture zone, fragments to		No Recovery 143.3-145.0'	
1 -			>10	1"x2"	ш	Limestone 145.0-147.6' - grayish orange, (10YR	-
-				145.0-145.25' - Fracture zone, fragments to	HH	7/4), fine grained, strong HCl	-
I _			8	1-1/2"x2"	ш	reaction, medium strong (R3), trace	
			١	145.35, 145.6, 146.15, 146.2, 146.3, 146.5,	ш	voids (up to 1/16"), trace fossil casts	
-	R15-NC		>2	146.7, 147.1, 147.35, 147.5, 147.5' - Bedding	111	(up to 1/8"x3/16"), trace dark	1
-	5 ft	0		plane (10), horizontal, smooth, planar, tight 145.4' - Fracture, 45 deg, smooth, planar,	口	_ laminations	1 -
I -	52%			tight	HH	No Recovery 147.6-150.0'	1 -
				145.85-146.2' - Fracture zone, fragments to	H	_	
1 -			NR	2"x2-1/2", multiple high angle fractures and			1 1
1 -			'''`	bedding planes	Ш	-	Driller's Remark: Regained -
I -				146.7' - Fracture, 65 deg, smooth, undulating, tight		_	circulation at 149.0' R15:12 minutes
				147.35-147.6' - Fracture zone, fragments to —	\Box		
-109.0				2"x2-1/2"	H	Limestone	Driller's Remark: Regained
I -			>4	150.1, 150.45, 150.65, 151.3, 151.7, 152.5,	Ш	 150.0-151.3' - moderate yellowish brown, (10YR 5/4), coarse grained, 	100% circulation at 150.0'; - water level 4.0' below
-				152.6, 153.4, 153.55, 153.7, 153.8' - Bedding	╂┼┦	mild HCl reaction, weak (R2), voids	ground surface at 13:30
-			>2	plane (11), horizontal, smooth, planar to undulating, tight to open 1/4"	┦┤	- (up to 1/8") cover 30-35% of surface,	Driller's Remark: At 151.0',
I _				150.8-151.3' - Fracture zone, fragments to	Ш	no visible fossil or cavities	circulation drops to 25%
1	R16-NC		_ ً	1"x2"	H	151.3-153.9' - Same as 145.0-147.6']
1 -	5 ft	48	2		111	- except mild HCl reaction, voids cover	1 1
-	78%				Ш	5-10% of surface and increase abruptly to 15-30% at 153.4', trace] -
I -			>4		H	- fossil casts (up to 3/16"x3/8"), rock]
1					Н	strength decreases to weak rock	
1 -			l		Ш	(R2) at 153.4' and coverage by dark	R16:10 minutes
-			NR		╂┼┤	- wavy laminations increases to 10%	-
155	155.0				₽	after 153.4'	

Rev. 7



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-12

SHEET 9 OF 10

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722835.8 N, 458289.6 E (NAD83)

ELEVATION: 41.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing ORIENTATION: Vertical WATER LEVELS: 3.5 ft bgs on 05/17/2007 START: 5/16/2007 END: 5/19/2007 LOGGER: C. Wallested DISCONTINUITIES LITHOLOGY COMMENTS CORE RUN, LENGTH, AND RECOVERY (%) 90 DEPTH BELOW SURFACE AND ELEVATION (ft) FRACTURES PER FOOT **DESCRIPTION** ROCK TYPE, COLOR SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD $\underline{\circ}$ MINERALOGY, TEXTURE, WEATHERING, HARDNESS, RQD(%) DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND AND ROCK MASS DROPS, TEST RESULTS, ETC. THICKNESS, SURFACE STAINING, AND TIGHTNESS CHARACTERISTICS -114.0 No Recovery 153.9-155.0 155.15, 155.4, 155.8, 156.0, 156.4, 157.2, 3 Limestone 157.25. 157.45. 157.6. 157.9. 158.1. 158.6. 155.0-157.9' - grayish orange to 158.7' - Bedding plane, horizontal, smooth, moderate yellowish brown, (10YR 7/4 planar to undulating, tight to open 1/4" 6 to 10YR 5/4), fine grained, moderate 156.1' - Fracture, 45 deg, rough, undulating, HCl reaction, weak to medium strong (R2 to R3), voids (up to 1/16") cover tight R17-NQ 156.2' - Fracture, 45 deg, rough, undulating, 5-15% of surface, trace cavities (up >7 5 ft 34 open to 3/8") 95% 156.8' - Mechanical break or bedding plane, 157.9-158.5' - grayish orange to pale horizontal, rough, undulating, tight 156.9, 156.95' - Fracture (2), 75 deg, rough, yellowish brown, (10YR 7/4 to 10YR 2 Driller's Remark: Soft 6/2), very fine grained, strong HCI undulating, tight drilling at 158.5-159.0' reaction, strong to very strong (R4 to 157.6-157.8' - Fracture zone, fragments to 2" 3 R17:6 minutes R5), no voids or cavities 158.85' - Fracture, 30 deg, smooth, 158.5-158.7' - Same as 155.0-157.9' 158.7-159.4' - Same as 157.9-158.5' 159.4-159.75' - Same as 160 undulating, tight 159.0-159.2' - Fracture zone, fragments to 160.0 NR -1190>2 3/4"x2" 155.0-157.9' except voids (up to 160.0-160.4' - Fracture zone, fragments to 1/16") coverage increasing to 25% Driller's Remark: Very soft 2"x1" No Recovery 159.75-160.0 >4 160.8, 161.3, 161.35, 161.55, 161.6, 161.7, at 161.0-162.0' Limestone 162.05, 162.95, 163.3' - Bedding plane, 160.0-161.4' - Same as 155.0-157.9' horizontal, smooth, planar, tight to open 1/4" R18-NO except fossil casts to 3/8"x3/4" and 2 52 5 ft 160.9' - Fracture, 70 deg, smooth, undulating, voids cover 5-30% of surface 74% tight 161.4-161.6' - Same as 157.9-158.5' 161.6-162.5' - Same as 160.0-161.4 162.5-163.7' - Same as 157.9-158.5' 161.3-161.35' - Fracture zone, fragments to 1 1/4"x2", mostly planar bedding plane No Recovery 163.7-165.0' R18:5 minutes NR End of day on 5/18/07 at 165 165.0 17:35 124.0 Limestone Begin coring on 5/19/07 at 165.0-167.8' - repeated alternating >6 165.3' - Fracture, 80 deg, smooth, planar, 08:05 open, fragments transitions between moderate 165.35, 165.4, 165.55, 165.7, 165.85, 166.45, 166.55, 166.65, 166.95, 167.1, 167.4, 167.6, yellowish brown and pale yellowish >4 brown, (10YR 5/4 and 10YR 6/2), 167.75' - Bedding plane (13), horizontal, moderate HCI reaction, medium smooth, planar, tight strong to strong (R3 to R4), pale R19-NQ 5 166.55-166.65' - Fracture zone, fragments to yellowish brown material is very fine 28 5 ft 1/4"x1", mostly planar, horizontal bedding grained and stronger, with no voids, 96% moderate yellowish brown material is . 168.0, 168.1' - Fracture (2), 10 deg, smooth, fine grained with 20-30% voids, 5% 2 planar, tight 168.35' - Fracture, 45 deg, smooth, medium grained gray limestone imbedded in the matrix of the R19:10 minutes undulating, tight 4 moderate yellowish brown material (possible infill), gradual transition to limestone at 167.8-169.8' 169.1' - Fracture, 35 deg, smooth, undulating, 170 170.0 NR tight 129.0 167.8-169.8' - yellowish brown to 169.3' - Fracture, 60 deg, smooth, undulating, 5 grayish orange, (10YR 6/2 to 10YR tiaht 169.55' - Fracture, 60 deg, smooth, 7/4), fine to medium grained, undulating, tight moderate HCI reaction, medium >3 169.6' - Fracture, 10 deg, smooth, undulating, strong (R3), voids (up to 1/8") over 5-25% of surface, fossil casts (up to R20-NO 170.35, 170.75, 170.85, 170.9, 171.1, 171.55, 174.05' - Bedding plane (7), horizontal, 3/16"x3/8") over 10% of surface, 2 5 ft 69 trace dark grey infill (to 1/8"x1"), 100% smooth, planar, tight except by fracture zone delayed HCI reaction 170.7' - Fracture, 80 deg, smooth, undulating, No Recovery 169.8-170.0' 1 171.55-171.9' - Fracture zone, fragments to R20:7 minutes 1"x2-1/2" 4 175 175.0



PROJECT NUMBER:

338884.FL

BORING NUMBER:

GSC-12 SHEET 10 OF 10

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722835.8 N, 458289.6 E (NAD83)

ELEVATION: 41.0 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Gainesville, FL; Driller: M. Boatright; Cathead Operator: G. Davis

CORING METHOD AND EQUIPMENT : CME 550 S/N 186073, mud rotary, NQ tools, HW casing

WATER	LEVELS: 3.5	ft bg	s on 0	5/17/2007 START: 5/16/2007 END: 5.	/19/20	D7 LOGGER : C. Wallested	
≥0₽	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-134.0 	R21-NC 5 ft 80% 180.0		1 3 >7 10 NR	171.9' - Fracture, rough, undulating, open by fracture zone 172.25' - Fracture, 30 deg, smooth, undulating, tight 172.7' - Fracture, 20 deg, smooth, undulating, tight 173.7' - Bedding plane, <5 deg, smooth, undulating, dark stain, tight 174.6, 174.65' - Fracture (2), 50 deg, smooth, undulating, tight 175.4, 176.35, 176.38, 176.4, 177.05, 177.15, 177.25, 177.55, 177.6, 177.85, 178.3, 178.32, 170.4, 178.45, 178.49, 178.5, 178.51, 178.53' - Bedding plane (18), horizontal, smooth, planar, tight 177.2' - Fracture, vertical, smooth,		Limestone 170.0-175.0' - Same as 167.8-169.8' except trace cavities up to 1-9/16" with grayish orange very weak (R1) infill, voids (up to 1/16") cover 20% of infill, laminated layers of very weak rock (R1) at 170.9-171.15' and 173.95-174.1' 175.0-176.4' - Same as 167.8-169.8' except trace cavities up to 3/16"x1-9/16" lying parallel to bedding 176.4-179.0' - sequences of interbedded limestone that begins as similar to 145.0-147.6' then grades into material similar to 167.8-169.8',	R21:7 minutes
-139.0 	R22-NC 5 ft 100%	80	3 1 2 0	177.2 - Fracture, Vertical, Smooth, undulating, missing opposite faces 177.55-177.6' - Fracture zone, fragments to 1/4"x1/2" 178.9, 178.95' - Fracture (2), 75 deg, smooth, undulating, tight 180.05, 181.7, 182.55, 182.75' - Bedding plane, horizontal, smooth, planar to undulating, tight to open 1/4" 180.4' - Fracture, 70 deg, smooth, undulating, missing face 180.75' - Fracture, 60 deg, smooth, undulating, tight to open 1/2" 184.65' - Fracture, 25 deg, smooth,		except trace cavities to 107.8-169.8	R22:9 minutes
-144.0 				undulating, dark stain, tight		Bottom of Boring at 185.0 ft bgs on 5/19/2007	
					+		



PROJECT NUMBER: BORING NUMBER: 338884.FL I-01 SHEET 1 OF 15

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DRILLING ME	HOD AND	EQUIPM	ENT : Rotosonic S	S/N SR-116, sonic, 8" surface casing, 6" outer casing and 4" core b	oarre	ORIENTATION : Vertical
WATER LEVE	S: 3.65 b	gs on 3/6/()7	TART : 2/20/2007 END : 2/22/2007 LOGGEF	R : R.	Gomez
> 0 0			STANDARD	SOIL DESCRIPTION	ğ	COMMENTS
SAMF	LE INTERV	AL (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,	O LC	DEPTH OF CASING, DRILLING RATE,
H BE ATIO	RECOV	/ERY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR	BOLI	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)		#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLIC LOG	INSTRUMENTATION
42.5 0.0			(**)	Poorly Graded Sand (SP) 0.0-1.3' - gray, (N3), moist to wet, fine grained, silica sand, trace nonplastic fines		"Water level is based on Ground Water Monitoring at LNP site (FSAR Table - 2.4.12.08)"
- - -				Silty Sand (SM) 1.3-3.0' - moderate yellowish brown grading to dark yellowish orange, (10YR 5/4 to 10YR 6/6), moist to wet, fine grained, poorly graded, with nonplastic fines	-	- - -
	6.0	R1-SN		Silty Sand (SM) 3.0-4.0' - dark yellowish orange, (10YR 6/6), wet, fine grained, silica sand, with nonplastic to low plasticity fines Sandy Silt/sandy Lean Clay (CL-ML)		Water levels were not recorded for I-01
5 37.5 6.0				4.0-4.5' - yellowish gray, (5Y 7/2), moist, low to medium plasticity, blocky, with fine grained silica sand Fat Clay With Sand (CH) 4.5-5.0' - medium light gray, (N6), moist to wet,		
-				medium to high plasticity, with fine grained silica sand Silt (ML) 5.0-13.0' - very pale orange, (10YR 8/2), moist, nonplastic to low plasticity, carbonate materials	- - -	- - - - -
10_ 32.5_ - -	10.0	R2-SN		- - - - - -	- - - -	- - - - - - -
- - - - 15_ 27.5				Silt With Limestone Fragments (ML) 13.0-16.0' - very pale orange, (10YR 8/2), moist, nonplastic to low plasticity, with sand to gravel-sized limestone fragments, sample is about 50% silt and 50% limestone fragments, all carbonate materials	- - -	- - - -
				16.0-19.0' - Same as 13.0-16.0' except greater percentage of silt (up to 60%)	-	- - - - -
20				Limestone 19.0-19.5' - very pale orange, (10YR 8/2), full core-diameter (4") fragments 1" thick		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	l I-01	SHEET	2	OF	15	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DRILLING METHOD AND EQUIPMENT: Rotosonic S/N SR-116, sonic, 8" surface casing, 6" outer casing and 4" core barrel

ORIENTATION: Vertical

DRILLIN	DRILLING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 8" surface casing, 6" outer casing and 4" core barrel ORIENTATION : Vertical									
WATER	LEVELS	: 3.65 bg	s on 3/6/0)7 S	START : 2/20/2007 END : 2/22/2007 LOGGE	R:	R.	Gomez		
					SOIL DESCRIPTION	T	<u>, </u>	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	AL (ft)	STANDARD PENETRATION TEST RESULTS		7	SYMBOLIC LOG			
BEL SE A		RECOVI	ERY (ft)	TEST RESOLTS	SOIL NAME, USCS GROUP STMBOL, COLOR,) 	DEPTH OF CASING, DRILLING RATE,		
YFA YFA			#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY		MBC	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION		
SCIE			,,,,,,	(N)			S			
22.5					Sandy Silt (ML)	П	П			
-]	400	DO ON		19.5-24.5' - palé yellowish brown, (10YR 6/2), moist to wet, nonplastic to low plasticity, blocky, all carbonate	1				
-	1	10.0	R3-SN		materials	1				
-	1					1		_		
-	1					1		_		
-	1					1		_		
-	1					1		_		
-						1		-		
-	1					1		-		
25	1				Limestone Fragments	T	Ш	-		
17.5	1				24.5-26.0' - very pale orange, (10YR 8/2), – fossiliferous, fragments up to 3"-4"	╁	Н	Top of rock estimated to be approximately		
-					1033illicrous, fragments up to 5 -4	F	\perp	26.0' below ground surface -		
-					Begin Rock Coring at 26.0 ft bgs	十	_			
-					See the next sheet for the rock core log	1		-		
-						1		-		
-						1		-		
-	1					1		-		
-	-					1		-		
-	-					1		-		
	-					1		-		
30 12.5	-				-	┨		_		
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-						+		-		
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-						+		-		
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35 7.5					-	4		_		
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40						⅃				



PROJECT NUMBER:	BORING NUMBER:		
338884 FI	I_01	CHEET	3 OF 15

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER I	LEVELS: 3.6	5 bgs	on 3/6	6/07 START : 2/20/2007 END : 2/2	22/20	07 LOGGER : R. Gomez	
30₽	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
30_12.5	R4-SN 10 ft 70%	NA	NA	26.0-36.0' - NA		Limestone 26.0-29.7' - grayish orange to dark yellowish orange, (10YR 7/4 to 10YR 6/6), mild HCI reaction, fossiliferous, fine to coarse sand and fine to coarse gravel-size limestone fragments, all carbonate materials Limestone Fragments 29.7-33.0' - moderate yellowish brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), mild to strong HCI reaction, non fossiliferous, full core-diameter fragments up to 2" thick	Set 8" casing to 28" with bentonite around between 8" to 6" casing
35_ 7.5	36.0		NR	- - -		No Recovery 33.0-36.0'	- - - - -
40 2.5 - - - - - - - - - - - - - - - - - - -	R5-SN 10 ft 75%	NA	NA NR	36.0-46.0' - NA		- 36.0-38.0' - dark yellowish brown, (10YR 4/2), dry, moderate HCI reaction, very weak to weak (R1 to R2), voids (<1/16") over 50-70% of surface, cavities up to 3/8" over 10-15% of surface, fossiliferous Silt With Limestone Fragments 38.0-41.0' - dark yellowish brown, (10YR 4/2), wet, sand to gravel-sized limestone fragments, fossiliferous Limestone Fragments 41.0-42.0' - limestone fragments from sand to fine gravel-sized, fossiliferous 42.0-43.5' - dark yellowish brown, moderate HCI reaction, silt to fine gravel-sized limestone fragments No Recovery 43.5-46.0'	SC-1 collected at 36.0- 37.3'
	46.0						



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-01	SHEET	4	OF	15

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DISCONTINUITIES DESCRIPTION DESCRIPTIO		LEVELS : 3.6			6/07 START : 2/20/2007 END : 2/2			
Limestone 46.0-4.0. Same as 36.0-38.0 46.7								COMMENTS
Limestone 46.0-4.0. Same as 36.0-38.0 46.7	DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%	Ø	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LO	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
Limestone Fragments 56.0-66.0' - NA 56.0-66.0' - NA 56.0-57.0' - limestone fragments 56.0-57.0' - limestone fragments 56.0-58.8' - dark yellowish orange, (10YR 6/6), low to medium plasticity, moderate HCI reaction, unconsolidated material, <20% silt at 58.8' Limestone Fragments 58.8-61.0' - Same as 56.0-57.0'		R6-SN 10 ft 100%	NA		46.0-56.0' - NA		- 46.0-47.0' - Same as 36.0-38.0' except medium to coarse grained, voids (<1/16") over <40% of surface at 46.0-46.7', fossiliferous Limestone Fragments 47.0-51.0' - mild to moderate HCI reaction, fossiliferous, limestone fragments sand to gravel-sized and up to 2-1/2" 51.0-53.0' - fine grained, medium strong to strong (R3 to R4), 10-20% fossils (casts/molds), sand to gravel-sized fragments up to 2-1/2" Silt (ML) 53.0-56.0' - moderate yellowish brown, (10YR 5/4), nonplastic, mild	
66.0 NR NR	-17.5 - - - - - - - - - - - - - - - - - - -	R7-SN 10 ft 93%			56.0-66.0' - NA		- 56.0-57.0' - limestone fragments <3-1/2" in size, fossiliferous Clay (CL) 57.0-58.8' - dark yellowish orange, (10YR 6/6), low to medium plasticity, moderate HCI reaction, unconsolidated material, <20% silt at 58.8' Limestone Fragments 58.8-61.0' - Same as 56.0-57.0' Clayey Silt (CL-ML) 61.0-61.7' - light brown to moderate yellowish brown, (5YR 5/6 to 10YR 5/4) Limestone Fragments 61.7-65.3' - dark yellowish brown, (10YR 4/2), moderate HCI reaction, very weak to weak (R1 to R2), 50-70% voids <1/16", cavities to 3/8"	63.9' End drilling for the day; R8 is down-hole, will retrieve



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	l-01	SHEET	5	OF	15	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 3.6	35 bgs	on 3/6	6/07 START : 2/20/2007 END : 2/2	22/20	D7 LOGGER : R. Gomez	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
DEPTH SURF/ ELEVA	CORE LENGI RECO	RQD	FRACT PER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - - 70 -27.5	R8-SN 10 ft 100%	NA	NA			Limestone 66.0-71.5' - moderate yellowish brown, (10YR 5/4), weak to medium strong (R2 to R3), <10% cavities across surface, fossiliferous	Resume drilling 2/21/07 SC-4 collected at 68.4- 69.3'
 -32.5 	76.0			- - - - - -		Clay (CH) 71.5-72.3' - dark yellowish orange, (10YR 6/6), moist, mild HCl reaction, carbonate material Limestone Fragments 72.3-73.6' - very fine grained, strong HCl reaction, extremely weak (R0), limestone fragments to 2", silty matrix Silt (ML) 73.6-75.5' - dry, very stiff, nonplastic, strong HCl reaction, blocky, carbonate material Silty Clay (CL)	- - - - - - - -
 	R9-SN 10 ft 75%	NA	NA	76.0-86.0' - NA		75.5-76.0' - light brown, (5YR 5/6), moist, low to medium plasticity Limestone Fragments 76.0-79.0' - fragments up to 2-3/8", 15-30% fragments to 1-3/8", silty/clay (fines) matrix in limestone, fossiliferous (molds/casts/shell fragments) Silty Clay (CL) 79.0-79.3' - moderate yellowish brown, (10YR 5/4), moist to wet, soft, black organic partings in matrix Limestone Fragments 79.3-81.0' - Same as 76.0-79.0' Limestone 81.0-82.5' - fossiliferous	SC-5 collected at 81.0-82.5'
85_ -42.5_	86.0		NR			82.5-83.5' - fragments up to 2-1/2", breaks between fragments mostly caused by fractures within rocks and mechanical breaks from drilling No Recovery 83.5-86.0'	- - - -



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	I-01	SHEET	6	OF	15	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 3.6	5 bgs	on 3/6	S/07 START : 2/20/2007 END : 2	/22/2	2007	LOGGER : R. Gomez	
₹ □ <i>⊋</i>	(%			DISCONTINUITIES	၂ ဗွ	R L	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG		ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-				86.0-96.0' - NA			Silty Clay (CL) 86.0-89.1' - grayish orange pink, (5YR 7/2), strong HCl reaction, unconsolidated, carbonate matrix, <5% sand, 10-15% coarse gravel-size limestone fragments (<3/4")	- - - -
90 -47.5 - - - - - - - - - - - - - - - - - - -	R10-SN 10 ft 1 100%		NA				Limestone 89.1-89.7' - very pale orange, (10YR 8/2), very fine grained, strong HCI reaction Clay (CH) 89.7-90.7' - moderate yellowish brown, (10YR 4/2), dry to moist, very stiff, with silt (ML), blocky partings Limestone Fragments 90.7-93.0' - very pale orange, (10YR 8/2), fine grained, strong HCI reaction, fragments up to 3/4" Clayey Silt (ML) 93.0-94.0' - light brown, (5YR 5/6), dry to moist, strong HCI reaction, carbonate matrix Limestone Fragments 94.0-96.0' - sand to gravel-sized fragments, weak (R0), fossiliferous (molds/casts/shell fragments)	- - - - - - - - -
- - - - 100 -57.5 - -	R11-SN 10 ft I 100%		NA	96.0-106.0' - NA			96.0-99.0' - very pale orange, (10YR 8/2), strong HCl reaction, 50% silty matrix, sand to gravel-sized fragments, poorly to moderately fossiliferous (10-20%) Lignite 99.0-99.2' - extremely weak (R0), black organic partings Limestone 99.2-101.0' - Same as 96.0-99.0' Clayey Silt (ML) 101.0-103.0' - dry, very stiff, low to medium plasticity, strong HCl reaction, blocky partings	- - - - - - - - - - - - - - - - - - -
- 105_ -62.5 _	106.0			-			103.0-105.0' - Same as 96.0-99.0' 105.0-105.1' - very pale orange, (10YR 8/2), very fine grained, poorly fossiliferous (<10% coverage)	- - -



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-01	SHEET	7	OF	15	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER I	LEVELS : 3.6	5 bgs	on 3/6	8/07 START : 2/20/2007 END : 2/	22/200	D7 LOGGER : R. Gomez	
≥∩≘	- ©			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-110 -67.5 -	R12-SN	NA	NA	106.0-116.0' - NA		Limestone 105.1-105.8' - fragments 105.8-106.0' - Same as 105.0-105.1' 106.0-109.5' - grayish orange, (10YR 7/4), very fine to fine grained, strong HCl reaction, laminar bedding, where the pieces are broken down the material is silt-sized, fragments to 3/8" in size 109.5-114.0' - very fine to fine grained, sand to gravel-sized fragments, non fossiliferous	
120 -77.5	R13-SN 10 ft 100%		NA	116.0-126.0' - NA		Company (10 of R 8/2), very fine to fine grained, strong HCl reaction, 20-30% gravel-sized and 70-80% fines, fragments up to 2" Disaggregated Limestone 121.0-126.0' - pale yellowish brown, (10 of R 6/2), strong HCl reaction, with sand-sized to fine gravel-sized limestone fragments	Rock disaggregated due to sonic drilling method



PROJECT NUMBER:	BORING NUMBER:			_
338884 FI	I_01	SHEET	9 OF 15	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATERLE	<u> EVELS : 3.6</u>	5 bgs	on 3/6	6/07 START : 2/20/2007 END : 2	/22/20	07 LOGGER : R. Gomez	
≥∩≘	_			DISCONTINUITIES	၂ ပွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
130 -87.5 -	R14-SN 10 ft 100%	NA	NA	126.0-136.0' - NA		Limestone 126.0-136.0' - grayish orange to pale yellowish brown, (10YR 7/4 to 10YR 6/4), very fine to fine grained, strong HCI reaction, sand to gravel-sized weak (R2) limestone fragments, grains and gravel reduce to silt-sized material (rock flour), few fine grained weak to medium strong (R2 to R3) fragments from 132.0-133.5'	- - - - - - - - - - - - - - - - - - -
140 -97.5 -	R15-SN 10 ft 1 100%	NA	NA	136.0-146.0' - NA		136.0-136.9' - Same as 126.0-136.0' 136.9-142.5' - very pale yellowish brown, (10YR 6/2), medium strong to strong (R3 to R4), very fossiliferous, up to 70% covered in fossil shells/casts/molds, 10-20% covered in voids (<1/16" up to 3/8"), cavities up to 4-3/4", broken sand to gravel-sized pieces at 139.0-139.5' Silty Clay (CL) 142.5-143.0' - moderate brown, (5YR 4/4), dry, low plasticity, blocky partings Limestone 143.0-146.0' - Same as 126.0-136.0'	- - - - - - - - - - - - - - - - - - -



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	l I-01	SHEET	9	OF	15	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 3.6	35 bgs	on 3/6	5/07 START : 2/20/2007 END : 2/2	22/20	07 LOGGER : R. Gomez	
≥ ∩ ⊕	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
ANI ANI (ft	Ä, AND ≪ (%		KES T	DESCRIPTION	010	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
_				-	H	Limestone - 146.0-148.7' - moderate yellowish	SC-6 collected at 146.3-
-				146.0-156.0' - NA	Ħ	brown, (10YR 5/4), fine grained, strong HCl reaction, strong to very	147.2'
-				-	Ħ	 strong (R4 to R5), <1/16" voids over <10% of surface, trace fossils 	-
					H	_]
_				<u>-</u>	F	_ 148.7-151.0' - strong HCl reaction,	_
				-	H	silt to fine gravel-sized limestone fragments	-
150 -107.5				_		_	-
-	R16-SN		NA	-	Ь	-	-
	10 ft 88%	NA			Ш	151.0-151.9' - strong HCl reaction, - very weak to weak (R1 to R2), very]
				_	上	fossiliferous	
-				-	上	151.9-154.0' - Same as 148.7-151.0'	-
-				-	上	_	-
-				-	世	-	-
-				-	世	Limestone Fragments	-
155					口	 154.0-154.8' - strong HCl reaction No Recovery 154.8-156.0' 	
-112.5 -			NR	-	口	-	_
-	156.0			-	匚		-
-				-	口	 156.0-161.6' - pale yellowish brown, (10YR 6/2), strong HCl reaction, silt 	-
-				156.0-166.0' - NA	口	to coarse gravel-sized limestone	-
					H	- fragments]
				_	F	_	
-				-	H	-	-
-				-		_	-
160_ -117.5				-	H	_	-
-	R17-SN			-	E	-	1
	10 ft 100%	NA	NA	_	Н	_]
				_	E	Limestone 161.6-161.8' - moderate yellowish]
-				-	H	brown, (10YR 5/4), fine grained,	-
-				-	H	strong HCl reaction, medium strong to strong (R3 to R4), non	-
-				-	H	 fossiliferous Disaggregated Limestone 	-
				-	Ħ	161.8-163.0' - strong HCl reaction, carbonate materials	1
165_					Ľ	Limestone Fragments 163.0-165.7' - moderate brown, (5YR	_]
-122 <u>.5</u> -				-	H	4/4), fine grained with silt, silt to 1"	_
	166.0				H	size limestone fragments	-



PROJECT NUMBER:

338884.FL BORING NUMBER:

I-01 SHEET 10 OF 15

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER LEVEL	S: 3.6	5 bgs	on 3/6	5/07 START : 2/20/2007 END : 2/	22/200	7 LOGGER : R. Gomez	
≥∩≘ -	. (9			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft) CORE RUN,	RECOVERY (9	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
170 -127.5	18-SN	NA	NA	166.0-176.0' - NA		Limestone 165.7-166.0' - moderate brown, (5YR 4/4), fine grained, weak to medium strong (R2 to R3), fossiliferous 166.0-170.0' - moderate yellowish brown, (10YR 5/4), fine grained, strong HCI reaction, sand to gravel-sized fragments, trace laminated bedding with mild HCI reaction 170.0-172.0' - moderate yellowish brown, (10YR 5/4), fine grained, medium strong to strong (R3 to R4), 10-20% covered in cavities (up to 3/8" in size) 172.0-173.7' - moderate yellowish brown, (10YR 5/4), fine grained, mild HCI reaction, rock-floor, silty matrix, sand to coarse gravel-sized fragments 173.7-174.2' - moderate yellowish brown, (10YR 5/4), fine grained, strong HCI reaction, medium strong to strong (R3 to R4), laminated Disaggregated Limestone 174.2-176.0' - mild HCI reaction, up	_
-	19-SN 10 ft 100%	NA	NA	176.0-186.0' - NA		to 3/4" gravel-sized pieces of compacted silt and limestone Limestone 176.0-179.5' - Same as 126.0-136.0' except core fragments up to 2-1/2" 179.5-180.6' - moderate yellowish brown, (10YR 5/4), moderate HCI reaction, silt to fragments, soil like properties 180.6-183.0' - grayish orange, (10YR 7/4), medium to coarse grained, strong HCI reaction, shell fragments, molds, casts, 30-40% cavities to 3/8" in size 183.0-184.5' - Same as 179.5-180.6' 184.5-185.2' - Same as 176.0-179.5' 185.2-185.5' - Same as 180.6-183.0' 185.5-185.7' - Same as 183.0-184.5'	_



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-01	SHEET	11	OF	15

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 3.6	5 bgs	on 3/6	5/07 START : 2/20/2007 END : 2/	22/20	D7 LOGGER : R. Gomez		
≥□₽	(%			DISCONTINUITIES	၂ ၅	LITHOLOGY	COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (#)	AND AND		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,	
TH B FACE	E RL STH, OVEI	R Q D (%)		DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD	
SUR!	ELEVATION (ff) CORE RUN, LENGTH, AND RECOVERY (%)	3 Q L	-RA(AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.	
		_				Limestone		
			A NA	- 186.0-196.0' - NA - - - -	╁┤	- 185.7-186.0' - Same as 176.0-179.5' 186.0-196.0' - moderate yellowish	-	
-					Ħ	brown, (10YR 5/4), medium to	-	
					Ħ	 coarse grained, mild to moderate HCl reaction, sand to gravel-sized 	-	
1 1					Ħ	fragments, fossiliferous, cavities up	-	
1 1					Ш	to 3/16" over 30-50% of surface at 186.6-186.8'	_	
1 7					Н		_	
190					dash	[
-147.5	R20-SN 10 ft 100%				尸	_		
					Ħ	_	_	
		INA			H	_	_	
				- - - -	団	_	_	
					⋳	_	_	
-					╀	_	_	
-					\Box	_	-	
-	R21-SN 10 ft NA 58%				H	_	-	
-				- - -	H	<u> </u>	-	
195_ -152.5					H	<u> </u>		
					H	-	-	
			NA		╁		-	
				196.0-206.0' - NA	H	- yellowish orange, (10YR 7/4 to 10YR 6/6), strong HCl reaction, blocky partings, silt to gravel-sized limestone fragments, friable	-	
					囯		-	
					囯		-	
1 7					Ħ		_	
					Ш			
					Н			
200_					Н			
-157.5 -					F		_	
					Ħ	=	_	
					H		_	
			NR		H	- No Recovery 201.8-206.0'	_	
					Ш	_	-	
-					₽	_	-	
-					П	_	-	
-					囯	-	-	
205 <u>-</u> -162.5					H	-	-	
				-	団	 -	_	
	206.0				Ш	-	-	
	<u></u>				\Box			



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-01	SHEET	12	OF	15

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 3.6	55 bgs	on 3/6	5/07 START : 2/20/2007 END :	2/22/20	07 LOGGER : R. Gomez	
≥∩≘	_ ()			DISCONTINUITIES	_ ြ ဖွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNES	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
210 -167.5 -	R22-SN 10 ft 100%		NA	206.0-216.0' - NA		Limestone - 206.0-216.0' - Same as 196.0-201.8'	- - - - - - - - - - - - - - - - - - -
-220 -177.5 - - - - - - - - - - - - - - - - - - -	R23-SN 10 ft 100%		NA	216.0-226.0' - NA		216.0-223.0' - Same as 196.0-201.8' - Clayey Silt (ML) 223.3-224.0' - light brown to very pale orange, (5YR 6/4 to 10YR 8/2), dry to moist, low plasticity when wet Limestone 224.0-226.0' - Same as 196.0-201.8'	



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	I_01	QUEET	13	OE	15	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 3.6	35 bgs	on 3/6	6/07 START : 2/20/2007 END : 2/2	22/20	07 LOGGER : R. Gomez				
≥∩≘	(%)			DISCONTINUITIES	G	LITHOLOGY	COMMENTS			
ELO.	AND 37 (%		ZES T	DESCRIPTION	CLO	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,			
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.			
					H	Limestone - 226.0-233.0' - very pale orange,				
					厂	(10YR 8/2), fine grained, strong HCl				
_				226.0-236.0' - NA -	厂	reaction, extremely weak (R0), sand to coarse gravel-sized fragments,	_			
_				-	\vdash	friable	-			
-				-	口	-	-			
-				-	口	-	-			
230				-	口	-	-			
-187.5				_	口	_	_			
1 -	R24-SN 10 ft		NA		口					
_	100%	INA	INA	_	口	_	_			
-				-	口	-	-			
-				-	口	_	-			
-				-	団	233.0-236.0' - Same as 226.0-233.0'	-			
-				-	世	 except increase in dark yellowish brown (10YR 4/2) silt 	-			
-				-	世	_ blown (1011(4/2) 3ii(-			
235				-	世	-	-			
-192.5										
-	236.0				団	- 000 0 040 01 0 000 0 000 01	_			
-				-	世	236.0-246.0' - Same as 226.0-233.0'	-			
-							236.0-246.0' - NA	世	 -	-
-				-	ш	-	-			
-				-	┢	-	-			
_				-	┢	-	-			
					H					
240 -197.5				_	上	_	_			
-197.5	R25-SN			-	団	_	-			
-	10 ft		NA	-	士	-	-			
-	100%			-	団	-	-			
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245 -202.5				_		_	-			
-	246.0			-		-	-			
	∠ 1 0.0									
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-01	SHEET	14	OF	15

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 3.6	5 bgs	on 3/6	S/07 START : 2/20/2007 END :	2/22/20	07 LOGGER : R. Gomez	
30 <i>⊋</i>	(%			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPT SURF ELEV	COR	RQ	FRA(PER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNES	SS XW	AND ROCK MASS CHARACTERISTICS Limestone	DROPS, TEST RESULTS, ETC.
-				246.0.256.01. NA	F	- 246.0-255.7' - Same as 226.0-233.0'	-
-				246.0-256.0' - NA		-	-
-						! - !-	-
250						_	_
-207.5 - -	R26-SN 10 ft		NA		#	- -	-
-	100%		,]_ 	-
-						 - -	-
-							-
255_					#	- -	_
-212.5 - -	256.0					Silt (ML)	-
-						255.7-256.0' - grayish orange, (10YR 7/4), strong HCl reaction, unconsolidated material, silt to sand	-
-				256.0-266.0' - NA		\text{grain-sized}	-
-						- - - -	-
260 -217.5						- 	- -
-	R27-SN 10 ft		NA			- -	- -
- -	97%				#	- -	- -
- -						- -	- -
- -					#	 -	- -
265 -222.5					臣	<u>-</u>	- -
⊣	266.0		NR			No Recovery 265.7-266.0'	-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-01	SHEET	15	OF	15	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724110.3 N, 457635.3 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 3.6	35 bgs	on 3/6	5/07 START : 2/20/2007 END : 2/2	22/20	07 LOGGER : R. Gomez	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ZES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE	E RU STH, OVEF	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30LI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP] SURF	COR	RQI	FRAC PER	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMI	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
						Bottom of Boring at 266.0 ft bgs on	
-				-	1	2/22/2007	-
-				-	1	<u> </u>	·
_				-	1	_	· -
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PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	I-02	SHEET	1	OF	17	

SOIL BORING LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DRILLING METHOD AND EQUIPMENT: Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel

WATER	LEVELS	: 3.65 bg	s on 3/6/0)7 S	START : 2/23/2007 END : 2/26/2007 LOGGE	:R:(C. Sump, S. Parks
				STANDARD	SOIL DESCRIPTION		COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,		DEPTH OF CASING, DRILLING RATE,
H BE		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR	5	DRILLING FLUID LOSS, TESTS, AND
SURF			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	INSTRUMENTATION
42.3	0.0			. ,	Topsoil	1/2.	
					0.0-1.0'	1/	Monitoring at LNP site (FSAR Table 2.4.12.08)"
					Poorly Graded Sand (SP) 1.0-5.4' - light gray to medium gray, (N7 to N5),		_
_					medium to coarse grained, with variable iron oxide		4
-					staining, silica sand	-	<u> </u>
-						-	Water levels were not recorded for I-02
-		6.4	R1-SN			-	-
-						1	-
5						1	<u>-</u>
37.3					_	1	
					Sandy Silt (ML) 5.4-6.4' - yellowish gray, (5Y 7/2), moist to wet, low to		
-					non plasticity, some fine to medium grain sand No Recovery 6.4-7.0'	\parallel	_
-	7.0				Sandy Silt (ML)	\parallel	-
-					7.0-9.0' - Same as 5.4-6.4'	\parallel	-
-						\parallel	-
-						\parallel	-
-					9.0-15.0' - grayish yellow to yellowish gray, (5Y 7/2 to	1	-
10					5Y 8/4), moist, nonplastic to low plasticity, some fine to coarse sand-size and gravel-size, some "clasts"		
32.3					<1" size at 9.5-10.5', all carbonate material	\parallel	_
-						\parallel	-
-						\parallel	-
-		10.0	R2-SN			\parallel	-
-						\parallel	-
-						\parallel	-
-						1	-
15					Limostono Francosto With Oth	Щ	Describly drill indused by the second
27.3					Limestone Fragments With Silt 15.0-17.0' - fragments are 1"-3" diameter, making up	片	Possibly drill induced breakage
-					>50% of sample, with silt <50% of soil, all carbonate materials (soil may be thin limestone beds with silty	七	
-	17.0				interbeds)	世	
-	17.0				Silty Sand With Limestone Fragments (SM)	1	-
-					17.0-22.0' - yellowish gray, (5Y 7/2), moist, fine to coarse grained, grades to sandy silt with depth, <10%		<u>-</u>
					fine to coarse gravel-sized (<1/2") limestone clasts, all carbonate materials		·
] -					Carbonate materials		
-							-
20						41	1
1							



PROJECT NUMBER: BORING NUMBER: 338884.FL I-02 SHEET 2 OF 17

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache ELEVATION: 42.3 ft (NAVD88)

DRILLING	DRILLING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical									
WATER	LEVELS	: 3.65 bg	s on 3/6/0)7 S	TART : 2/23/2007 END : 2/26/2007 LOGGER	R : C	. Sump, S. Parks			
2001				STANDARD	SOIL DESCRIPTION	١	COMMENTS			
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	COIL NAME LICCS ODOLID SYMBOL COLOD	SYMBOLIC LOG	DEDTH OF CASING DRILLING DATE			
ACE ATIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	ĬŽ	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND			
EPTI LEV4			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	√ME	INSTRUMENTATION			
<u> </u>				(N)		S				
- - - - - - -		10.0	R3-SN		Limestone Fragments 22.0-23.6' - moderate yellowish brown, (10YR 5/4), 1"-3" thick fragments with 1"-2" thick light tan/gray silt/clay infill (possible interbeds) Silty Sand With Limestone Fragments (SM) 23.6-27.0' - grayish orange, (10YR 7/4), fine to coarse		Possibly drill induced breakage (breaks without infilling of fines) -			
25_ 17.3 - -	27.0				grained, strong HCI reaction, 10-20% fine to coarse gravel-sized limestone fragments (1/4"-1-1/4") Limestone Fragments					
3012.3					27.0-29.0' - moderate yellowish brown, (10YR 5/4), 1"-4" thick fragments, fossiliferous with small (1/16"-1/8") voids across the surface (40-60%), clay/silt on fragment faces, all carbonate derived Silty Sand With Limestone Fragments (SM) 29.0-31.4' - moderate yellowish brown, (10YR 5/4), fine to coarse grained, 10-15% fine to coarse gravel-sized limestone fragments (<1" diameter), all carbonate material		Possibly drill induced breakage			
- - - - - 35_ 7.3		7.8	R4-SN		Limestone Fragments 31.4-31.7' - yellowish gray, (5Y 8/1), moderate HCI reaction, 1" thick fragments, light gray (N7) clay interbeds between fragments, all carbonate materials Sandy Silt (ML) 31.7-33.0' - moderate yellowish brown, (10YR 5/4), 10-15% fine to coarse gravel-sized limestone fragments, all carbonate derived materials Limestone Fragments 33.0-34.8' - dark gray, (N3), fine grained, moderate HCI reaction, medium strong (R3), silt material infilling around fragments, all carbonate materials No Recovery 34.8-37.0'		Possibly drill induced breakage			
	37.0				Limestone 37.0-39.6' - olive gray, (5Y 4/1), medium strong (R3), finer grained than above, poorly fossiliferous, fine laminations/bedding planes visible in zones (1/8"-1/2"), horizontal partings 1"-4" spacing, light gray to medium gray (N7 to N6) clayey infill on partings, all carbonate materials		Possibly drill induced breakage			



PROJECT NUMBER: BORING NUMBER: 338884.FL I-02 SHEET 3 OF 17

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DRILLI	NG METH	OD AND	EQUIPM	ENT : Rotosonic	S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION: Vertical
WATER	R LEVELS	: 3.65 bg	s on 3/6/0)7	START : 2/23/2007 END : 2/26/2007 LOGGER : C. Sump, S. Parks
> 0 0				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
H H H H		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
THE STATE			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
2.3				(N)	
2.0		10.0	R5-SN		Silty Sand With Limestone Fragments (SM) 39.6-44.0' - pale yellowish brown, (10YR 6/2), fine to coarse grained, 20-50% fine to coarse gravel-sized limestone fragments, increasing with depth, all carbonate materials
45_ -2.7	47.0				Limestone 44.0-44.5' - yellowish gray, (5Y 7/2), fossiliferous (molds/casts), 50% small surface voids (1/16"-1/8") and small roughly circular solution cavities (1/2"), horizontal partings 1"-2", silty clay infilling material on partings Silty Sand (SM) 44.5-47.0' - yellowish gray, (5Y 7/2), fine to coarse grained, 20-30% fine to coarse gravel-sized limestone fragments, decreasing with depth, all carbonate
50 -7.7	-	6.2	R6-SN		materials Silty Sand With Limestone Fragments (SM) 47.0-53.2' - fine to medium grained, 50-70% angular to subangular limestone fragments, full-diameter (4") limestone core pieces 2"-4" thick at 49.0-49.5' and 50.0-51.0' with thin clayey silt material on horizontal parting surfaces, all carbonate materials Difficulty driving 6" casing to 51.0' below ground surface Top of rock estimated to be approximately 53.0' below ground surface
55 -12.7					Begin Rock Coring at 53.2 ft bgs See the next sheet for the rock core log



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-02	SHEET	4	OF	17

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

				IENT . ROLOSOFIIC 5/N 5R-110, SOFIIC, O OULEI CASING AND			ORIENTATION : Vertical
WATER	LEVELS: 3.6	55 bgs	on 3/6	6/07 START : 2/23/2007 END : 2/2	26/20	07 LOGGER : C. Sump, S. Parks	
	_			DISCONTINUITIES	ניז	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		S	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	
HH H	N. A. C.	(9)	유민	3200.111	윽	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
T E E E	SHER OVE	(%) Q	달	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	N N	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
교공교	RNA	Ø	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	Z	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
Δош		œ	μФ	THIORNEOU, CONTACE CHAINING, AND HOTTINESC	S		
-	53.2			-	₩	Limestone	Start of rock core _
1 4				_	厂	53.2-57.0' - yellowish brown to gray, moderate to strong HCl reaction, light	_
				47.0-57.0' - NA		gray silty clay interbed/infill material	
	R6-SN				╨	on horizontal parting surfaces	_
55 <u> </u>	3.8 ft	NA	NA	_	╆	— spaced 1"-2" with few up to 4",	Coring run times not
'-"-	100%			-		medium yellowish brown silt (<15%)	recorded for I-02
					Н	zone at 54.0-54.5', highly fragmented	
				_		- 56.0-57' with angular to subangular fragments 2"-3" in size, increasing	
-				-	╁	silt sized component with depth	Highly fragmented
-	57.0			-	╀	Limestone Fragments	Highly fragmented Iimestone
				_	\Box	57.0-59.5' - strong HCl reaction,	Possibly drill induced _
1					\vdash	angular to subangular fragments 1-3"	breakage
1 7				57.0-67.0' - NA	Ľ	in diameter, <40% carbonate derived]
-				-	ш	- clayey silt, fines change color from	-
1 -				-	╁╌	light gray to moderate yellowish brown at 58.0'	-
1 _				_			_
60					\vdash	Limestone	
-17.7					T	59.5-63.0' - moderate yellowish brown, (10YR 5/4), horizontal	NA = Not Applicable
-				-		partings 1"-2" spacing with dark	NR = No Recovery -
				-	₩	grayish brown clayey silt interbed	_
1 _				_		material rough and undulating, fine	_
	R7-SN				—	black laminar inclusions 1/16"-1/8" in	
1 7	10 ft 100%	NA	NA		₩	length (horizontal)	_
-	100 /0			-	仜	 	-
-				-	₩	CO O CA 71 wellowish grow to alive	_
				_	H	63.0-64.7' - yellowish gray to olive gray, fine grained, trace to no fossils,	Possibly drill induced
						few small surface voids (1/16"-1/8"),	breakage
1 7				-	\vdash	horizontal partings at various spacing	_
l				-		from 1"-8", parting surfaces mostly	=
65 -22.7				_	4111	clean with trace silty clayey material	
-22.1				_	Ш	Silt (ML)	_
					ш	mottling/laminations, possibly	
1 1				-	1—	organics, possible bioturbation	1
-				-	广	Limestone	-
1 -	67.0			-	╀	_ 65.5-68.1' - grayish yellow brown,	Dogoibly drill indeced
1]				_		medium strong (R3), fossiliferous,	Possibly drill induced breakage -
					<u> </u>	horizontal partings with 2"-4" spacing, trace to no infill in partings,	bicanage
1 7				67.0-77.0' - NA	1	surface coverage of small (<1/8")	Possibly drill induced
-				-	1	- \voids >50%	breakage -
1 -				-	世	Silt With Limestone Fragments (ML)	Repeating limestone/silt -
1]				_	┢	68.1-68.8' - orange gray, limestone	interbeds
70					E ⁺	↑ \fragments 1/2"-1" diameter	
-27.7				_		Limestone 68.8-70.0' - yellowish brown, fine	
-				-	₩	grained, medium strong to strong (R3	-
-				-		- \ to R4), few fossils (<5%) few surface \	
				_	₽	voids, dense partings 3/4"-4", light	
1 7	R8-SN		, , ,			gray silty infilling (interbeds)]
1 7	10 ft 100%	NA	NA	-		- Silt (ML) 70.0-70.5' - Same as 68.1-68.8'	
1 -	100 /0			-	╀	except strong HCl reaction	-
1 -				-	仜	- Shoopt on ong Front rouding	
					1		
1					1		
					_	I	



PROJECT NUMBER:

33884.FL BORING NUMBER:

I-02 SHEET 5 OF 17

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 3.6	65 bas	on 3/0	6/07 START : 2/23/2007 END : 2/	26/20	2007 LOGGER : C. Sump, S. Parks
				DISCONTINUITIES	П	LITHOLOGY COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES_	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,
HH	RUT. VER	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	1	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, WEATHERING, HARDNESS,
F.F.F.	JRE ING	οD	RAC ER F	PLANARITY, INFILLING MATERIAL AND	MB	AND ROCK MASS CHARACTERISTICS SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	225	ď	뜌핆	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	
-					₽	Limestone - 70.5-74.2' - pale yellowish brown to
-					工	moderate yellowish brown, (10YR 6/2
-					┢	to 10YR 5/4), medium strong (R3),
75				_	F	moderately fossiliferous (molds/casts), 2"-8" horizontal
-32.7				_	Ľ	partings, 1"-2" thick semi-indurated
l _					╨	gray silty interbeds (dry), dry powdery interbed material at 73.0'
						74.2-75.9' - dusky orange to gray,
-	77.0				Ш	fragmented, fine sand-sized material
-					ш	(carbonate derived) with sparse 1/2"
-					┢	organic laminations
-				77.0-87.0' - NA	F	75.9-76.5' - dark gray, strong HCl reaction, fossiliferous, large solution
-					片	cavities (1"x3"), interconnected
-					⊬	rounded cavities (possible tube
-					匚	
-37.7				_	士	76.5-77.0' - light gray to tan,
-37.7					F	laminated
-						Limestone 77.0-81.5' - moderate yellowish
l _				_	⊬	brown, (10YR 5/4), dense, moderate
l _	R9-SN 10 ft	NA	NA		Д	HCl reaction, medium strong to strong (R3 to R4), small surface
	93%	INA				voids (1/16"-1/8") covering 40-50%
					\vdash	surface, limestone parting
-					Ħ	— (horizontal) 2"-6" thick, gray clayey silt interbeds, clay zone 78.5-79.6'
-					╨	(dark brown /black interbed
-				-	匚	aminations, vitreous luster when rubbed with hand, organic)
					世	81.5-82.3' - pale yellowish brown,
85 <u> </u>				_	╁	— (10YR 6/2), fine grained, medium
-						trong (R3), few small surface voids, (1/16"-1/8") (<10%), few fossils
-					世	- Limestone Fragments -
-			NR		oxdot	82.3-84.2' - moderate HCl reaction, gravel sized fragments (1/4"-1-1/2"),
-	87.0		INIX		口	 smaller fragments are subangular to
-					┢	subrounded, larger fragments
-					F	— angular to subangular — Limestone -
_				87.0-97.0' - NA	片	84.2-86.3' - pale yellowish brown to
					\vdash	yellowish brown, (10YR 6/2 to 10YR 5/4), small surface voids (<1/8")
1					口	covering 50% of surface, 5-10%
90					Ш	small (<1/2") roughly circular cavities, light gray silty clay infilling
-47.7				_	\vdash	on horizontal partings vary from
1 -					Ħ	1"-9", increasing fossils (mostly molds) with depth
1 -					₽	No Recovery 86.3-87.0'
-	R10-SN	 			圧	Disaggregated Limestone Possibly drill induced
-	10 ft		NA	-	世	87.0-91.4 - mottled gray/tan/brown, moderate HCl reaction, <20%
-	100%				+	limestone fragments (<3/4"), few
<u>_</u> -						fragments >1-1/2"
					<u> </u>	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-02	SHEET	6	OF	17	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 3.6	65 bgs	on 3/6	6/07 START : 2/23/2007 END : 2/	26/20	07 LOGGER : C. Sump, S. Parks	
\$□≎	(%			DISCONTINUITIES	۱	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
95 -52.7 -	97.0 R11-SN 10 ft 100%	NA	NA	97.0-107.0' - NA		91.4-91.6' - light grayish tan, weak (R2) Limestone 91.6-92.7' - light yellowish gray, medium strong (R3), <10% small surface voids (1/16"-1/8"), fossiliferous Disaggregated Limestone 92.7-94.4' - light grayish tan, compacted, <20% gravel size (<1") limestone fragments, dark olive brown laminations (possible organics) Limestone 94.4-94.8' - Same as 91.6-92.7' Disaggregated Limestone 94.8-97.0' - light grayish orange, few (<10%) gravel sized (<3/4") limestone fragments, dark brown lamination appears to transect bedding Limestone Fragments 97.0-107.0' - 0-25% carbonate derived clay, gravel size (<1") limestone fragments, few fragments >1-1/2", friable fragments of slightly more competent material are easily broken by hand, sparse dark brown roughly horizontal laminations associated with finer grained zones (organics)	Upward fining sequences of increasing clay and decreasing sand fractions over 4.0'-6.0' intervals
-0 -0 -62.7 -0 -0 -0 -0	107.0			107.0-117.0' - NA			- - - - - - - - - -
-110 -67.7 - - - - -	R12-SN 10 ft 100%	NA	NA			- - - - -	- - - - - - -



PROJECT NUMBER:

338884.FL

BORING NUMBER:

I-02

SHEET 7 OF 17

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	WATER LEVELS: 3.65 bgs on 3/6/0				26/20	DO7 LOGGER : C. Sump, S. Parks	
≥ ∩ ⊕	(9)			DISCONTINUITIES	ڻ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
115 -72.7 - - - - - - - - 120 -77.7	117.0			117.0-127.0' - NA		Limestone Fragments - 117.0-127.0' - Same as 97.0-107.0'	-
- - - - 125 -82.7 -	R13-SN 10 ft i 100%	NA	NA	- - - - - -			- - - - - - -
130 -87.7 -	R14-SN 10 ft 1 100%	NA	NA	127.0-137.0' - NA		127.0-137.0' - Same as 97.0-107.0'	- - - - - - - - -



PROJECT NUMBER:

338884.FL BORING NUMBER:

I-02 SHEET 8 OF 17

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 3.6	5 bgs	on 3/6	6/07 START : 2/23/2007 END : 2/2	26/20	07 LOGGER : C. Sump, S. Parks	
₹ □₽	(%			DISCONTINUITIES	၅	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
135 -92.7 - - - - 140 -97.7 - - - - - - - - - - - - - - - - - -	137.0 R15-SN 10 ft 100%	NA	NA	137.0-147.0' - NA		Limestone Fragments 137.0-139.5' - Same as 97.0-107.0' Limestone 139.5-143.0' - very pale grayish orange, numerous (1/2"-1") solution cavities, fine black inclusions (<1/8"), variable zones of small voids (<1/16") on surface, fossiliferous, molds and casts up to 3/4" in size, dark brown staining on some of the partings (original bedding plane), mottled dark gray 143.0-145.6' - moderate yellowish brown, (10YR 5/4), strong HCI reaction, dense, less fossiliferous than above, few surface voids/cavities (<10%), horizontal partings 2"-4" spacing, 2"-3" semi-compacted clayey silt interbeds Disaggregated Limestone	Fossiliferous, partial recrystallization (very fine subhedral/cross faces)
150 -107.7 -	147.0 R16-SN 10 ft 100%		NA	147.0-157.0' - NA		145.6-147.0' - grayish orange brown, few gravel sized (<1/2") limestone fragments 147.0-148.9' - Same as 145.6-147.0' except increasing percent of limestone fragments and increase in size of fragments (1"-3") Limestone 148.9-151.6' - grayish orange, (10YR 7/4), small voids (1/16"-1/8") covering 50% surface, horizontal partings 6"-1.0' spacing, silty clay interbeds (up to 1.0"), partings thickness decreasing with depth Disaggregated Limestone 151.6-152.3' - moderate yellowish brown, (10YR 5/4), with friable limestone fragments 3/4"-1 1/2" diameter	Repeating sequences of limestone with softer (carbonate derived) interbeds separated by zones of unconsolidated carbonates with limestone fragments (possibly drill induced breakage)



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-02	SHEET	9	OF	17	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 3.6	35 bgs	on 3/0	6/07 START : 2/23/2007 END : 2/2	26/20	D7 LOGGER : C. Sump, S. Parks	
30₽	(%			DISCONTINUITIES	၅၉	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-155 -112.7 160 -117.7	157.0					Limestone 152.3-153.9' - Same as 148.9-151.6' Disaggregated Limestone 153.9-155.1' - grayish orange to very pale orange, (10YR 7/4 to 10YR 8/2), small (<1/2") gravel-sized limestone fragments <10% Limestone 155.1-156.0' - Same as 148.9-151.6' Limestone Fragments 156.0-157.0' - limestone fragments (60%) 3/4"-2" size, friable, with sandy silt-sized carbonates Disaggregated Limestone 157.0-160.8' - with 30-40% grayish orange limestone fragments (1/2"-1-1/2")	Possibly drill induced breakage -
	R17-SN 10 ft 93%	NA	NA	- - - - - -		- 160.8-165.7' - Same as 157.0-160.8' except increasing amount of limestone fragments with depth (up to 40-50%), color change for limestone fragments to very pale orange (10YR 8/2)	Possibly drilling induced segregation of particles
	167.0 R18-SN 10 ft 94%		NR NA	167.0-177.0' - NA		Limestone 165.7-166.3' - dark dusky yellow, (5Y 6/4), 50% surface voids (1/16"-1/8"), fossiliferous No Recovery 166.3-167.0' Limestone 167.0-167.2' - fossiliferous, large number of solution cavities (1/2"), molds and casts 167.2-168.4' - pale yellowish gray, dense, horizontal partings, 3/4"-1" thick Limestone Fragments 168.4-168.9' - moderate yellowish brown, (10YR 5/4), carbonate derived silt to sand-sized matrix with limestone fragments 1/2"-2" in size Limestone 168.9-170.5' - Same as 167.2-168.4' except 2"-4" horizontal partings becoming large fragments at end	Material lost may have been fines from above Repeating sequence of limestone (with interbeds) separated by zones of silty material with limestone fragments Possibly drill induced breakage



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-02	SHEET	10	OF	17	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 3.6	35 bgs	on 3/6	6/07 START : 2/23/2007 END : 2	/26/200)7 LOGGER : C. Sump, S. Parks	
≥0 <i>€</i>	(°)			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- 175 -132.7 - - - - - -	177.0		NR	- 177.0-187.0' - NA		Pasty Limestone 170.5-171.0' - yellowish gray to orange gray, dark brown laminations (possible organics), no gravel sized fragments Limestone 171.0-173.9' - Same as 167.2-168.4' Disaggregated Limestone 173.9-176.4' - brown, limestone fragments generally 3/4" but up to 1"-3" diameter, light gray interbeds No Recovery 176.4-177.0' Disaggregated Limestone 177.0-177.3' - Same as 173.9-176.4' Limestone 177.3-179.0' - yellowish gray, dense, little to no surface voids, horizontal partings 1"-3" spacing	Possibly drill induced breakage - Possibly drill induced - Possibly drill induced breakage
180 -137.7 - - - - - - - 185 -142.7 -	R19-SN 10 ft 100%		NA	_		Limestone Fragments 179.0-179.9' - moderate yellowish brown, (10YR 5/4), fine grained, 50% limestone fragments 3/4"-1-1/2" size Limestone 179.9-180.9' - Same as 177.3-179.0' except increase in small (1/16"-1/8") surface voids and soft interbeds on 1"-2" partings Disaggregated Limestone 180.9-183.6' - moderate yellowish brown, (10YR 5/4), fine grained, with limestone fragments Limestone 183.6-187.0' - yellowish gray, fragmented, fragments <1/2"-3" size	- - - - - - - - - - -
	R20-SN 10 ft 81%		NA	187.0-197.0' - NA		187.0-189.0' - fragmented, angular to subangular, 1-1/2"-3" size 189.0-192.0' - fossiliferous (molds/casts), horizontal partings 1"-3" spacing, very thin soft interbeds (1/2") Limestone Fragments 192.0-195.1' - limestone fragments, sand-sized to 1/2"-2" size	Possibly drill induced breakage -
$\overline{}$					_		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-02	SHEET	11	OF	17

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 3.6	35 bgs	on 3/6	6/07 START : 2/23/2007 END : 2/2	26/20	07 LOGGER : C. Sump, S. Parks	
≥0.≘	. ()			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ZES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH BI	E RU 3TH, 3VEF	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SURF	SOR	RQI	FRA(PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMI	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
F	0	_					_
					\vdash	_	
l _				_	F	_	
195_					F	_	
-152 <u>.</u> 7				<u>-</u>	H	-	
_			NR	-	H	- 11 - 10-11	_
_				-	₽	No Recovery 195.1-197.0'	_
-	197.0			-	F	Limostono Eragmento	-
-				-	П	Limestone Fragments - 197.0-203.3' - medium to coarse	-
-				- 197.0-207.0' - NA	匚	grained, grain size increasing with depth, limestone fragments are 2"-4"	-
-				-	世	 size, subangular to angular, 	-
-				-	士	fragments above 200' are fine grained, exhibit bedding plane	-
				-	╁	 fractures and have trace to no 	-
200_ -157.7				_	F	surface voids, fragments below 200.0' are fossiliferous (molds/casts)	_
-			NA	-	Ħ	and exhibit 30-40% small (1/16"-1/8") surface voids and small cavities	-
-					Ħ	(<1/2")	-
-	R21-SN			-	H	-	-
-	10 ft 74%	NA		-	H	-	1
-				-	╙	-	1
-				_	\vdash	Disaggregated Limestone]
					H	203.3-204.4' - yellowish]
				_	口	gray/moderate brown, 25% limestone fragments	Lost material may be fines -
205_				<u> </u>	口	No Recovery 204.4-207.0'	from across entire run
-162.7				_	上	_	_
-			NR	-	\vdash	-	_
_				-	F	-	_
-	207.0			-	F	_ Limestone Fragments	Possibly drill induced
-				-	Ħ	 207.0-215.7' - mild HCl reaction, 	breakage -
-				- 207.0-217.0' - NA	Ħ	variable (5-15%) clay-sized pasty limestone, limestone is fine grained,	-
-				-	片	 fossiliferous with 1/2"-3/4" cavities, 	-
-				-		fragments are angular to subangular with smooth to irregular surfaces, 6"	-
210				-	世	 clayey layers at 211.0' and 215.7', silt and clay-sized carbonate content 	-
-167.7				_	尸	decrease with depth	
-				-	匚	<u> </u>	
-			NA	-	口	-	1
-	R22-SN			-	口		1
	10 ft 87%	INA		1	上]
					Ы	_]
					† <u> </u>		
					1		



PROJECT NUMBER:

33884.FL BORING NUMBER:

I-02 SHEET 12 OF 17

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 3.6	55 bgs	on 3/6	6/07 START : 2/23/2007 END : 2/	26/20	07 LOGGER : C. Sump, S. Parks	
> 0 0	<u>.</u>			DISCONTINUITIES	U	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
215 -172.7 - - - - - - 220 -177.7	217.0 R23-SN	NA	NR NA	217.0-227.0' - NA		Disaggregated Limestone 217.0-217.5' - very pale orange and grayish orange, (10YR 8/2 and 10YR 7/4), moderate HCl reaction, laminated, dark brown organic rich layers, limestone fragments (<10%) 1/4"-1/2" in diameter Limestone Fragments 217.5-226.0' - pale greenish yellow to very light gray, (10Y 8/2 to N8), repeating sequences of upward fining material with limestone fragments up to 3" in coarse zones, average sequence length 2.0'-2.5', limestone fragments are moderate to	- - - - - - - - - - - - - - - - - - -
- - - 225 -182.7	10 ft 90%	NA .	NR	- - - -		strong HCl reaction fossiliferous, (molds & casts), mostly subangular, few subrounded fragments No Recovery 226.0-227.0'	- - - - - -
- - - - 230 -187.7	227.0			227.0-237.0' - NA		Limestone Fragments 227.0-235.5' - medium to coarse grained, 30-50% limestone fragments generally <3/4", few >1" fragments, repeating/alternating zones (1'-2' length) of coarser material and finer silt zones (less fragments)	- - - - -
- - - -	R24-SN 10 ft 100%		NA			- - - - -	- - - -



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	I-02	SHEET	13	OF	17	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 3.6	35 bgs	on 3/	5/07 START : 2/23/2007 END : 2/	26/20	07 LOGGER : C. Sump, S. Parks	
≥0 ::	6)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE	E RU STH, OVEF	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
LEV EV	SORE	RQD	RAC FR I	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	₹	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
1000	016	ш.	шш		0,		
-				-	H	_	
-				-	Ħ	_]
235				_	Ľ]
-192.7				_	╨		
				_	${\mathbb H}$	Disaggregated Limestone 235.5-236.5' - orange gray/moderate	
				_	ш	brown, contorted laminations,	
	237.0				上	organics - Limestone	
					\vdash	236.5-237.0' - light yellowish gray,	
					H	fine grained, very weak (R1), thinly bedded (1/4"-1/2" thick), well	
I -				237.0-247.0' - NA -	F	developed bedding planes, appears	
-				_	Ħ	similar to silt material Limestone Fragments	_
_				_	H	237.0-247.0' - grayish orange and]
240_				_	H	yellowish gray, (10YR 7/4 and 5Y — 7/2), very fine to medium grained,	_
-197 <u>.</u> 7				-	₽	moderate to mild HCl reaction, two zones with organic laminations (3"-4"	_
-				-	\vdash	 thick), gravel-sized material is 	_
-	R25-SN				I	subangular, size varies from 1/4"-2"	_
-	10 ft	NA	NA	-	上	-	-
-	100%			-	士	_	-
-				-	╁	-	-
-					\vdash	-	-
-					F	_	-
245				-	Ħ	-	-
-202.7					Ħ		_
-				-	Ľ	-	-
-				·	ᡛ	<u> </u>	
-	247.0			-	尸	-	1
-	-			-	\vdash	247.0-255.7' - grayish orange and]
					厂	 very pale orange, (10YR 7/4 and 10YR 8/2), mild HCl reaction,]
				247.0-257.0' - NA	口	limestone fragments are sand to gravel-sized, angular, up to 3", with	
					上	zones of fragments that appear to	
_				_	\vdash	have been possibly laminated prior to drilling	
250_				_	F		_
-207 . 7				-	厈	-	
-					Ħ	-	_
-	D00 01	l NA		-	H	-	_
-	R26-SN 10 ft			-	世	-	-
-	87%				F	-	-
				-	$oxed{\Box}$	_	-
			1		1		I



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-02	SHEET	14	OF	17

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 3.6	35 bgs	on 3/6	5/07 START : 2/23/2007 END : 2/2	26/20	D7 LOGGER : C. Sump, S. Parks	
≥0 <i>€</i>	(%			DISCONTINUITIES	၅	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
255 -212.7 -	257.0		NR	-		- - No Recovery 255.7-257.0' -	- - - - -
260 -217.7	257.0			257.0-267.0' - NA		Limestone Fragments - 257.0-268.5' - Same as 247.0-255.7'	- - - - - -
- - - - - - 265_	R27-SN 10 ft 100%	NA	NA	- - - - -		- - - - -	- - - - - -
-222. 7 -	267.0					268.5-271.5' - very pale orange, (10YR 8/2), mild to moderate HCl	- - - - - -
270 -227.7 - - - - -	R28-SN 10 ft 100%	NA	NA	- - - - - - -		reaction, laminated with organic layers in top 6", limestone fragments are angular to subangular, average 1/4"-1/2" size	- - - - - - -



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-02	SHEET	15	OF	17

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 3.6	55 bgs	on 3/6	5/07 START : 2/23/2007 END : 2/2	26/200	7 LOGGER: C. Sump, S. Parks	
>00	(9			DISCONTINUITIES	ڻ ا	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- 275 -232.7 -	277.0			- - - -		Limestone Fragments 271.5-277.0' - grayish orange, (10YR 7/4), moderate to mild HCl reaction, limestone fragment size ranges from 1/4"-4", predominately subangular with some rounded fragments, percentage of limestone fragments increases with depth	- - - - -
- - - 280 -237.7				277.0-287.0' - NA		277.0-282.0' - grayish orange, (10YR 7/4), moderate to mild HCl reaction, graded into fining up sequence 2.0'-2-1/2' thick, varies from angular to rounded, 1/4"-4", fossiliferous with molds and casts, vuggy	- - - - -
- - - - - 285 -242.7	R29-SN 10 ft 87%	NA	NA	- - - - - -		282.0-285.7' - very light gray, (N8), moderate to mild HCl reaction, some organic laminations in upper 0.5', predominately angular to subangular, fossiliferous, 1/4"-1" average size, some fragments up to 2", thin layer of limestone fragments at 285.0', laminated up to 2"	- - - - - - -
-	287.0		NR	-		No Recovery 285.7-287.0'	-
				287.0-297.0' - NA		Disaggregated Limestone 287.0-297.0' - yellowish gray with very pale orange and dark gray mottling, (10YR 8/2 and N3), 1/4" average size	Note: Using 20.0' core barrel to increase sample depth beyond bottom of 6" casing (302.0')
-			NA	- - - -		- - - -	- - - -



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	I-02	SHEET	16 (ΩF	17	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

MINERALOGY, TEXTURE, S E DEPTH, TYPE, ORIENTATION, ROUGHNESS, WEATHERING, HARDNESS, SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, FLUID LOSS, CORING RATE AN SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, FLUID LOSS, CORING RATE AN SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, FLUID LOSS, CORING RATE AN SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, FLUID LOSS, CORING RATE AN SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, FLUID LOSS, CORING RATE AN SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, FLUID LOSS, CORING RATE AN SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, FLUID LOSS, CORING RATE AN SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, FLUID LOSS, CORING RATE AN SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE, MINERALOGY, MINERALOGY, TEXTURE, MINERALOGY, MINERALOGY, MINERALOGY, MINERALOGY, MINERALOGY, MINERALOGY,	WATER	LEVELS : 3.6	35 bgs	on 3/	5/07 START : 2/23/2007 END : 2/2	26/20	D7 LOGGER : C. Sump, S. Parks	
295. 7	> 0 00	6)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
295. 7	DEPTH BELOV SURFACE ANI ELEVATION (fl	CORE RUN, LENGTH, AND RECOVERY (%	Ø	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LO	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
Limestone Fragments 302.0-302.75' - Same as 227.0-297.0' 302.75-305.75' - grayish orange, 10/10/R 7/4), moderate to mild HCl reaction, limestone, size ranges from 1/4"-2", subangular, crystalline quartz grains found throughout column Note: Using 20.0' 4" cave barrel to sample material beyond 6" casing depth (302.0') 1st attempt failed to recover material (fell out during retrieval) 2nd attempt with flapper bit successful although sample is disturbed No Recovery 306.5-317.0' R31-SN 15 ft 30% NA 307.0-317.0' - NA	295 -252.7 - - - - - - - - -	R30-SN 15 ft			297.0-307.0' - NA		No Recovery 297.0-302.0'	- - - - - - - - - - - -
HCl without scratching the surface, angular to subangular limestone No Recovery 306.5-317.0' R31-SN 15 ft 30% -267.7 HCl without scratching the surface, angular to subangular limestone No Recovery 306.5-317.0'		302.0		NA	- - - - - - -		- 302.0-302.75' - Same as 287.0-297.0' 302.75-305.75' - grayish orange, (10YR 7/4), moderate to mild HCI reaction, limestone, size ranges from 1/4"-2", subangular, crystalline quartz grains found throughout column - 305.75-306.5' - very pale orange and dusky blue green, (10YR 8/2 and	barrel to sample material beyond 6" casing depth (302.0') 1st attempt failed to recover material (fell out during retrieval) 2nd attempt with flapper bit successful although
	310 -267.7 -			NR	307.0-317.0' - NA		HCl without scratching the surface, angular to subangular limestone	- - - - - - - - -



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-02	SHEET	17	OF	17	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724046.5 N, 457700.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	VATER LEVELS: 3.65 bgs on 3/6/07		on 3/6	6/07 START: 2/23/2007 END: 2	/26/20	007 LOGGER : C. Sump, S. Parks	
>00	<u></u>		_	DISCONTINUITIES	ڻ ان	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS SUBFACE STAINING AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- 31 <u>5</u> -272.7 -	CORE RECOV) BADI	FRACTI PER FC	DEPTH, TYPE, ORIGINESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SAMBO	WEATHERING, HARDNIESS, AND ROCK MASS CHARACTERISTICS Bottom of Boring at 317.0 ft bgs on 2/26/2007 Bottom of Boring at 317.0 ft bgs on 2/26/2007	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC. Total depth of boring is 317.0'



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	I-03	SHEET	1	OF	14	

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723978.8 N, 457771.7 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DRILLIN	<u>G METH</u>	OD AND	EQUIPM	ENT : Rotosonic :	N SR-116, sonic, 8" surface cas	ng, 6" outer casing ar	nd 4" core b	arrel	ORIENTATION : Vertical
WATER	LEVELS	: 2.0 ft bo	gs on 3/2	1/07	TART: 3/21/2007 END	: 3/23/2007	LOGGER	: C.	Sump, J. Burkard
				STANDARD	SOIL DES	CRIPTION		Ģ	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				SYMBOLIC LOG	
HSE		RECOVE	RY (ft)		SOIL NAME, USCS GRO MOISTURE CONTENT, I			OLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
FAY VA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STR			MB	INSTRUMENTATION
E S E				(N)				Ś	
42.1	0.0				Poorly Graded Sand (SP) 0.0-3.0' - fine to medium gra	ained, no HCl reacti	ion. –		Start drilling 12:32 Set 8" casing
1 _					brownish black (5YR 2/1) a	nd organic rich from	n		0-27' below ground surface
1 _					0.0-1.0' (topsoil) grading to dark yellowish brown (10YF				
					dark yellowish blown (1011)	. 4/2) between 2.0-0	5.0		
-							_		Water level: 2 ft below ground surface
-							_		-
-		5.4	R1-SN		Clayey Sand (SC)		-		-
-					3.0-6.0' - medium plasticity, silica sand, finely laminated	no HCl reaction, fir	ne –		-
-					orange (10YR 6/6) layers a				-
5							_		-
37.1									R1: 2 minutes
-							-		-
-	6.0				Silt With Sand (ML)		_		-
-					6.0-16.0' - grayish orange, (10YR 7/4), mild to s	strong -		-
-					HCl reaction, very fine to fir 2-1/2" limestone fragments				-
-					materials	,,	-		-
-							_		-
-							-		-
-							_		-
-							-		-
10							_		
32.1							_		_
-		10.0	R2-SN				_		_
1 _		10.0	112 011						_
1 _									_
l _									_
1 -									
-							_		_
15							_		_
27.1									R2: 10 minutes
1 -	16.0						_		5 bolts sheared off on drill head. Down for
1 -					Limestone			Т.	maintance 12:55-15:13 (2:18)
1 -					16.0-17.5' - very pale orang with molds/casts. Fossils ex		iliferous -		-
-					horizontal orientation (bedd	ing plane), few large	e –		-
1 -					molds (3/4"), numerous smale over 40% of surface. Horizon	all voids (3/8" to 1-3	3/16")	TH.	-
-					clay/silt interbeds up to 2" th	nick, partings may b	be / -		-
-					mechanical breaks				-
-							-		-
							-		-
20								1.[.].	
1									



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-03	SHEET	2	OF '	14

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723978.8 N, 457771.7 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DRILLIN	GMEIH	OD AND	EQUIPM	ENT: Rotosonic	S/N SR-116, sonic, 8"	surface casing, 6" outer c	asing and 4" core b	arrel	ORIENTATION : Vertical
WATER	LEVELS	: 2.0 ft bo	gs on 3/2	1/07	START : 3/21/2007	END: 3/23/2007	LOGGER	: C.	Sump, J. Burkard
				STANDARD		SOIL DESCRIPTION		ڻ ق	COMMENTS
N A S	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				2.00	
H H H		RECOVE	ERY (ft)			, USCS GROUP SYMBOL CONTENT, RELATIVE DE		O E	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"		Y, SOIL STRUCTURE, MI		SYMBOLIC LOG	INSTRUMENTATION
22.1				(N)	Oilte Oere d Wide	Lineartena Francisco	(0.84)	Ś	
22.1					17.5-24.6' - very	Limestone Fragments pale orange, (10YR 8/2	(SM) !), fine-coarse –		-
-		8.6	R3-SN		sand-sized mate	rials and variable fines of to >15%. Limestone f	content		-
-					similar to limesto	one above and are suba	ngular to -		-
-					subrounded in sl	hape. Most fragments < >2" on 2.0-3.0' spacing	0.5" with few		-
-					large fragments	>2 On 2.0-3.0 spacing	(tilli beds)		-
-							-		-
-							-		-
-							-		-
-							-		-
25 <u> </u>					No Recovery 24	.6-26.0'			R3: 20 minutes
''.'-							-		NS. 20 Hillidges
-	26.0				Cilty Cand And	Limestone Fragments	(CM)		-
-					26.0-27.2' - Sam		(SIVI) -		Drill induced breakage -
-							-		-
-					Limestone	ne as 26.0-27.2 except the	nin hada (1 O"	П	-
-					thick) with clay/s	ilt interbeds (1-1/2" thicl	K) =		-
-					Silty Sand And	Limestone Fragments	(SM) _		-
-					fine to coarse sa	erate yellowish brown, (ınd-sized materials, 20-4	40% fine to		-
l					coarse gravel-siz 3/4"-1-1/2" with f	zed limestone fragments	s, range from _		-
30 12.1					3/4 -1-1/2 WIUITI	EW /2			
-							-		-
-		10.0	R4-SN				-		-
-							-		-
-							-		-
-							-		-
-							-		-
-							-		-
-							-		-
							-		-
35 7.1							_		R4: 12 minutes
-							-		-
-					Begin Rock Cori	ng at 36.0 ft bgs		111	
-					See the next she	eet for the rock core log	-		-
-							-		-
-							-		-
-							=		-
-							-		-
-							-		-
40							-		-
40_									



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	I-03	SHEET	3	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723978.8 N, 457771.7 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 2.0) ft bgs	s on 3/	21/07 START : 3/21/2007 END : 3/2	23/20	D7 LOGGER : C. Sump, J. Burkard	
				DISCONTINUITIES	G	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - - 40 2.1	36.0			36.0-46.0' - NA		Limestone Fragments 36.0-39.6' - with horizontal partings (2-4" spacing) with clayey silt interbeds/infilling on partings (1/4"-3/4" thick) Silt (ML) 39.6-41.0' - moderate yellow brown,	- - - - - NA = Not Applicable
- - - - - - - 45	R5-SN 10 ft 89%	NA	NA	- - - - - -		- (10YR 5/4), mild to moderate HCl reaction - Well Graded Limestone Fragments - With Sand - 41.0-43.0' - limestone fragments <1". - At 41.0' large, irregularly shaped - limestone fragment (5") - Limestone - 43.0-44.9' - Same as 36.0-39.6' - except with very thin clayey silt infilling on horizontal parting surfaces - (bedding planes)	NR = No Recovery -
-2.9 -	46.0		NR			No Recovery 44.9-46.0'	R5: 13 minutes
	R6-SN 10 ft 96%	NA	NA	46.0-56.0' - NA		Limestone And Limestone Fragments 46.0-56.0' - Same as 41.0-44.9' except on 1.5-2.0' spacing with well graded gravel (limestone fragments) with silt and sand (GW-GM) interval in between, very thin clayey silt similar to 41.0-44.9' above	
55 -12.9 -	56.0		NR			No Recovery 55.6-56.0'	R6: 14 minutes



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	I-03	SHEET	4	OF	14	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723978.8 N, 457771.7 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 2.0	ft bgs	on 3/	21/07 START : 3/21/2007 END : 3/	23/200	D7 LOGGER : C. Sump, J. Burkard	
≥ ∩ ∷	<u></u>			DISCONTINUITIES	ڻ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - - - - - - - - - - - - - - - -	R7-SN 10 ft 100%	NA	NA	56.0-66.0' - NA		Limestone 56.0-58.3' - very pale orange, (10YR 8/2), fossiliferous limestone (molds/casts), voids (1/16"-1/8") over 20-30% of surface, horizontal partings on 2-6" spacing (bedding plane), with 1-2" clayey, silty (low to moderate plasticity) interbeds with gravel-sized limestone fragments <1"/ Calcareous Silt With Limestone Fragments (ML) 58.3-60.0' Limestone 60.0-61.4' Limestone Fragments 61.4-66.0' - up to 4"	R7: 38 minutes
	R8-SN 10 ft 85%	NA	NA NR	66.0-76.0' - NA		Limestone 66.0-68.6' - medium to coarse grained, voids (<1/16") over 80% of surface Limestone Fragments 68.6-70.1' Limestone 70.1-71.5' Limestone Fragments 71.5-72.5' Disaggregated Limestone 72.5-74.5' - contains limestone fragments No Recovery 74.5-76.0'	Core run times not recorded below R7-SN



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-03	SHEET	5	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723978.8 N, 457771.7 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 2.0	ft bgs	s on 3/	21/07 START: 3/21/2007 END	3/23/2	2007	LOGGER : C. Sump, J. Burkard	
≥∩≘	_ (6			DISCONTINUITIES	ဗ	L	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNES	SYMBOLIC LOG		ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - -				76.0-86.0' - NA			Limestone 76.0-79.0' - pale yellowish brown, (10YR 6/2), moderate HCl reaction, discs up to 3" in length with interbeds of silt and gravel-sized fragments with voids over 10% of surface	- - - - -
80_ -37.9 - - -	R9-SN 10 ft 100%	NA	NA				79.0-81.0' - Same as 76.0-79.0' except limestone fragments with increased fines and interbeds of clay and sand-sized particles 81.0-82.5' - pale yellowish brown, (10YR 6/2), moderate HCl reaction	- - - - -
 85 -42.9							82.5-83.7' - gravel-sized limestone fragments with silt size fines 83.7-86.0' - moderate yellowish brown, (10YR 4/2), moderate HCl reaction, 4" limestone fragments with voids over 60-75% of surface, poorly fossiliferous	- - - - -
-	86.0			86.0-96.0' - NA			86.0-88.0' - Same as 83.7-86.0' except 2" fragments Limestone Fragments 88.0-88.8' - Same as 86.0-88.0'	- - - -
90 -47.9 -	R10-SN 10 ft 100%		NA				except gravel-sized fragments 88.8-90.3' - Same as 83.7-86.0' except with black organic matter (1-1/2"- 1/2" spacing) Limestone Fragments With Clay And Sand 90.3-92.4' - yellowish gray, (5Y 7/2), strong HCl reaction, fragments are	- - - - -
- - - - 95							gravel-sized Limestone Fragments 92.4-95.0' - very pale orange, (10YR 8/2), strong HCI reaction, limestone disc up to 5" in length with thin clay interbeds, trace voids on surface, apparent non-fossiliferous, rock is dry and powdery	- - - - -
-52.9	96.0				#	+	95.0-96.0' - Same as 92.4-95.0' except with thin beds of dry lean clay	-



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	I-03	SHEET	6	OF	14	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723978.8 N, 457771.7 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 2.0	ft bgs	s on 3/		/23/200	D7 LOGGER : C. Sump, J. Burkard	
30₽	(%			DISCONTINUITIES	၅	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	R11-SN 10 ft 100%		NA	96.0-106.0' - NA		Disaggregated Limestone 96.0-106.0' - very pale orange, (10YR 8/2), strong HCl reaction, with lean clay interbedding and isolated limestone disc, moderately moist, 20-40% lean clay at 99.0-99.8' and 103.0-106.0'	
	R12-SN 10 ft 100%		NA	106.0-116.0' - NA		106.0-116.0' - very pale orange, (10YR 8/2), strong HCI reaction	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-03	SHEET	7	OF	14

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723978.8 N, 457771.7 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 2.0	ft bgs	on 3/	21/07 START: 3/21/2007 END:	3/23/20	07 LOGGER : C. Sump, J. Burkard	
≥∩≘	. (%			DISCONTINUITIES	_ ပွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNES.	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - 120 -77.9 - - - - - - - - - - - - - - - -	R13-SN 10 ft 100%	NA	NA	116.0-126.0' - NA		Disaggregated Limestone - 116.0-126.0' - Same as 106.0-116.0'	
130 -87.9 -	R14-SN 10 ft 85%		NA NR	126.0-136.0' - NA		126.0-134.3' - very pale orange, (10YR 8/2), strong HCl reaction, interbedded limestone discs and fragments, locally moist and dry sections	
	136.0				+		
ldot							



PROJECT NUMBER: BORING NUMBER: SHEET 8 OF 14

338884.FL I-03

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723978.8 N, 457771.7 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 2.0) ft bgs	s on 3/	21/07 START : 3/21/2007 END : 3/	23/20	07 LOGGER : C. Sump, J. Burkard	
30₽	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	R15-SN 10 ft 93%		NA	136.0-146.0' - NA		Limestone Fragments 136.0-139.4' - yellowish gray, (5Y 7/2), strong HCl reaction, gravel-sized fragments 139.4-142.3' - moderate brown, (10YR 6/2), strong HCl reaction, limestone fragments up to 2" in length with little to no fines, with worm holes that contain pyrite, fine grained, moderately fossiliferous 142.3-143.6' - gravel-sized rock fragments up to 2" in diameter with thin clay coating	
- 145_ -102.9 -	146.0		NR	146.0-156.0' - NA		Limestone 143.6-146.0' - yellowish gray, (5Y 7/2), 13" long with no fines, voids over 50-75% of surface, fine grained, poorly fossiliferous No Recovery 145.3-146.0' Limestone Fragments	145.3'
-150 -107.9 -	R16-SN 10 ft 100%		NA			- 146.0-148.0' - yellowish gray, (5Y 7/2), strong HCl reaction, fragments are gravel-sized - 148.0-149.5' - dusky yellow, (5Y 6/4), strong HCl reaction, fragments are gravel-sized, silica sand present - Limestone - 149.5-152.9' - pale yellowish brown, (10YR 6/2), fine grained, strong HCl reaction, limestone core segment with interbedded clay lenses 1/8" to 2" thick, poorly fossiliferous - Limestone Fragments - 152.9-156.0' - dusky yellow, (5Y 6/4), strong HCl reaction, fragments are gravel-sized, silica sand present	
155 <u> </u>	156.0					 154.3-156.0' - pale yellowish brown, (10YR 6/2), strong HCl reaction, limestone core segment up to 5" in length with interbedded clay, poorly fossiliferous 	-



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-03	SHEET	9	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723978.8 N, 457771.7 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 2.0	ft bgs	s on 3/	21/07 START: 3/21/2007 END: 3/	23/20	07 LOGGER : C. Sump, J. Burkard	
≥∩≘	_ (6			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-160 -117.9 	R17-SN 10 ft 100%		NA	156.0-166.0' - NA		Disaggregated Limestone 156.0-163.7' - yellowish gray, (5Y 7/2), strong HCI reaction, contains isolated limestone fragments up to 3" in diameter Limestone 163.7-166.0' - dusky yellow, (5Y 6/4), fine grained, strong HCI reaction, limestone fragments up to 1" in length with interbedded silty sand,	- - - - - - - - - - - - - - - - - - -
-170 -127.9 -127.9 -132.9	R18-SN 10 ft 100%		NA	166.0-176.0' - NA		Limestone Fragments 166.0-168.9' - yellowish gray, (10YR 6/2), fine grained, strong HCl reaction, up to 3" in length with no fines, moderately fossiliferous, voids over 25-50% of surface Disaggregated Limestone 168.9-170.5' - grayish orange, (10YR 7/4), strong HCl reaction Limestone 170.5-172.3' - pale yellowish brown, (10YR 6/2), moderate HCl reaction, with limestone discs up to 4" in length with thin interbeds of clay, voids over 20-40% of surface Disaggregated Limestone 172.3-173.5' - dusky yellow, (5Y 6/4), strong HCl reaction Limestone 173.5-176.0' - Same as 170.5-172.3'	Possible rip-up clast at 168.8'



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-03	SHEET	10	OF	14

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723978.8 N, 457771.7 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER LEVI	'ELS : 2.0	ft bgs	on 3/	21/07 START: 3/21/2007 END: 3	/23/20	07 L	OGGER: C. Sump, J. Burkard	
≥0.00	(§			DISCONTINUITIES	ي [LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE KON, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINI WEA	OCK TYPE, COLOR, ERALOGY, TEXTURE, THERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - - - - - - - - - - - - - - - -	R19-SN 10 ft 100%		NA	176.0-186.0' - NA		- 176.0-181. yellowish g fine graine in length, p over 10-20 - Disaggreg - 181.0-182. 7/2), mode 182.1-183. brown, (10 reaction - 183.6-186. (10YR 6/2)	.0' - pale yellowish brown,), strong HCl reaction,	- - - - - - - - - - - - - - - - - - -
185 -142.9 - 186. - 186. - 190 -147.9 - 195 -152.9 - 196.	R20-SN 10 ft 100%	NA	NA	186.0-196.0' - NA		interbedde highly foss 30-60% of Disaggreg 186.0-196. 7/2), mild t limestone section, 60 from 186.0	o 3" in length with de clays 1/8" to 1" thick, siliferous with voids over surface pated Limestone .0' - yellowish gray, (5Y to moderate HCI reaction, fragments throughout 10' 0-80% limestone fragments 0-188.8', decreases with 10% from 192.0-196.0'	



PROJECT NUMBER:

33884.FL BORING NUMBER:

I-03 SHEET 11 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723978.8 N, 457771.7 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 2.0	ft bgs	s on 3/	21/07 START: 3/21/2007 END: 3	23/20	007 LOGGER : C. Sump, J. Burkard	
≥ ∩ ⊕	(9)			DISCONTINUITIES	ڻ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
 200 -157.9 		NA	NA	196.0-206.0' - NA		Limestone Fragments 196.0-199.7' - yellowish gray, (5Y 7/2), fine grained, mild to moderate HCl reaction, vary from 2"-5" in length and discs 1/8" to 2-1/2" in diameter Disaggregated Limestone 199.7-203.0' - grayish orange, (10YR 7/4), mild to moderate HCl reaction, fragments with voids over 50-70% of surface	
- - 205 -162.9 -	206.0		NR	- 206.0-216.0' - NA		Limestone Fragments 203.0-204.0' - moderate yellowish brown, (10YR 5/4), strong HCI reaction, fragments are gravel-sized, up to 1/2" in diameter No Recovery 204.0-206.0' Limestone Fragments	- - - -
210 -167.9 - - - - - - - - - - - - - - - - - - -	R22-SN 10 ft 100%		NA	200.0-210.0 - NA		- 206.0-207.0' - yellowish gray, (5Y 7/2), very fine to fine grained, mild HCI reaction, poorly fossiliferous Disaggregated Limestone 207.0-216.0' - yellowish gray, (5Y 7/2), mild to strong HCI reaction, gravel-sized fragments up to 1" in diameter, subrounded to subangular	
	216.0				Ħ		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-03	SHEET	12	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723978.8 N, 457771.7 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 2.0	ft bgs	on 3/		23/200	D7 LOGGER : C. Sump, J. Burkard	
30₽	<u>(</u>			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
SELO E AN ON (f	ANE RY (3	_	RES)T	DESCRIPTION	10 [ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
				216.0-226.0' - NA	$oxed{\mathbb{H}}$	Disaggregated Limestone 216.0-233.0' - yellowish gray, (5Y	_
				-	Ш	7/2), moderate to strong HCl reaction, subangular to angular	-
-				-	Н	 gravel-sized fragments up to 1" in 	-
-				-	Ш	diameter, limestone fragments up to 3" in diameter at 220.0-220.7', pale	-
					Ш	 greenish yellow (10YR 8/2), fine grained, strong HCl reaction]
				_	H	_	
220 -177.9			A NA	_	H		_
-	R23-SN			-	H	_	-
	10 ft 100%	NA		-	\Box	_	-
					Ш	_	
-				-	Ш	_	-
-				-	団	_	-
				-	Ш	_	-
				_	Ш		
225 -182.9				_	Н		
-102.5	000.0			-		_	-
	226.0		\dashv	226.0-236.0' - NA	Ш	_	-
				_	H		_
				-	H	<u>-</u>	_
-				-	H	_	-
-				-	Ħ	_	-
					Ħ	_	
230 -187.9				_	Ш		_
-107.9	R24-SN		NA	-	Ш	_	-
-	10 ft 85%	NA		-	団	_	-
	55,3			-	囯	_	-
				-	Щ	_	
-				-	日	_ Limestone Fragments	_
-				-	田	- 233.0-234.5' - moderate yellowish brown, (10YR 5/4), mild to moderate	-
				-	Ш	HCl reaction, fragments are gravel-sized	-
235_					No Recovery 234.5-236.0'		
-192.9 -			NR	-	H	-	_
	236.0	-	\dashv		H		-



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-03	SHEET	13	OF	14

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723978.8 N, 457771.7 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DISCONTINUTES DESCRIPTION PORT PROPERTY WATER	LEVELS : 2.0	ft bgs	s on 3/	21/07 START : 3/21/2007 END : 3/	23/20	07 LOGGER : C. Sump, J. Burkard		
240197.9 R25-Sh 10 ft 10 ft NA NA 246.0-256.0' - NA Limestone Fragments 250.0-256.0' - NA NA NA NA NA NA NA NA	≥∩≘	_ (6			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
240197.9 R25-Sh 10 ft 10 ft NA NA 246.0-256.0' - NA Limestone Fragments 250.0-256.0' - NA NA NA NA NA NA NA NA	DEPTH BELOV SURFACE ANI ELEVATION (f	CORE RUN, LENGTH, AND RECOVERY (%	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY. INFILLING MATERIAL AND	SYMBOLIC LC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
250 -207.9 R26-SN 10 ft 86% NA R255 -212.9 NR Pisaggregated Limestone 246.0-254.6' - Same as 236.0-246.0' Limestone Fragments -249.5-254.6' - fine grained, mild HCl reaction, non fossiliferous -250.8-254.6' - mild HCl reaction, highly fossiliferous limestone fragments with voids over 60-80% of surface No Recovery 254.6-256.0'	-40 -197.9 -	R25-SN 10 ft l		NA	236.0-246.0' - NA		236.0-246.0' - yellowish gray, (5Y 7/2), fine grained, moderate to strong HCI reaction, fine-grained limestone fragments, subrounded to	
250.0	-207.9 - - - - - - 255 -212.9	R26-SN 10 ft 86%			246.0-256.0' - NA		Limestone Fragments 249.5-254.6' - fine grained, mild HCl reaction, non fossiliferous 250.8-254.6' - mild HCl reaction, highly fossiliferous limestone fragments with voids over 60-80% of surface	_
		256.0				Ħ		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-03	SHEET	14	OF	14	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723978.8 N, 457771.7 E (NAD83)

ELEVATION: 42.1 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 2.0	ft bgs	on 3/	21/07 START : 3/21/2007 END :	3/23/20	07 LOGGER : C. Sump, J. Burkard	
≥ ∩ ⊙	(9)			DISCONTINUITIES		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
DEPTH SURF/ ELEVA	CORE LENGI RECO	R Q D (%)	FRACT PER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNES	SYMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-				256.0-266.0' - NA	\mp	Limestone Fragments - 256.0-266.0' - Same as 249.5-254.6'	-
					庄	-	
]					十	-	- -
						-	_
260					· I	-	-
-217.9					丁	-	
-	R27-SN 10 ft 100%	NA	NA		H] -	-
	10070				臣	-	_
-						-	-
					#	-	- -
-					臣]-	_
265 -222.9					上	_	_
I -	266.0				\pm	-	-
-					-	Bottom of Boring at 266.0 ft bgs on - 3/23/2007	-
					1	-	=
-					-	-	-
					1	-	- -
-					+	-	_
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PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	I-04	SHEET	1	OF	14	

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723902.3 N, 457585.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

						END: 3/34/3007) · A	ORIENTATION : VEITICAL
WATER	LEVELS	. 1.0 11 09	gs on 3/23		START : 3/23/2007	END: 3/24/2007 SOIL DESCRIPTION	LUGGER	(. A.	Teal, C. Sump COMMENTS
<u>≥</u> 9€	CVMDIL	: INTERVA	I (#\	STANDARD PENETRATION		SOLDEGOM HON		90.	COMMENTO
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE INTERVAL (ft) BECOVERY (ft) SAMPLE INTERVAL (ft) RECOVERY (ft)				SOIL NAME, USCS GROUP SYMBOL, COLOR,			SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
ATI B		RECOVE			MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY				DRILLING FLUID LOSS, TESTS, AND
			#TYPE	6"-6"-6" (N)	CONSISTENC	CY, SOIL STRUCTURE, MINERA	ALOGY	SYM	INSTRUMENTATION
41.6	0.0			(. 1)	Poorly Graded	I Sand (SP)		3.3	
-					0.0-4.0' - moder	rate yellowish brown, (10YR 5 to medium silica sand to 1/16	5/4), trace -		-
-					fines, trace orga	anics, color varies to dark yell	o, irace _ lowish		-
-					orange (10YR 6	6/6) between 1.0-2.0' , dusky y			-
-					(5Y 6/4) betwee	en 2.0-4.0°	-		-
-							-		-
-		6.0	R1-SN				-		-
-							-		-
-					Sandy Lean Cla	lav (CI)	_	///	-
-					4.0-5.0' - pale o	olive, (10Y 6/2), moist, soft, lov			-
5 36.6					medium plastici	ity, slow to rapid dilatancy, no % very fine to fine silica sand	HCI /		R1: 3 minutes
-					Silt (ML)	•			TVI. O Milliates
-	6.0				5.0-6.0' - grayis	sh yellow, (5Y 8/4), wet, stiff, id dilatancy, moderate HCl rea	- ection		-
-					10% very fine s	sand-sized sand, carbonate m	aterials -		-
-					6.0-7.9' - Same	e as 5.0-6.0'	-		-
-							_		_
-					Limestone			₩	_
-					7.9-9.9' - dusky	yellow, (5Y 6/4), medium gra	ined, _		_
-						on, very weak (R1), moderate 6 coverage of small voids	ly _	Ľ	_
-					Cernentea, 6676	v coverage of small volus	_		_
10					Silt (ML)				
31.6					9.9-16.0' - Sam	ne as 4.0-5.0' except small 1-2	" thick _		_
_		10.0	R2-SN		sections of lime	estone	_		_
_							_		_
l -							_		_
l _							_		_
l _							_		_
l _							_		
							_		
1									
15									
26.6									R2: 7 minutes
-	16.0						-]
-					16.0-26.0' - San	me as 5.0-6.0' except strong h	HCI -]
-					reaction, limesto	tone fragments up to 3" thick, s s from gravel-size up to 3/8"	many -]
-]	. 0	-]
-							-		1
-							-		
-							-		
-							-		-
20							-		-
20								┞	
								L	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-04	SHEET	2	OF	14

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723902.3 N, 457585.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DRILLIN	G METH	OD AND	EQUIPM	ENT : Rotosonic S	S/N SR-116, sonic, 6" outer casing and 4" core barrel		ORIENTATION: Vertical
WATER	LEVELS	: 1.0 ft bo	s on 3/23	3/07		R : A	. Teal, C. Sump
≥0₽1				STANDARD PENETRATION	SOIL DESCRIPTION	၂ ဗ္ဂ	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,	SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE,
H BI		RECOVE	RY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR	BOL	DRILLING FLUID LOSS, TESTS, AND
DEPT SURF			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYM	INSTRUMENTATION
21.6 - - - - - - - - - - - - - - - - - - -	26.0	10.0	R3-SN	(N)	Silt With Sand And Limestone Fragments (ML) 26.0-36.0' - Same as 16.0-26.0' except strong HCl reaction, limestone fragments up to 2", 20% very fine to fine sand-sized fragments, last 3" slightly darker in color to light olive gray (5Y 5/2)		R3: 9 minutes
30	36.0	10.0	R4-SN		Limestone 36.0-44.7' - light olive gray, (5Y 5/2), fine to medium grained, strong HCl reaction, medium strong to strong (R3 to R4), strongly cemented, 80-90% coverage of small voids, few cavities up to 1/4" in size	- - - - -	R4: 12 minutes
- - - 40							
						1	1



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-04	SHEET	3	OF	14	

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723902.3 N, 457585.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS	: 1.0 ft bo	gs on 3/23	3/07 5	TART : 3/23/2007 END : 3/24/2007 LOGGE	R:	Α.	Teal, C. Sump
>				STANDARD PENETRATION	SOIL DESCRIPTION		<u>۔</u> ق	COMMENTS
AND (ft.)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME LISCS CROLID SYMBOL COLOR	١	CC	DEPTH OF CASING, DRILLING RATE,
H BE		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	ı	BOLI	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	ı	SYMBOLIC LOG	INSTRUMENTATION
1.6				()		†		
-		100	R5-SN			1		_
		10.0	KO-SIN]		
-						1		_
-						ŧ	Ι	-
-	_					Ł	Τ	-
-						Ł	Τ	-
-						+	Т	-
45					Sandy Lean Clay (CL)	-	///	-
-3.4	-				44.7-46.0' - moderate olive brown, (5Y 4/4), moist, low			R5: 8 minutes
-	46.0				to moderate plasticity, strong HCl reaction, 30-40% sand-sized sand, carbonate materials			-
					Silt (ML)	1	П	
-					46.0-47.6' - light olive gray, (5Y 5/2), nonplastic to low plasticity, moderate to strong HCl reaction, fine to			_
-	-				medium sand-sized particles, carbonate materials	\perp		-
-	_				Limestone 47.6-55.5' - Same as 36.0-46.0' except many zones	Ł	_	-
-	<u> </u>				where rock fragments from fine to medium sand-sized up to cobble sized fragments, possibly from drilling	Ł		-
-					up to copple sized fragments, possibly from drilling	+		-
50						F		-
-8.4	-				_	Ŧ		
-			DC ON			Ŧ		-
		9.5	R6-SN			F		
-						1		_
-						#		-
-						+	I	-
-	-					#	L	-
-	-					#	Ι	-
55	-					†		-
-13.4	1				_	上		R6: 9 minutes
-					No Recovery 55.5-56.0'	1	Τ	-
					Begin Rock Coring at 56.0 ft bgs See the next sheet for the rock core log			
-					occurs fieat affect for the rock core log			
-						1		_
-						-		-
-	-					-		-
-	-					+		-
60	-					1		-
00_						\dagger		



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	1-04	CHEET	4	OF .	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723902.3 N, 457585.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache



PROJECT NUMBER:	BORING NUMBER:		
338884 FI	I-04	SHEET	5 OF 14

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723902.3 N, 457585.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

Second S	Section Page	WATER	LEVELS: 1.0	ft bgs	s on 3/	23/07 START: 3/23/2007 END: 3	24/200	D7 LOGGER : A. Teal, C. Sump	
Limestone To -0.98 0' - Same as 36.0-46.0'	76.0-86.0' - NA 77.0-86.0' - Several salt zones, possibly due to drilling The limestone matrix (drive gray image) in the strong limitation of the	≥Q⊋	(%				၂ ဗွ	LITHOLOGY	COMMENTS
Limestone To -0.98 0' - Same as 36.0-46.0'	76.0-86.0' - NA 77.0-86.0' - Several salt zones, possibly due to drilling The limestone matrix (drive gray image) in the strong limitation of the	DEPTH BELO' SURFACE AN ELEVATION (f	CORE RUN, LENGTH, AND RECOVERY (R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
No Recovery 85.3-86.0'	No Recovery 85.3-86.0' R9: 26 minutes	- - - - - - - - - - - - - - - - - - -	R9-SN 10 ft	NA		76.0-86.0' - NA		 76.0-86.0' - Same as 36.0-46.0' except at 76.0-77.0' dark gray solution features, very fine micro-sized grains, many cavities up to 1/4" 77.0-86.0' - several silt zones, 	gray limestone) has strong HCl reaction, while dark gray features have mild
Section NR	86.0 NX Solution	-43. 4				_	Ы	 - No Recovery 85.3-86.0'	R9: 26 minutes
	- -	-48.4 - - - - - - - - - - - - - - - -	R10-SN 10 ft			86.0-96.0' - NA		Limestone 86.0-91.7' - Same as 36.0-46.0' except yellowish gray, (5Y 7/2), 60-70% coverage of small voids Organic Clay (OH) 91.7-92.0' - greenish black, (5GY 2/1), very stiff, low plasticity, micro stress features (folding) bedding	



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	I-04	SHEET	6	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723902.3 N, 457585.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 1.0) ft bgs	s on 3/	23/07 START: 3/23/2007 END: 3/3	24/20	D7 LOGGER : A. Teal, C. Sump		
>00	(9)			DISCONTINUITIES	₀	LITHOLOGY	COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		rES T	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,	
TH BE	E RU STH., SVEF	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	30E	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD	
DEP SURI ELE\	COR	RQI	FRA(PER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.	
						Limestone		
-				-	世	- 96.0-106.0' - Same as 36.0-46.0'	1	
				96.0-106.0' - NA	96.0-106.0' - NA	」]
_			NA	-	上	=		
_				-	士	_		
-				-	Ь	_	-	
100_ -58.4				-	╁	_	-	
-	R11-SN				┢	_	-	
-	10 ft 50%	NA		-	F	No Recovery 101.0-106.0'	†	
-				-	F	-	1	
					H	_]	
_					F	_]	
_			NR	-	F	_		
-				-	F	_	-	
405				-	H	-	-	
105_ -63.4				-	Ħ		R11: 27 minutes	
-	106.0			-	Ħ	[†	
_	100.0		\dashv	<u> </u>	Ħ	Disaggregated Weak Limestone 106.0-116.0' - very pale orange,	Logger changes to C. Sump at 106.0' until end of	
					片	(10YR 8/2), strong HCl reaction,	log	
_				106.0-116.0' - NA -	H	gravel-sized clasts of more indurated fine grained material, thin (<1/32")	Driller's Remark: -	
_				-	H	calcite fracture coating observed on one indurated fragment, fossil molds	maintaining drilling fluid _ circulation at 106.0-112.0'	
-				-	片	 visible on few indurated fragments: 	-	
-				-	世	115.5-116.0' - weak (R2), roughly horizontal parting surfaces (2-3"	Weak limestone completely disaggregated	
110				-		 apart), rough and undulating 	by drilling method –	
-68.4					L	_	Run time: N/A, core at end	
-	R12-SN		NIA	-	L	Ī	of previous shift retrieved – at start of this shift	
	10 ft 100%	NA	NA		尸		(3/24/07)	
					F	_		
_				<u>-</u>	F	=]	
-	_			-	F	_		
-	-				┌	_	-	
-	-			-	厂	-	-	
115				-	仜	-	-	
115 <u></u> -73.4				_	口	<u> </u>	-	
	116.0			-	口	<u> </u>	-	
					<u> </u>			



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-04	SHEET	7	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723902.3 N, 457585.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

COMING	METHOD /	ND L	JUII IV	IENT: Rotosonic S/N SR-116, sonic, 6" outer casing and	7 ((ne barrer	ORIENTATION : Vertical
WATER	LEVELS: 1.0	ft bg	s on 3/	23/07 START : 3/23/2007 END : 3/2	24/20	D7 LOGGER : A. Teal, C. Sump	
200	(3)			DISCONTINUITIES	U	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		SI.	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	OUTE AND DEDTIL OF GARNING
ᆱᇬ	RUN H, A	(%) Q	URE TOC	DEDTH TYPE OBJENITATION BOUGHNESS	1	MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
PT-FA-N	RE VGT) Q (ACT R F(DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	MBC	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SU	Sää	A Q	FRACTURES PER FOOT	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SY	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
					ш	Limestone Fragments	i
-				-	╁	- 116.0-124.5' - very pale orange,	-
-				- 116.0-126.0' - NA		(10YR 8/2), strong HCl reaction, fragments very weak and friable,	-
-				-	╀	 range in size from fine gravel to 3.0" 	-
-				-	П	lenticular disc-shaped fragments (1-2" thickness), large fragments	-
-				-	世	may be indicative of thin more	-
_				_	H	competent limestone beds with	_
						weaker interbeds that disintegrate during drilling	_
120					\vdash		
-78.4			NA	_	ш		
1 -	R13-SN			·	┢	†	1
1 -	10 ft 85%	NA		-	F	-	
-	00/0			-	Ħ	-	-
-				-	⊬	-	-
-				-	匚	_	-
-				-	H	_	-
-				-	F	_	-
_				_		_	
_				_	╨	_	Material lost from 124.5- 126.0' may have been fines -
125_					口	No Recovery 124.5-126.0'	lost over length of run
-83.4			NR				R13: 17 minutes
	126.0				Н		
						Disaggregated Limestone With	
-				-	╨	 Limestone Fragments 126.0-133.9' - very pale orange to 	1
-				126.0-136.0' - NA	\Box	yellowish gray, (10YR 8/2 to 5Y 7/2),	1
-				-		 very strong HCl reaction, >15% gravel-sized limestone fragments, 	1
-				-	╁	limestone fragments 1" or less in silty	-
-				-	岸	- zone increasing to 2.5" in the lower	-
-				-		half of run, silt-size particles grading with depth into sand-sized fragments	-
-				-	╙	-	_
130 <u> </u>			NA	_	ш	<u></u>	-
-50.4	B			-	\vdash	-	-
1 -	R14-SN 10 ft			-	F	 -	_
1 4	79%			_	Ľ	_	_
				_	\vdash		
					Щ		
				_	上]
1 1				-	H		1
-				·	岸	T	1
1 -				-		No Recovery 133.9-136.0'	
105				-	匚	-	-
135 -93.4			NR	_	世	-	R14: 20 minutes
-				-	\vdash	-	-
-	136.0				F		



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	I-04	SHEET	8	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723902.3 N, 457585.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 1.0) ft bg:	s on 3/	23/07 START: 3/23/2007 END: 3/2	24/20	D7 LOGGER : A. Teal, C. Sump	
≥0≎	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - -				- 136.0-146.0' - NA - - -		Disaggregated Limestone With Limestone Fragments 136.0-140.0' - very pale orange, (10YR 8/2), strong HCl reaction, gravel-sized (<1.0" diameter) fragments similar to 126.0-136.0, horizontal partings range from 0.75-3.0" with little to no fine grained infill material	- - - - -
140 -98.4 - - - - - -	R15-SN 10 ft i 87%		NA			Limestone And Limestone Fragments 140.0-142.5' - very pale orange, (10YR 8/2), strong HCl reaction, medium strong (R3), fossiliferous limestone with molds and casts, fine grained with irregular zones of small voids (<1/32-1/8") covering 25-30% of surface, large brachiopod molds and casts up to 0.75" diameter, surfaces of molds and casts have fine crystalline appearance indicating partial recrystallization, fine grain pyrite crystals on the interior of some	
145 -103.4 -	146.0	N	NR		H	molds; horizontal partings range from 0.75-30" with little or no fragment infill material Limestone	R15: 24 minutes Driller's Remark: Lost
-150 -108.4 	R16-SN 10 ft 75%		NA	146.0-156.0' - NA			Circulation (driving 6" casing) at approximately 141' Trace very fine silica sand grains (<5%)
155_ -113.4 -	156.0		NR			- - -	R16: 22 minutes



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	l I-04	SHEET	9	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723902.3 N, 457585.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

Page Page	WATER	LEVELS : 1.0			23/07 START: 3/23/2007 END: 3/2			
160118.4 NA 160118.4 NA R17.Sb. 10.ft NR NR R18.Sh. 10.ft NR NA R18.Sh. 10.ft NR R18.Sh. 10.ft NR NA R18.Sh. 10.ft NR R18.Sh. 10.ft NR R18.Sh. 10.ft NR NA R18.Sh. 10.ft NR R18.Sh. 10.ft NR NA NA R18.Sh. 10.ft NR NA NA R18.Sh. 10.ft NR NA NA NA R18.Sh. 10.ft NR NA NA NA NA NA NA R18.Sh. 10.ft NR NA NA NA NA NA NA NA NA NA	≥∩ ∷	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
160118.4 NA 160118.4 NA R17.Sb. 10.ft NR NR R18.Sh. 10.ft NR NA R18.Sh. 10.ft NR R18.Sh. 10.ft NR NA R18.Sh. 10.ft NR R18.Sh. 10.ft NR R18.Sh. 10.ft NR NA R18.Sh. 10.ft NR R18.Sh. 10.ft NR NA NA R18.Sh. 10.ft NR NA NA R18.Sh. 10.ft NR NA NA NA R18.Sh. 10.ft NR NA NA NA NA NA NA R18.Sh. 10.ft NR NA NA NA NA NA NA NA NA NA	DEPTH BELOV SURFACE ANI ELEVATION (ft	CORE RUN, LENGTH, AND RECOVERY (%	Ø	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LO	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
except moderate yellowish brown, sandy slift at bottloms No Recovery 183.5-166.0° Disaggregated Limestone With Limestone Fragments 1 to pour form of graing with depth to subrounded limestone fragments at top or nur graing with depth to Poorly Graded Gravel with Sand (GP), sand-sized dragments are all carbonate derived and likely segred during drilling 161.6-161.8° moderate yellow brown, (10YR 5/4), strong HCI reaction Limestone 161.8-164.7° moderate yellow brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), moderate to strong particularly at grain boundaries HCI reaction, agillaceous, from grain glight gray, N7) No Recovery 164.7-166.0° Limestone RRIS-SN No 10 ft 8/8% RRIS-SN NO 10 ft 8/8% RR		10 ft		NA	- 156.0-166.0' - NA - - - - -		- 147.8-150.5' - pale yellowish brown, (10YR 6/2), strong HCI reaction, medium strong to strong (R3 to R4), dense, poorly fossiliferous with few small voids (1/32-1/8") on <5% of surface, light gray (N7) clayey silt interbed at 148.2' (2" thick) with thin coatings on partings below, slight recrystallization evident on fresh surfaces 150.5-151.5' - moderate yellowish brown, (10YR 5/4), mild to moderate HCI reaction, friable thinly bedded (<1/2") limestone fragments with sandy fines, trace silica sand grains (<5%)	fell out of core barrel during retrieval. Used 20' core barrel to recover this interval plus following run (166.0-176.0'). Sample is disturbed, upward fining sequence from 156.0- 161.0' may be the result of losing the sample on first attempt.
166.0-176.0' interval not disturbed 166.0-176.0' - NA 1770 - Table				NR	- - - - -		except moderate yellowish brown, sandy silt at bottom No Recovery 153.5-156.0' Disaggregated Limestone With Limestone Fragments 156.0-161.6' - with few subangular to subrounded limestone fragments at top of run grading with depth to Poorly Graded Gravel with Sand (GP), sand-sized and gravel-sized fragments are all carbonate derived	grains
- NR	-128.4 	R18-SN 10 ft		NA	166.0-176.0' - NA		brown, (10YR 5/4), strong HCI reaction Limestone 161.8-164.7' - moderate yellow brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), moderate to strong particularly at grain boundaries HCI reaction, argillaceous, horizontal partings, 1-6" spacing with light gray sandy silt interbeds/coating (light gray, N7) No Recovery 164.7-166.0' Limestone 166.0-168.5' - light olive gray, (5Y 5/2), moderate especially grain boundaries HCI reaction, poorly to moderately indurated argillaceous fine grained limestone, finely laminated, with very thin (1/16-1/8") very pale orange (10YR 8/2) laminations, 1/8"-3/8" spacing, more indurated zones exhibit well developed bedding plane partings, less indurated zones are soft and friable and exhibit contorted lamination surfaces, pale orange	
	-133.4 133.4 	176.0		NR	-		greater than olive gray -	-



PROJECT NUMBER:	BORING NUMBER:				
338884 FI	1-04	QUEET	10	OE	4.

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723902.3 N, 457585.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 1.0) ft bgs	s on 3	/23/07 START: 3/23/2007 END: 3/2	24/20	07 LOGGER : A. Teal, C. Sump	
≥ D ≥	(%)			DISCONTINUITIES	၅	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-180 -138.4 -138.4 -	R19-SN 10 ft ' 84%		NA			Limestone 168.5-171.0' - yellowish gray, (5Y 7/2), medium strong (R3), poorly fossiliferous with small voids (1/16-1/8") over <10% of surface, horizontal partings 1-4" spacing, light gray (N7) clayey silt with gravel-sized limestone fragments Limestone Fragments 171.0-174.9' - Same as 168.5-171.0' except with more fragmentation and disaggregation (down to silt and clay-sized particles) possibly due to drilling, full core-sized limestone fragment at end of run No Recovery 174.9-176.0' Limestone Fragments 176.0-178.6' - moderate yellow brown, (10YR 8/9), fine grained, argillaceous, with fine gravel-sized small fragments, fragments exhibit well defined bedding plane fractures (1/4" bedding) Disaggregated Limestone With Limestone Fragments	- 10% silica fine sand
-185_ -143.4 -	186.0		NR	- -		178.6-178.9' - moderate yellow brown, (10YR 8/9), medium to coarse grained, moderate HCl reaction Limestone	R19: 33 minutes
- - - - 190 -148.4 - - - - - - - - - 195 -153.4	R20-SN 10 ft 1 93%		NA	186.0-196.0' - NA		Limestone 178.9-182.0' - grayish orange, (10YR 7/4), 20-30% small voids (1/16-1/8") in discreet zones, few larger solution cavities (possible fossil molds) 1"x1" Disaggregated Limestone With Limestone Fragments 182.0-183.5' - Same as 178.9-182.0 except moderate yellow brown, (10YR 8/9), 4" layer argillaceous, limestone fragments are gravel-sized Limestone 183.5-184.4' - Same as 178.9-182.0' except increasing fossil content with depth, large (up to 1.0") brachiopod and gastropod molds and casts No Recovery 184.4-186.0'	
-153.4	196.0		NR		Ė	-	R20: 23 minutes
	130.0						



PROJECT NUMBER: BORING NUMBER:

338884.FL I-04

SHEET 11 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723902.3 N, 457585.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel

ORIENTATION : Vertical

WATER	LEVELS : 1.0) ft bgs	s on 3/	23/07 START: 3/23/2007 END: 3/2	24/200	D7 LOGGER : A. Teal, C. Sump	
≥ ∩≎	(%)			DISCONTINUITIES	ဖွ	LITHOLOGY	COMMENTS
SELO E ANI ON (fi	JN, AND RY (%	(0	RES OT	DESCRIPTION) 	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
200158.4	R21-SN 10 ft 92%	NA	NA	196.0-206.0' - NA		Limestone And Limestone Fragments 186.0-195.3' - grayish orange, (10YR 7/9), limestone with variable percentage of small voids (1/16-1/8"), larger cavities and fossil molds up to 1.0" in diameter (few), length of full core diameter limestone fragments range from 1-2" with few fragments >3.0", parting surfaces are rough and irregular, zones of smaller fragments contain fine grained limestone with little or no fossils/small voids, smaller fragments tend to be more angular and exhibit well define bedding planes approximately 1/2"-3/4" thick, sand-sized and gravel-sized limestone fragments at end of run 193.8-195.3' No Recovery 195.3-196.0' Limestone Fragments 196.0-199.0' - fine grained, mild to moderate HCI reaction, medium	- - - - - - - - - - - -
205 -163.4 - - - - - - 210 -168.4	206.0		NR	206.0-216.0' - NA		strong (R3), 90% fragments are >1" diameter, angular and lack well developed bedding plane surfaces (rough, irregular fracture surfaces), tends to be more equidimensional than fine grained limestone fragments noted earlier, trace silt-sized particles 199.0-201.0' - well graded upward fining sequence of fine grained limestone fragments beginning with coarse sand-sized and ending with fragments >1" similar to above 201.0-204.2' - fragments are gravel-sized, and are less angular, contain small voids (1/16"-1/8") over 10-20% of surface, and are more fossiliferous than fragments above Disaggregated Limestone 204.2-205.2' - moderate yellow brown, (10YR 7/4), strong HCI	R21: 22 minutes
- - - - - 215 -173.4	R22-SN 10 ft 100%		NA	- - - - - -		orown, (10YR 7/4), strong HCl reaction, "punky texture", weakly indurated, somewhat mottled/remnant laminations No Recovery 205.2-206.0' Disaggregated Limestone With Limestone Fragments 206.0-216.0' - moderate HCl reaction, all material carbonate derived, limestone fragments are gravel-sized, large (>3.0") limestone fragments at 208.2-209.3', 6" slightly indurated silt bed at 212.0', finely laminated more indurated layers in center of bed (<3/4" thick)	- - - - -



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-04	SHEET	12	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723902.3 N, 457585.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 1.0	ft bg	s on 3/	23/07 START: 3/23/2007 END: 3/2	24/20	07 LOGGER : A. Teal, C. Sump	
≥ ∩ ⊕	(,)			DISCONTINUITIES	ű	LITHOLOGY	COMMENTS
N (#	N, AND ≪ (%		KES T	DESCRIPTION	010	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
Δош	072	œ	ΨФ	THIORNEGO, GOTA AGE GTAINING, AND HOTTINEGO	S	Disaggregated Limestone With	
-				-	F	 Limestone Fragments 	-
-				216.0-226.0' - NA	Ħ	216.0-226.0' - mild HCl reaction, grading to Silty Sand with Gravel	-
-				-	Ħ	 (SP-SM) in places, similar to above 	-
-				-	H	(206.0-216.0') except greater silt and sand-sized particles and limestone	-
-				-	岸	 fragments are smaller (<1") and weaker (very friable) 	-
					片	- 216.6-217.0' moderately indurated	
220				_	H	silt-sized, light gray (N7) bed, friable	
-178.4				_	⊬	_	_
-	R23-SN 10 ft	NA	NA	-	E	-	_
-	94%			-	\vdash	-	-
-				-	H	_	-
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-				-	口	-	-
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-				-	世	<u> </u>	-
225				-	世	_	_
-183.4					上	- No Bossyam, 225 4 226 0	R23: 24 minutes
-	226.0		NR	_	上	No Recovery 225.4-226.0'	_
-				-	団	Disaggregated Limestone With Limestone Fragments	_
-				226.0-236.0' - NA	士	226.0-236.0' - Same as 216.0-226.0' except no semi indurated silt bed,	_
-				-	╁	 slight increase in overall fine to 	-
-				-	H	medium sand-sized material (carbonate derived), few zones with	-
-				-	F	 very thin (<3/4") gravel-sized angular fragments of limestone (or indurated 	-
-				-	F	calcareous silt-sized material)	_
230					F		_
-188.4				_	F	_	_
-	R24-SN 10 ft	NA	NA	-	片	-	_
-	100%			-	H	-	-
-				-	F	_	-
-				-	Ħ	-	-
-				-	Ħ	-	-
-				-	H	<u> </u>	
1 -				-	1		1
235_					片		
-193.4				_	片	_	R24: 36 minutes
<u></u>	236.0				\vdash		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-04	SHEET	13	OF	14

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723902.3 N, 457585.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

CORING	NETHOD A	ND E	JUIPIV	IENT: Rotosonic S/N SR-116, sonic, 6" outer casing and	4 C	ore parrei	ORIENTATION : Vertical
WATER	LEVELS: 1.0	ft bg	s on 3/	23/07 START: 3/23/2007 END: 3/2	24/20	D7 LOGGER : A. Teal, C. Sump	
>	<u> </u>			DISCONTINUITIES	U	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) Q	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP SUR ELE	COR	A D	FRA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	- SYM	AND ROCK MASS CHARACTERISTICS Disaggregated Limestone With	DROPS, TEST RESULTS, ETC.
- - - - - - 240				236.0-246.0' - NA		Limestone Fragments 236.0-246.0' - Same as 226.0-236.0' except weakly consolidated silt-sized material with little gravel-sized limestone fragments from 236.0-237.5', otherwise very similar to above	- - - - - -
-198.4 -198.4 - - - - - - - - - - 245 - -203.4	R25-SN		NA	_			R25: 27 minutes
250 -208.4 	R26-SN 10 ft 100%		NA	246.0-256.0' - NA		246.0-256.0' - mild to moderate HCI reaction, slightly more indurated silt-sized material forming larger clasts, finely laminated very weakly indurated 6" thick silt zones at 248.5, 249.2', 251.8' and 254.0' (repeating sequence), may be argillaceous	R26: 31 minutes
	256.0				F		
							<u> </u>



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-04	SHEET	14	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723902.3 N, 457585.6 E (NAD83)

ELEVATION: 41.6 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

CORING	NETHOD A	ND E	JUIPIV	IENT: Rotosonic S/N SR-116, sonic, 6" outer casing and	4 ° CC	ore parrer	ORIENTATION : Vertical
WATER	LEVELS : 1.0) ft ba	s on 3/	23/07 START: 3/23/2007 END: 3/	24/20	007 LOGGER : A. Teal, C. Sump	
				DISCONTINUITIES	П	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	-	[₍₀]	DESCRIPTION	SYMBOLIC LOG		
O N A	Z, A, ∑	_	FRACTURES PER FOOT	DESCRIPTION	⊒	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
ATI	J. H.	%)		DEPTH, TYPE, ORIENTATION, ROUGHNESS,	ğ	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
F F F F	NS S	Q D (%)	SAC FIRE	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	₽	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ESE	8.58	ď	뜐뮙	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	Briol 6, 1261 1126216, 216.
					ш	Disaggregated Limestone With	No silica sand grains
-				-	╁	- Limestone Fragments	visible (too fine grained) -
				050 0 000 01 NA	+-	256.0-266.0' - Same as 246.0-256.0'	-
				256.0-266.0' - NA	\Box	except lack of distinct laminated beds of silt-sized material, silty sand-sized,	
					Н	with gravel-sized limestone	
1 7						fragments (weak, friable), all	7
-					╙	 carbonate derived 	-
-					╁╌	<u> </u>	_
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260					\vdash	-	
-218.4				_	ഥ	<u></u>	_
-	R27-SN	l			 	<u> </u>	4
	10 ft		NA		╀	_}	-
	100%				\Box	1 l	
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265				-	┰	<u>†</u>	
-223.4				_		<u> -</u>	R27: 37 minutes
					₩	-	-
1 _	266.0						
						Bottom of Boring at 266.0 ft bgs on	
1 7	1			·	1	- 3/24/2007	_
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-05	SHEET	1	OF	14	

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724148.8 N, 457804.5 E (NAD83)

DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache ELEVATION: 42.2 ft (NAVD88)

DRILLIN	DRILLING METHOD AND EQUIPMENT: Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION: Vertical										
WATER	LEVELS	: 4.41 bg	s on 3/6/0)7 5	TART : 2/9/2007						
				STANDARD	SOIL DESCRIPTION Q COMMENTS						
ANG	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS							
ACE AT S		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND						
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6"	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION						
<u>42.2</u>	0.0			(N)	Poorly Graded Sand (SP) "Water level is based on Ground Water						
- - - - - -	0.0	6.0	R1-SN		0.0-5.0' - brownish gray, (5YR 4/1), moist, very fine grained, no HCl reaction, angular to subrounded, weakly to moderately iron oxide stained, black organic blebs, limited bedding, silica sand 1.0-1.5' - brownish black to moderate brown, (5YR 2/1 to 5YR 3/4) 1.5-5.0' - light brown to dark yellowish orange, (5YR 5/6 to 10YR 6/6) Water levels were not recorded for I-05 Coring run times were not recorded for I-05						
5 37.2 -	6.0				Well Graded Sand With Silt And Limestone Fragments (SW-SM) Fragmen						
- 10 32.2 	16.0	10.0	R2-SN		5.0-6.0' - pale green, (10G 6/2), no to mild HCI reaction, 10-15% fines and 20% rock fragments (very hard, with shell fragments) Poorly Graded Sand With Silt (SP-SM) 6.0-7.3' - dark yellowish orange, (10YR 6/6), very fine grained, no to mild HCI reaction, 12-15% nonplastic fines, iron oxide staining, silica sand Clayey Sand (SC) 7.3-8.1' - dark yellowish orange to light brown, (10YR 6/6 to 5YR 5/6), very fine to fine grained, no HCI reaction, 15% medium plastic fines, silica sand, iron stained Sandy Silt (ML) 8.1-13.0' - grayish orange, (10YR 7/4), loose, nonplastic, no dilatancy, mild HCI reaction, with very fine to fine grained sand-sized particles, carbonate materials Sandy Silt And Limestone Fragments (ML) 13.0-19.0' - grayish orange, (10YR 7/4), low plasticity, mild to moderate HCI reaction), all carbonate material Silt (ML) 19.0-20.0' - grayish orange, (10YR 7/4), low plasticity, mild to moderate HCI reaction, carbonate material						



PROJECT NUMBER: BORING NUMBER: 338884.FL I-05 SHEET 2 OF 14

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724148.8 N, 457804.5 E (NAD83)

DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache ELEVATION: 42.2 ft (NAVD88)

DRILLIN	ORILLING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical										
WATER	LEVELS	: 4.41 bg	s on 3/6/0)7 S	TART : 2/9/2007 END : 2/12/2007 LOGGER : M. Faurote, J. Burkard						
				STANDARD	SOIL DESCRIPTION O COMMENTS						
A PON E	SAMPLE	INTERVAL (ft)		PENETRATION TEST RESULTS							
A BE		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND						
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6"	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION						
				(N)							
22.2		10.0	R3-SN		Silty Sand With Limestone Fragments (SM) 20.0-21.3' - dusky yellow, (5Y 6/4), limestone fragments are friable, 1/4" to 2" in size, fossiliferous (casts/molds), some shell "hash", all carbonate material Sandy Silt (ML) 21.3-24.8' - dusky yellow, (5Y 6/4), nonplastic to low plasticity, mild to moderate HCl reaction, carbonate material						
25_ 17.2 - - -	26.0				Silty Sand With Limestone Fragments (SM) 24.8-31.2' - grayish orange, (10YR 7/4), fine to coarse grained, moderate HCl reaction, with nonplastic to low plasticity fines and fine to coarse gravel-sized (1/4 to 1/2") limestone (fossiliferous [molds/casts], friable), all carbonate materials, iron oxide staining at 27.0'						
- - - 30_ 12.2											
- - - -		10.0	R4-SN		Limestone 31.2-34.0' - greenish gray, (5GY 6/1), very fine to fine grained, mild HCl reaction, fragmented (up to 2" size), fragments separated by fat clay with sand (pale yellowish brown [10YR 6/2]), limestone fragments have abundant fossil casts, sparse organic fragments and cast linings, HCl reaction occurs mostly at void linings and healed fractures Silt With Sand (ML)						
35 7.2 -	36.0				34.0-36.0' - pale yellowish brown, (10YR 6/2), nonplastic, moderate HCl reaction, with very fine grained sand-size particles, all carbonate materials Silica grains (yeny fine) to silt sized in yeny						
- - - - - - 40					Fat Clay With Sand (CH) 36.0-37.6' - grayish brown, (5YR 3/2), high plasticity, no HCl reaction, with very fine to fine grained silica sand, organic rich Silty Sand To Sandy Silt (SM) 37.6-47.8' - pale yellowish brown, (10YR 6/2), trace fine gravel-sized fragments of fossiliferous limestone, with grayish brown (5YR 3/2) stringers of clay (medium plastic, trace sand-sized grains) at 46.7-47.5', all carbonate materials						



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-05	SHEET	3	OF	14	

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724148.8 N, 457804.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DRILLING METHOD AND EQUIPMENT: Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel

ORIENTATION: Vertical

			s on 3/6/0		START: 2/9/2007	END : 2/12/2007		GER :	- М	Faurote, J. Burkard
			5 511 5/0/0/	STANDARD		SOIL DESCRIPTION				COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS				\dashv	SYMBOLIC LOG	
BEL 10N		RECOVE		TEST RESULTS	SOIL NAM	ME, USCS GROUP SYMBO	DL, COLOR,		CIC	DEPTH OF CASING, DRILLING RATE,
T A F			#TYPE	6"-6"-6"	CONSISTEN	E CONTENT, RELATIVE [NCY, SOIL STRUCTURE, I	MINERALOGY		MBC	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
SUB			#1117	(N)					SΥ	
2.2										_
l .		10.0	R5-SN					1		_
		10.0	110 011							_
];		_
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-								1		_
-										_
-								4.		<u>-</u>
45								4		
-2.8								4		<u>-</u>
-	46.0							4		-
-								4		-
-								4		Grayish brown clay (5YR 3/2) as stringers,
-								4		tacky, soft and contains minor sand size grains
-					Sandy Silt Wi	th Limestone Fragmen	s (ML)	7	Н	-
-					47.8-56.0' - pa	ale yellowish brown, (5YI oderate HCl reaction, wit	R 3/2), moist,	- 4		-
-					fine sand-size	d particles and 20-35%	ine to coarse	- 4		-
-					gravel-sized lin	mestone fragments, per ments increases with de	centage of oth all	- 4		-
50 -7.8					carbonate mat	terials	p, a	4		Brown clay seams
-7.0 -								- 4		-
-		10.0	R6-SN							-
-										-
-										Clay seams
-								4		Gravel-sized fragments increase in
-								- 1		percentage to end of run
-								- 1		-
-								- 1		-
										-
55 <u> </u>								\dashv		_
-								- 1		-
-					Begin Rock Co	oring at 56.0 ft bgs		\dashv	Щ	
-					See the next s	sheet for the rock core lo	g	\dashv		-
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-05	SHEET	4	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724148.8 N, 457804.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER LEVELS: 4.4	1 bgs	on 3/6	5/07 START : 2/9/2007 END : 2/	2/200	D7 LOGGER : M. Faurote, J. Burkard	
\$Q\$ 08			DISCONTINUITIES	စ္က	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft) CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
56.0 - 56.0 - 7.8 - 7.8 - 7.8 - 7.8 - 7.9 - 7.0 -		NA	56.0-66.0' - NA		Limestone Fragments 56.0-57.5' - pale yellowish brown, (10YR 6/2), fine to medium grained, moderate HCl reaction, fragments from 1/2" to 1" in length, fossil casts and tiny voids over 100% of the surface Disaggregated Limestone With Limestone Fragments 57.5-62.5' - dusky yellow, (5Y 6/4), moderate HCl reaction, sparse limestone fragments to 4" Limestone 62.5-66.0' - pale yellowish brown, (10YR 6/2), fine to medium grained, moderate HCl reaction, medium strong (R3), limestone fragments from 1/2" to 8" with fossil casts and small (<1/16" voids over 100% surface, interbedded with clay	Rock may have been fragmented due to the drilling process Limestone fragments 58.5-59.3', 61.7-62.0' NA = Not Applicable NR = No Recovery
70 -27.8 - R8-SN 10 ft 100% 	NA	NA	66.0-76.0' - NA		66.0-70.0' - moderate olive brown, (5Y 4/4), fine grained, strong HCI reaction, medium strong to strong (R3 to R4), fragmented, with fragments from 4" to 6", fossiliferous with voids (<1/16") covering 85% of surface, intermittent sections of clay, silt, gravelly silt, and silty clay comprising 10% of core Disaggregated Weak Limestone 70.0-71.0' - light brown, (5YR 6/4), moderate to strong HCI reaction, all carbonate derived 71.0-71.8' - light medium brown to grayish orange, (10YR 7/4) Limestone 71.8-76.5' - Same as 66.0-70.0' except light brown, (5YR 6/4), weak to medium strong (R2 to R3), fragments to 3" in length, 15% fine sand-sized particles, sparse organic material	SC-1 collected at 69.3- 70.0' Possible organics in 1/4" or less stringers -



ı	PROJECT NUMBER:	BORING NUMBER:					
	338884.FL	I-05	SHEET	5	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724148.8 N, 457804.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 4.4	1 bgs	on 3/6	5/07 START : 2/9/2007 END : 2/	12/20	D7 LOGGER : M. Faurote, J. Burkard	d
≥ ∩ ∵	. (9			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
ELOV ON (#	Ä, AND (%)		ZES JT	DESCRIPTION	IC LO	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - - - 80 -37.8	R9-SN		NA	76.0-86.0' - NA		Disaggregated Limestone With Limestone Fragments 76.5-79.5' - light brown, (5YR 5/6), strong HCl reaction, gravel-sized (3/8" to 1") limestone fragments Limestone 79.5-85.0' - moderate yellowish brown, (10YR 5/4), moderate HCl reaction, medium strong to strong	Limestone fragments are very friable, easily broken with finger pressure, very fossiliferous and composed of sand and silt sized carbonate derived grains
- - - - 85 -42.8	K9-Sh 10 ft 90%	NA	NR	- - - - - -		(R3 to R4), fragments up up 4" in length, infilling between fragments or partings, partings range from 1/2" to 2" wide, 60-70% porosity on fresh surface, delayed reaction to HCl	- - - - - - -
	86.0			_	H	_	
90 -47.8 -	R10-SN 10 ft 90%		NA	86.0-96.0' - NA		Limestone 86.0-87.0' - moderate yellowish brown, (10YR 5/4), moderate HCl reaction, pulverized to sand-sized particles Limestone Fragments 87.0-88.0' - light brown, (5YR 5/6), fragments are in a sandy silt matrix, probably separated from material 86.0-87.0' Disaggregated Limestone With Limestone Fragments 88.0-89.8' - yellowish gray, (5Y 7/2), strong HCl reaction, carbonate derived, subrounded limestone fragments up to 1-1/2", with moderate HCl reaction Disaggregated Limestone 89.8-92.5' - yellowish gray, thinly bedded (<3/8") down to varve-like planes Limestone 92.5-93.4' - very pale orange, (10YR 8/2), micritic, sparse flecks of organic material	Limestone contains numerous voids (65-70%) of fossil casts and molds, thin (<1/8") organic stringers less than 1/2" long
-52.8	96.0		NR			-	-



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-05	SHEET	6	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724148.8 N, 457804.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 4.4	1 bgs	on 3/6	6/07 START: 2/9/2007 END: 2/	12/20	D7 LOGGER : M. Faurote, J. Burkard	j
≥∩≎	(%)			DISCONTINUITIES	ပ္ထ	LITHOLOGY	COMMENTS
N (ft O)	N, AND ≪ (%		ES	DESCRIPTION	C LO	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
					Ш	Disaggregated Limestone With	
					Щ	 Limestone Fragments 93.4-95.0' - very pale orange fines, 	
				96.0-106.0' - NA	Ш	(10YR 5/2), strong HCl reaction, grayish orange pink (5YR 7/2)	
_					Ш	limestone fragments from 3/16" to	_
-				-	Ш	>2", fragments are fossiliferous with casts and molds, <5% shell	_
-				-	Ш	fragments, <10% organic material, fragments react moderately to HCl	-
-				-	Ш	No Recovery 95.0-96.0'	_
100_ -57.8				-	Н	Disaggregated Limestone With Limestone Fragments	_
-	R11-SN			-	Ħ	 96.0-115.5' - very pale orange, (10YR 8/2), moderate to strong HCI 	-
-	10 ft 100%	NA	NA	-	Ħ	reaction, grades from a tacky, pasty, carbonate derived silt/clay with	-
-				-	Ħ	10-15% sand-sized particles	_
					Ħ	becoming 35-45% gravel-sized fragments at 102.3', fragments are	
_				_	Ħ	fossiliferous limestone (bi-valves, forams and bryozoans) with 50%	_
-				<u>-</u>	H	void space, no organic material	_
-	-			-	Ħ	-	_
				-	H	-	-
105_ -62.8					H	_	
-	106.0			-	H	_	-
-	100.0			-	Ш	_	-
-				-	Ш	-	-
				106.0-116.0' - NA	Н	_]
_				_	Н	_	_
-				-	Н	_	_
-				-	Н	_	-
-				-	H	-	-
110 -67.8					H	<u> </u>	
-	R12-SN		NA	-	H	Very friable light brown (5YR 6/4)	Loose carbonate grains ar
	10 ft 95%	NA		_	Н	 limestone fragments of carbonate derived sand and silt at 110.5', 	the same as the - constituents of the
				_	\vdash	fragments from 2"x2-1/2" to pea gravel size with numerous fossil	limestone fragments, suggesting that the drilling -
-				<u>-</u>	H	casts and visible shell fragments,	method disaggregates the
-				-	口	most of the rock is sand and silt-sized grains, void space is	limestone
-				-	Щ	minimal at 25-30%, moderate HCl reaction	-
-				-	Ш	-	-
115				-	団	-	-
115_ -72.8				-	団		-
-	116.0		NR	-	Ш	No Recovery 115.5-116.0'	-
1					ı		ı



PROJECT NUMBER:

338884.FL

BORING NUMBER:

I-05 SHEET 7 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724148.8 N, 457804.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 4.4	1 bgs	on 3/6	6/07 START : 2/9/2007 END : 2/	12/20	D7 LOGGER : M. Faurote, J. Burkard	d
≥00	(,)			DISCONTINUITIES	Ğ	LITHOLOGY	COMMENTS
ELOV N (ft	AND 37 (%		ZES T	DESCRIPTION	CLO	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
				_	E	Disaggregated Limestone With - Limestone Fragments	_
-				116.0-126.0' - NA	L	116.0-118.3' - very fine grained, 6" of light brown sandy silt-sized particles	Delayed mild to moderate
-				- TIO.0-120.0 - NA	世	 with gravel-sized particles atop 0.8' 	reaction to HCl on actual -
-				-	H	of limestone fragments, pale yellowish brown (micritic) limestone	limestone, finer grained clast fillings react strongly
-					片	 clasts with 15% void space and poorly fossiliferous 	to HCl - This is carbonate silt-sized
_					片	Disaggregated Limestone 118.3-123.1' - very pale orange to	material -
120 <u>-</u> 77.8				_	H	grayish orange, (10YR 8/2 to 10YR 7/4), strong HCl reaction, strong	_
-	R13-SN			-	厈	 reaction to HCl in all carbonate derived particles, gravel-sized 	-
-	10 ft 100%	NA	NA	-		fragments at 120.5-121.0'	-
-				_	\vdash	_	
-				-	上	_	-
-				-	世		-
-				-	口	Limestone Fragments 123.1-125.2' - very pale orange,	-
-				•	F	(10YR 8/2), strong HCl reaction, limestone fragments up to 1" in size	
125_ -82.8				_	$oxed{\mathbb{H}}$	_	_
-	126.0			-	H	_ 125.2-126.0' - very pale orange, (10YR 8/2), 15% fragments (up to	-
-	120.0			-	Ħ	3/4") of very fine grained limestone 126.0-128.1' - very pale orange,	The sequence at 126.0-
-				-	片	(10YR 8/2), moderate HCl reaction, sand and silt-sized carbonate grains,	136.0' looks very similar to the immediately preceding
-				126.0-136.0' - NA -	H	limestone fragments are composed of sand and silt-sized grains and	fining upward materials
-				-	F	3-5% black spots (1/16") that appear organic	The major part of these
-				-	\Box	Disaggregated Interbedded Weak Limestone	runs were sliced in half by the spatula and moved with
				-	\vdash	128.1-135.6' - grayish orange pink,	a mortar trowel; the gravelly parts tend to be in
130_ -87.8				_	世	(5YR 7/2), moderate to strong HCl—reaction, friable to micritic thin (<1/2")	more pieces
-	R14-SN			-	⊏	limestone beds; beds are undulant and generally discontinuous across	-
-	10 ft 100%	NA	NA	-	F	- the width of the core	-
				_	F	_	
-				-	L	_	-
-				-	片	-	-
1 -				-	岸	-	-
-					片	-]
135_ -92.8				_	Ħ	_	_
52.5	136.0			-	Ė	-	-
	130.0				\Box		
					L		1



PROJECT NUMBER:

338884.FL

BORING NUMBER:

I-05

SHEET 8 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724148.8 N, 457804.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 4.4	11 bgs	on 3/	5/07 START : 2/9/2007 END : 2/	12/20	07 LOGGER : M. Faurote, J. Burkar	b
>00	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) Q	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPT SURF ELEV	CORF	RQ	FRAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC. Large fossil (possible
- - - - 140 -97.8 - -	R15-SN 10 ft ^l 90%		NA	136.0-146.0' - NA		Limestone Fragments 135.6-137.5' - pale yellowish brown, (10YR 6/2), fine grained, mild HCI reaction, strong to very strong (R4 to R5), partings show thin re-crystallized coatings of carbonate and minor iron oxide Disaggregated Weak Limestone With Limestone Fragments 137.5-141.0' - light brown, (5YR 6/4), fine grained, mild HCI reaction, fragments are angular, with apparent carbonaceous material on fracture surfaces and 5-15% of "spots" in fine grained limestone Limestone Fragments 141.0-142.5' - grayish orange, (10YR 7/4), very fine grained, mild HCI reaction, fragments up to 4" long, many partings with not much infilling,	gastropod) in pale yellowish brown (10YR 6/2) limestone This unit appears to be weak rock; limestone destroyed during sonic drilling
- - - 145 -102.8	146.0		NR	- - -		at 142.0-142.5' Limestone 142.5-145.0' - angular, granulated fragments, fragments are very friable and composed of silt and sand-sized carbonate particles No Recovery 145.0-146.0'	Limestone fragments appear broken due to drilling methods -
- - - - 150 -107.8 -	R16-SN 10 ft 1 100%		NA			Limestone 146.0-148.6' - the first 0.8' is angular to very angular washed limestone fragments up to 2-1/2", most fragments are porous (55% voids space) from fossil dissolution Disaggregated Weak Limestone 148.6-151.0' - yellowish gray, (5Y 7/2), strong HCl reaction, all size ranges are carbonate derived grains Limestone 151.0-151.3' - light brown, (5YR 6/4), fossiliferous (casts), fragments up to 1" in size	- - - - - - - -
- - - 155 -112.8 -	156.0			- - - -		Disaggregated Limestone With Limestone Fragments 151.3-156.5' - strong HCl reaction, limestone fragments (5-20%) are yellowish gray (5Y 8/1), very fine to fine grained, friable, "orange" spots may indicate iron oxide halos, no discernible bedding features, at 155.6-156.0' the limestone fragments are up to 1-1/2", angular, and friable	- - - - -



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-05	SHEET	9	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724148.8 N, 457804.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

MATERIA PURIS, 24, 41 to an 34607 START 1.28/2007 END. 21/12/2007 LOCGER M. Faurote, J. Burkant					IENT . ROLOSOFIIC S/N SR-110, SOFIIC, O OULEI CASING AND			ORIENTATION . Vertical
150			FI DGS	on 3/6		ТТ		
Arenaccous Limestone 156.0-166.0' - NA 156.0-166.0	るら悪	(%) ام				8		COIVIIVIEIVIO
Arenaccous Limestone 156.0-166.0' - NA 156.0-166.0	ON APIC	Z,A,Y	<u> </u>	RES	DESCRIPTION	길		
Arenaccous Limestone 156.0-166.0' - NA 156.0-166.0	ATI	E RI STH OVE	ا ان	F		BOL	WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS CAVING ROD
Arenaccous Limestone 156.0-166.0' - NA 156.0-166.0	E.E.	SEC	Ø	ER/		₹		DROPS, TEST RESULTS, ETC.
160117.8 R17.SN 10 R 17.SN 10		01111	ш	ш.ш		0)		
160117.8 170117.8 180180.0 -180.0	-					H	- Avenagasia Limaatana	_
very fine grained, medium strong (R3), fossilierous, fagmented with the largest fragment being 0.4 long, 90% vold sposes (casts of disasoled on the largest fragment being 0.4 long, 90% vold sposes (casts of disasoled on the largest fragment being 0.4 long, 90% vold sposes (casts of disasoled on the largest fragment bedding with beds as thin as 1/8°, possible pyrite blebs R17. SN 10 nt NA NA 10 limited to 10 limited limited to 10 limited li	-				4=0 0 400 01 HJ	₽		_
the largest fragment being 0.4 long, 60% wold spaces (casts of dissolved blota), sparse 1.16°-3.16° voids, thin to laminar bedding with beds as thin as 1.8°, possible pyrite blebs 160	l .]			156.0-166.0' - NA	Д	very fine grained, medium strong	
160 117.8 100% NA NA NA 100% NA NA NA 100% NA NA NA 100% NA NA NA 100% NA NA NA 100% NA NA NA 100% NA NA NA 100% NA NA NA 100% NA NA NA 100% NA NA NA 100% NA NA NA 100% NA NA NA 100% NA NA NA 100% NA NA NA NA 100% NA NA NA NA 100% NA NA NA NA 100% NA NA NA NA NA NA NA NA NA NA NA NA NA N						Н		
160 - 117.8 R17.SN 10ft NA NA NA 100% NA 100% NA NA 100						Н	60% void spaces (casts of dissolved	
160 117.8 10	-	1				世		
160	-	1				₩		_
Limestone 10.1 (10.7%) NA 10.7	160	-				口		-
Limestone 1610-162.3' - light brown, (5YR 6/4), very fine grained, moderate to strong HC reaction, weak to medium strong (RR), bossificrous (casts) Limestone 162.3' - light brown, (5YR 6/4), very fine grained, moderate to strong HC reaction, weak to medium strong (RR), bossificrous (casts) Limestone 162.3' - light prown, (5YR 6/4), midl HCl reaction, very thinly to thinly bedded, limestone contains silica plangagregated Weak Limestone 163.8 - 165.2' - light prown, (5YR 6/4), midl HCl reaction, very thinly to thinly bedded, limestone contains silica grains Disaggregated Weak Limestone 163.8 - 165.2' - light prown, (5YR 6/4), midl HCl reaction to HCl, which was the strength of th		1			_	╁┼		
Limestone 1610-162.3' - light brown, (5YR 6/4), very fine grained, moderate to strong HC reaction, weak to medium strong (RR), bossificrous (casts) Limestone 162.3' - light brown, (5YR 6/4), very fine grained, moderate to strong HC reaction, weak to medium strong (RR), bossificrous (casts) Limestone 162.3' - light prown, (5YR 6/4), midl HCl reaction, very thinly to thinly bedded, limestone contains silica plangagregated Weak Limestone 163.8 - 165.2' - light prown, (5YR 6/4), midl HCl reaction, very thinly to thinly bedded, limestone contains silica grains Disaggregated Weak Limestone 163.8 - 165.2' - light prown, (5YR 6/4), midl HCl reaction to HCl, which was the strength of th	-	R17-SN				\Box	-	-
16.0-16.2 - In International Properties and Propert	-	10 ft		NA		╁	Limestone	-
Very fine grained, moderate to storong (R2 to R3), fossiliferous (casts) Limestone To Arenaceous Limestone To Arenaceous Limestone To Arenaceous Limestone To Arenaceous Limestone To Arenaceous Limestone To Arenaceous Limestone To Arenaceous Limestone To Arenaceous Limestone To Arenaceous Limestone To Arenaceous Limestone To Arenaceous Limestone To Arenaceous Limestone To Arenaceous Limestone To Arenaceous Limestone To Arenaceous Limestone To Arenaceous Limestone To Arenaceous Limestone To Arenaceous Limestone To Arenaceous Limestone Limesto	-	100%				\square		-
(R2 to R3), fossiliferous (casts) Limestone Arenaceous Limestone on Arenaceous Limestone on Arenaceous Limestone on Arenaceous Limestone (ag. 3-163.8" - light brown, (5YR 6/4), mild HCl reaction, very thinly to thinly bedded, limestone contains silica grains Disaggregated Weak Limestone (ag. 3-163.8" - light olive gray, (5Y 5/2), carbonation action and silica same derived silica sized particles along bedding planes <1/8" to 3/8" thick, beds contain <10% silica same (ag. 3), fossilide same large and silica sized particles along bedding planes <1/8" to 3/8" thick, beds contain <10% silica same (ag. 3), fossilide same large and silica sized particles along bedding planes <1/8" to 3/8" thick, beds contain <10% silica same (ag. 3), fossilide same large and silica sil	-					口	very fine grained, moderate to strong	_
Limestone To Arenaceous Limestone 182.3-163.8' - light brown, (5YR 6/4), mild HCl reaction, very thinly to thinly bedded, limestone contains silica grains Disaggregated Weak Limestone 163.8-165.2' - light olive gray, (5Y 5/2), carbonale derived silt-sized particles along bedding planes <1/8'* 186.0 166.0 166.0-176.0' - NA 176.0-1	_					H		This material is highly –
166.0 167. 168.8	l .					曰	Limestone To Arenaceous	
mild HCl reaction, very thinly to thinly bedded, timestone contains silical grains 166.0 16						Ш		
166.0 167. 122.8 168. 168. 168. 2						Н		
166.0 16	-	1				団		_
-122.8 166.0 166.0 166.0 166.0 166.0 166.0-176.0' - NA 170.8-176.0' - NA 170.8-17	165	1				\vdash		_
particles along bedding planes <1/8" to 3/8" thick, beds contain <10% silica sand Arenaceous Limestone 166.0-176.0' - NA 178		-			_	口	163.8-165.2' - light olive gray, (5Y	
170 -127.8 R18-SN 10 ft 90% NA NA R18-SN 10 ft 90% NA NA NA NA NA R18-SN 10 ft 90% NA NA NA NA NA NA NA NA NA N	-	1,000				Ш		-
Arenaceous Limestone 165.2-170.8'- light brown, (5YR 6/4), mild HCl reaction, medium strong (R3), 15-25% very fine silica grains widely distributed through the micro to very fine grained limestone, mild reaction to HCl, with a weak intergranular and void filling response, 40-45% porosity, arenaceous limestone grades into very fine grained limestone that is represented as 0.1' to 0.4' pieces to the end of this run (170.8') Disaggregated Weak Limestone 170.8-171.6' moderate HCl reaction, <2% muscovite and pyrite as slightly oxidized blebs, some small rock fragments Limestone 171.6-175.0' - pale brown, (5YR 5/2), very fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), thinly interbedded, porosity is 35-45%, mostly fossil casts No Recovery 175.0-176.0'	-	166.0				╁┼┼		-
166.0-176.0' - NA 166.2-170.8' - light brown, (5YR 6/4), mild HCl reaction, medium strong (R3), 15-25% very fine silica grains widely distributed through the micro to very fine grained limestone, mild reaction to HCl, with a weak intergranular and void filling response, 40-45% porosity, arenaceous limestone grades into very fine grained limestone that is represented as 0.1' to 0.4' pieces to the end of this run (170.8') Disaggregated Weak Limestone 170.8-171.6' - moderate brown, (5YR 4/4), moderate HCl reaction, <2% muscovite and pyrite as slightly oxidized blebs, some small rock fragments Limestone 171.6-175.0' - pale brown, (5YR 5/2), very fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), thinly interbedded, porosity is 35-45%, mostly fossil casts No Recovery 175.0-176.0'	-	-				団		=
mild HCl reaction, medium strong (R3), 15-25% very fine silica grains widely distributed through the micro to very fine grained limestone, mild reaction to HCl, with a weak intergranular and void filling response, 40-45% porosity, arenaceous limestone grades into very fine grained limestone that is represented as 0.1' to 0.4' pieces to the end of this run (170.8') Disaggregated Weak Limestone 170.8-171.6' - moderate brown, (5YR 4/4), moderate HCl reaction, <2% muscovite and pyrite as slightly oxidized blebs, some small rock fragments Limestone 171.6-175.0' - pale brown, (5YR 5/2), very fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), thinly interbedded, porosity is 35-45%, mostly fossil casts No Recovery 175.0-176.0'	-	-			166 0 176 0' NA	\vdash		_
widely distributed through the micro to very fine grained limestone, mild reaction to HCI, with a weak intergranular and void filling response, 40-45% porosity, arenaceous limestone grades into very fine grained limestone that is represented as 0.1' to 0.4' pieces to the end of this run (170.8') Disaggregated Weak Limestone 170.8-171.6' - moderate Drown, (5YR 4/4), moderate HCI reaction, <2% muscovite and pyrite as slightly oxidized blebs, some small rock fragments Limestone 171.6-175.0' - pale brown, (5YR 5/2), very fine grained, moderate HCI reaction, weak to medium strong (R2 to R3), thinly interbedded, porosity is 35-45%, mostly fossil casts No Recovery 175.0-176.0'	-				100.0-170.0 - INA	П	mild HCl reaction, medium strong	_
to very fine grained limestone, mild reaction to HCI, with a weak intergranular and void filling response, 40-45% porosity, arenaceous limestone grades into very fine grained limestone that is represented as 0.1' to 0.4' pieces to the end of this run (170.8') NA NA NA R18-SN 10 ft NA 90% NA NA NA R18-SN 10 ft NA 90% NA NA NA NA NA NA NA NA NA N						Ш		_
reaction to HCI, with a weak intergranular and void filling response, 40-45% porosity, arenaceous limestone grades into very fine grained limestone that is represented as 0.1' to 0.4' pieces to the end of this run (170.8') NA 10 ft 90% NA NA NA NA NA NA NA NA NA N	l .					Ш		
response, 40-45% porosity, arenaceous limestone grades into very fine grained limestone that is represented as 0.1' to 0.4' pieces to the end of this run (170.8') Disaggregated Weak Limestone 170.8-171.6' - moderate brown, (5YR 4/4), moderate HCl reaction, <2% muscovite and pyrite as slightly oxidized blebs, some small rock fragments Limestone 171.6-175.0' - pale brown, (5YR 5/2), very fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), thinly interbedded, porosity is 35-45%, mostly fossil casts No Recovery 175.0-176.0' R18-SN 10 ft york jieces to the end of this run (170.8') Disaggregated Weak Limestone 170.8-171.6' - moderate brown, (5YR 5/2), with grained, moderate HCl reaction, weak to medium strong (R2 to R3), thinly interbedded, porosity is 35-45%, mostly fossil casts No Recovery 175.0-176.0'						Ш	reaction to HCI, with a weak	
arenaceous limestone grades into very fine grained limestone that is represented as 0.1' to 0.4' pieces to the end of this run (170.8') Disaggregated Weak Limestone 170.8-171.6' - moderate brown, (5YR 4/4), moderate HCl reaction, <2% muscovite and pyrite as slightly oxidized blebs, some small rock fragments Limestone 171.6-175.0' - pale brown, (5YR 5/2), very fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), thinly interbedded, porosity is 35-45%, mostly fossil casts No Recovery 175.0-176.0' R18-SN NA Disaggregated Weak Limestone 170.8-171.6' - moderate brown, (5YR 78 10 10 10 10 10 10 10 10 10 10 10 10 10						H		
R18-SN 10 ft 90% NA 11 ft 90% NA 12 ft 13 ft 90% NA 13 ft 90% NA 14 (A) moderate HCl reaction, <2% muscovite and pyrite as slightly oxidized blebs, some small rock fragments Limestone 171.6-175.0' - pale brown, (5YR 5/2), very fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), thinly interbedded, porosity is 35-45%, mostly fossil casts No Recovery 175.0-176.0' NA NA NA NA NA NA NA NA NA NA NA NA NA	170	1				H	arenaceous limestone grades into	_
the end of this run (170.8') Disaggregated Weak Limestone 170.8-171.6' - moderate brown, (5YR 4/4), moderate HCI reaction, <2% muscovite and pyrite as slightly oxidized blebs, some small rock fragments Limestone 171.6-175.0' - pale brown, (5YR 5/2), very fine grained, moderate HCI reaction, weak to medium strong (R2 to R3), thinly interbedded, porosity is 35-45%, mostly fossil casts No Recovery 175.0-176.0' The drilling method may have created the partings and vibrated the fines between individual pieces of rock No euhedral or subhedral crystals visible SC-2 collected at 171.6- 172.3'		1			_	ㅂ		_
Disaggregated Weak Limestone 170.8-171.6' - moderate brown, (5YR 4/4), moderate HCI reaction, <2% muscovite and pyrite as slightly oxidized blebs, some small rock fragments Limestone 171.6-175.0' - pale brown, (5YR 5/2), very fine grained, moderate HCI reaction, weak to medium strong (R2 to R3), thinly interbedded, porosity is 35-45%, mostly fossil casts No Recovery 175.0-176.0' Disaggregated Weak Limestone 170.8-171.6' - moderate brown, (5YR have created the partings and vibrated the fines between individual pieces of rock No euhedral or subhedral crystals visible SC-2 collected at 171.6- 172.3'	-	R18-SN		NA		田		-
- War and the partings and vibrated the partings and vibrated the fines between individual pieces of rock - War and the process of rock - Was and vibrated the partings and vibrated the fines between individual pieces of rock - Was and vibrated the partings and vibrated the fines between individual pieces of rock - Was and vibrated the partings and vibrated the fines between individual pieces of rock - Was and vibrated the fines between individual pieces of rock No euhedral or subhedral crystals visible sc-2 collected at 171.6-175.0'-175.0'-176.0'-172.3'-172	-	10 ft				団	Disaggregated Weak Limestone	The drilling method mav
muscovite and pyrite as slightly oxidized blebs, some small rock fragments Limestone 171.6-175.0' - pale brown, (5YR 5/2), very fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), thinly interbedded, porosity is 35-45%, mostly fossil casts No Recovery 175.0-176.0' muscovite and pyrite as slightly oxidized the lines between individual pieces of rock No euhedral or subhedral crystals visible SC-2 collected at 171.6-172.3'	-	90%				╂┼┼		have created the partings -
oxidized blebs, some small rock fragments Limestone 171.6-175.0' - pale brown, (5YR 5/2), very fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), thinly interbedded, porosity is 35-45%, mostly fossil casts No Recovery 175.0-176.0' of rock No euhedral or subhedral crystals visible SC-2 collected at 171.6-172.3'	-	-				口	muscovite and pyrite as slightly	
Limestone 171.6-175.0' - pale brown, (5YR 5/2), very fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), thinly interbedded, porosity is 35-45%, mostly fossil casts No Recovery 175.0-176.0' No euhedral or subhedral crystals visible SC-2 collected at 171.6-172.3'	-						oxidized blebs, some small rock	
171.6-175.0' - pale brown, (5YR 5/2), very fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), thinly interbedded, porosity is 35-45%, mostly fossil casts NR NR NR	-					Щ	- Limestone	No subodral or subbodral
very fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), thinly interbedded, porosity is 35-45%, mostly fossil casts No Recovery 175.0-176.0' No Recovery 175.0-176.0'						Ш	171.6-175.0' - pale brown, (5YR 5/2),	
to R3), thinly interbedded, porosity is 35-45%, mostly fossil casts No Recovery 175.0-176.0'	-]				$\vdash\vdash\vdash$		SC-2 collected at 171.6-
175 -132.8 No Recovery 175.0-176.0']				口	to R3), thinly interbedded, porosity is	1/2.3'
-132.8 No Recovery 175.0-176.0'	175					Ш		
	-132.8				_	Ш	No Recovery 175.0-176.0'	
]		,,_				
	-	-		NR		団	·	_
	<u> </u>	-		NR				-



PROJECT NUMBER:

33884.FL BORING NUMBER:

I-05 SHEET 10 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724148.8 N, 457804.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

				IENT : ROLOSOFIIC 3/N 3R-110, SOFIIC, O OULEI CASING AND			ORIENTATION : Vertical
WATER	LEVELS : 4.4	1 bgs	on 3/6		12/20		
≥□₽	Ç (%			DISCONTINUITIES	ဗ္ဂ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
A A CE	SEÄ	(%) Q	F.0	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	J	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
IFF.	NG:	ο	RAC:	PLANARITY, INFILLING MATERIAL AND	₩	AND ROCK MASS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
E S E	898	œ	F E	THICKNESS, SURFACE STAINING, AND TIGHTNESS	Ś	CHARACTERISTICS	BROI 6, 1261 R266216, 216.
					Н	Limestone	Partings or interbed
1 7				-	世	 176.0-183.2' - grayish orange to pale brown, (10YR 7/4 to 5YR 5/2), very 	surfaces exhibit organic or - iron oxide (Gothite) patinas
-				176.0-186.0' - NA	⇤	fine grained, mild to moderate HCl	or stains
-				-		 reaction, arenaceous, thinly 	-
-				-	₽	interbedded with carbonate intergranular filling, HCl reaction is	_
-				-	匚	 mainly in void filling and fossil cast 	_
_				<u> </u>	┢	lining, poorly fossiliferous, overt	
				_		porosity is <35%, limestone contact is irregular and gradational in a very	179.0-179.6' - Appears as a breccia, gray clast in pale -
180				_	⊬	thin zone (<1/16")	brown limestone matrix
-137.8					Ш		
1 1	R19-SN		NA	-	Ħ		_
	10 ft 90%	NA		-	H	-	- 181.0-182.1' - Thinly
-	30 /0			-	Ľ	-	bedded limestone -
1 -				-	Н	-	400 4 400 01 This harden
-				-	仜	_	182.1-183.2' - Thin broken beds, drilling related
-				-	╁	_	-
_				_		Disaggregated Weak Limestone	183.2-185.0' - Unit may
				_	Ľ	183.2-185.0' - grayish orange, (10YR 7/4), very fine grained, strong HCl	have been broken by drilling method, particularly
					ot	reaction, carbonate derived silt-sized	in "harder" beds
185						and very fine sand-sized grains in	
-142.8				_	Н	 irregular thin beds with organic material defining some of the planar 	
1 7	186.0		NR	-		features, silica <5% and sparse	_
-	100.0			-		 No Recovery 185.0-186.0' Disaggregated Limestone With 	This appears to be partially
-				-	╙	Limestone Fragments	to be a very weak - agglomeration of silt, sand
-				186.0-196.0' - NA	口	 186.0-194.1' - grayish orange, (10YR 7/4), mild to moderate HCl reaction, 	and rock (gravel-sized
-				-	\vdash	up to 40% gravel-sized limestone	fragments) that may
-				-	F	 fragments, broken and granulated, 	represent a collapse
-				-	L	fragments range from <1/4" to 1-1/2"x2"x1", independent clasts	-
					Н	 exhibit bedding plane discontinuities 	_
					ш	and settling features, limestone	_
190				_	\vdash	moderately fossiliferous (casts)	_
-147.8					F		_
1]	R20-SN				片]
1	10 ft 100%	ΝA	INA		щ		_
				-	ш		_
1 1				·	Н	<u> </u>	-
				-	F	 	-
-				-	Ľ	-	-
1 -				-	⊬	-	-
-					口	_	-
					\vdash	-	_
195				_	F	_	_
-152.8					片	_	_
	196.0				\vdash		



PROJECT NUMBER:

338884.FL BORING NUMBER:

I-05 SHEET 11 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724148.8 N, 457804.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 4.4	1 bgs	on 3/6	6/07 START : 2/9/2007 END : 2/	12/200	7 LOGGER : M. Faurote, J. Burkard	1
30€	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-0 -0 -157.8 -0 -157.8 -0 -0 -0 -0 -162.8	R21-SN 10 ft 100%	NA	NA	196.0-206.0' - NA		Limestone 194.1-204.7' - very pale orange, (10YR 8/2), very fine grained, mild to moderate HCl reaction, with sub-horizontal, thin (<1/8") beds with apparent organic partings above a very broken (in angular, sharp fragments) very fine grained limestone with fragments showing possible subsidence features (cracks) Disaggregated Interbedded Limestone	The rock fragments (195.5-196.0') appear to have been broken by the drilling method Possible collapse infilling, or extremely broken from the drilling method
210 -167.8 - - 215 -172.8	R22-SN 10 ft 100%	NA	NA	206.0-216.0' - NA		204.7-206.0' - very pale orange, (10YR 8/2), moderate to strong HCI reaction, very tacky when wet Disaggregated Interbedded Limestone With Limestone Fragments 206.0-210.5' - Same as 204.7-206.0' except with sandy silt and gravel-sized limestone fragments, where the limestone fragments are very angular to generally sub-rounded, fragments constitute 35-50% of the total material, thin micritic layers/fragments found at 209.8' and 214.0' Disaggregated Weak Limestone 210.5-213.5' Disaggregated Interbedded Limestone With Limestone Fragments 213.5-216.0' - Same as 206.0-210.5'	This interval appears as repetitive units, ie. a fossil cast/mold rich generally friable limestone grading into a very fine grained micritic limestone, with limestone fragments up to 1-1/2", many of the limestone "fragments" are adhesions of sand sized carbonate grains that are quite friable, they may be weak rock, but became disaggregated due to the sonic drilling method



PROJECT NUMBER:	BORING NUMBER:				
338884 FI	1-05	CHEET	42	OE	4.4

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724148.8 N, 457804.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 4.4	1 bgs	on 3/6	5/07 START : 2/9/2007 END : 2/	12/200	COMPANY OF THE LOGGER : M. Faurote, J. Burkard	d
≩ Ω≨	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - 220 -177.8 - - - - - - - - - - - - - -	R23-SN 10 ft 95%		NA	216.0-226.0' - NA		Disaggregated Fossiliferous Limestone 216.0-225.5' - grayish orange to grayish orange pink, (10YR 7/4 to 5YR 7/2), moderate to strong HCl reaction, friable and pliable, with carbonate derived sand and silt-sized grains that react to HCl, thin (<1" to 2") layers with a 10-15% clay content and higher plasticity, sparse rock fragments consisting of very fine grained, fossiliferous (casts) limestone that exhibits HCl reactions primarily in void filling or along partings	At 218.5' there are apparent carbonaceous organic materials, but they are degraded
-102.0	000.0		NR		\Box	No Recovery 225.5-226.0'	-
	R24-SN 10 ft 100%		NA	226.0-236.0' - NA		Disaggregated Fossiliferous Limestone 226.0-236.0' - Same as 216.0-225.5'	
	236.0				Ħ		
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-05	SHEET	13	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724148.8 N, 457804.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 4.4	1 bgs	on 3/6	6/07 START : 2/9/2007 END : 2/	12/200	7 LOGGER : M. Faurote, J. Burkan	d
				DISCONTINUITIES	П	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-240 -197.8 	R25-SN 10 ft 100%		NA	236.0-246.0' - NA		Disaggregated Fossiliferous Limestone 236.0-246.0' - Same as 216.0-236.0' except with occasional limestone fragments	At 236.5' - very fine grained, small (1/2"x3/8") limestone fragment is moderate orange pink (5YR 8/4), with very few fossil casts, strong HCI reaction All of these samples were split with the spatula blade and one-half the core was placed in the core box; very few rock fragments impeded the cut The final 20-30' of drilling was quite difficult, and many runs in and out were
250 -207.8 - - - - - - - - - - - - - - - - - - -	R26-SN 10 ft 85%		NA NR	246.0-256.0' - NA		246.0-254.5' - very pale orange, (10YR 8/2), strong HCI reaction, fragments of very fine grained fossiliferous limestone at 247.5' exhibit very sharp angular edges, fragments are easily broken, a fragment at 254.3' shows a nearly horizontal contact between fossiliferous (casts) and very fine grained limestone, both exhibiting strong reactions to HCI, the rock character change is obvious	required to drill the hole and maintain the borehole; some of the rock appears completely broken due to the drilling technique
	0.00∠				Ħ		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	l-05	SHEET	14	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1724148.8 N, 457804.5 E (NAD83)

ELEVATION: 42.2 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 4.4	1 bgs	on 3/6	6/07 START : 2/9/2007 END : 2/	12/20	D7 LOGGER : M. Faurote, J. Burkard	d
₹ Ω₽	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS TEST RESULTS FTC
260 -217.8 - - 265 -222.8	R27-SN 10 ft 1 100%		NA PE	THICKNESS, SURFACE STAINING, AND TIGHTNESS 256.0-266.0' - NA		Disaggregated Limestone With Limestone Fragments 256.0-259.7' - light brown, (5YR 6/4), fine to medium grained, moderate to strong HCI reaction, composed of carbonate derived grains, <15% gravel-sized limestone fragments (angular, <1" in size, typically micritic) 259.7-265.0' - light brown, (5YR 6/4), moderate HCI reaction, limestone fragments average less than 1" in size Disaggregated Limestone 265.0-266.0' - moderate orange pink, (5YR 8/4), contains no limestone	DROPS, TEST RESULTS, ETC.
-	200.0		NA			fragments - 266.0-267.5' - 1.5' recovered	process resulted in extending the boring's total depth to 271.0' in order to recover casing and core
	5 ft 30%	NA	NR	- - - -		No Recovery 267.5-271.0'	- - - - -
- - - - - - -						Bottom of Boring at 271.0 ft bgs on 2/12/2007	Total depth of boring is 271.0' -



PROJECT NUMBER:

33884.FL

BORING NUMBER:

I-06

SHEET 1 OF 14

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723163.0 N, 457960.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DRILLING METHOD AND EQUIPMENT: Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel

ORIENTATION · Vertical

DRILLIN	G METH	OD AND	EQUIPM	ENT : Rotosonic S	S/N SR-116, sonic, 6" outer casing and 4" core barrel		ORIENTATION : Vertical
WATER	LEVELS	: 4.41 bg	s on 3/6/0	07 5	TART : 3/7/2007 END : 3/10/2007 LOGGER	: C.	Sump
				STANDARD	SOIL DESCRIPTION	U	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		SYMBOLIC LOG	
		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT. RELATIVE DENSITY OR	l S	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
THE A			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	/WB	INSTRUMENTATION
				(N)	- :	رن رن	
42.3	0.0	4.5	R1-SN		Topsoil 0.0-0.3' - brownish black, (5YR 2/1), organic rich Poorly Graded Sand Grading To Poorly Graded Sand With Silt (SP-SM) 0.3-3.3' - brownish black grading to grayish orange, (5YR 2/1 grading to 10YR 7/4), fine grained, fines increase with depth to 10-15%, HCl reaction in fines, silica sands		Reduced recovery typical of partial core lengths (6' in 10' core barrel) "Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08)"
5 37.3		4.5	KI-SN		3.3-4.5' - light gray, (N7 to N8), fine grained, 10-15% silt/clay increasing with depth, carbonate matrix, silica sand, 2-1/2" limestone fragment at 4.3-3.5' (very pale orange [10YR 8/2], fossiliferous [molds/casts], strong HCl reaction) No Recovery 4.5-6.0'		Water levels were not recorded for I-06
-	6.0					111	_
-					Poorly Graded Sand (SP) 6.0-7.0' - light gray, (N7), brownish black (5YR 2/1) organic material (slough)		-
-					Silty Sand With Limestone Fragments (SM) 7.0-8.5' - 3" yellowish gray (5Y 8/1), disc shaped, rounded clast at 7.4'		- -
10		10.0	R2-SN		Sandy Silt (ML) 8.5-15.0' - <10% fine gravel clasts (<1/2"), large concretionary limestone masses (possible stromatolites) at 10' that have botryoidal, non-concentric, globular appearance, and a strong reaction to HCl, medium strong (R3), portion at 14.5' has a tapered horn shape		At 10.0-14.0' possible stromatolites, large euhedral crystals (associated with globular concretionary masses), smoky clear with tetrahedral form well defined, twinning visible, no reaction to HCI
	16.0				15.0-16.0' - Same as 8.5-15.0' except grayish orange, (10YR 7/4), moderate to strong HCl reaction, weak (R2), thin bedding plane fractures (1/4-3/4"), friable, carbonate 16.0-26.0' - Same as 15.0-16.0' except nonplastic to low plasticity, very fine sand-sized particles decreasing with depth, trace fine gravel-sized limestone fragments, carbonate materials		
20					- -		-
						┞	
						l	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-06	SHEET	2	OF	14

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723163.0 N, 457960.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS	: 4.41 bg	s on 3/6/0)7	START : 3/7/2007 END : 3/10/2007 LO	GGER	: C.	Sump
> ~ ~				STANDARD	SOIL DESCRIPTION		9	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA		STANDARD PENETRATION TEST RESULTS	SOIL NAME. USCS GROUP SYMBOL COLOR		SYMBOLIC LOG	DEPTH OF CASING, DRILLING RATE
TH B		RECOVE	#TYPE	011 011 011	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	.	/BOL	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
DEP SUR ELE			#IYPE	6"-6"-6" (N)	CONCIOTENCY, COIL OT CONC., MINVELVILLOCT		SYI	INSTRUMENTATION
22.3	26.0	10.0	R3-SN	(N)	26.0-30.3' - Same as 16.0-26.0' except no very fine sand, no fine gravel-sized limestone fragments Begin Rock Coring at 30.0 ft bgs See the next sheet for the rock core log			
1								



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	l-06	SHEET	3	OF	14	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723163.0 N, 457960.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 4.4	1 bgs	on 3/6	6/07 START: 3/7/2007 END: 3/	10/2	2007	7 LOGGER : C. Sump	
≥∩≎	(%)			DISCONTINUITIES	ر	ي ر	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION		ر د	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH BE	E RU STH, OVEF	(%) O	FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	3		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPT SURF	SORE	RQ	FRAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	1	Z M	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
12.3	30.0	ш		· · · · · · · · · · · · · · · · · · ·	Н	_		
-				30.3-36.0' - NA	F	Ŧ	Limestone] -
-				-	ļ	다	30.3-36.0' - grayish orange and medium gray, (10YR 7/4 and N5),	-
-				-	þ	╬	moderate to strong HCl reaction, medium strong (R3), thin to medium	1
-				-	b	╁	bedding, horizontal partings 3/4"-4",	1
-	R4-SN			-	Ь	╓	numerous small (1/32"-1/8") voids, few (<3/4") cavities, fossiliferous with	1
_	6 ft 100%	NA	NA	-	Н	╁	significantly more molds than casts, thin horizontal zones (possibly beds)	NA = Not Applicable
					Н	\exists	of fine grained limestone with no	NR = No Recovery -
					F	Æ	voids; 1/2"-4" thick (1"-3" average) silt/clay interbeds with gravel-sized]
35				<u> </u>	F	7	limestone fragments, light gray (N6) grading to medium dark gray (N4)	
7.3				<u>-</u>	E	#	with depth, sharp contacts]
-	36.0			36.0-46.0' - NA	F	+	Sandy Silt With Limestone	
-				30.0-40.0 - NA	╢	╟	Fragments (ML)	-
-				-	╢	╟	36.0-46.0' - moderate yellowish brown, (10YR 5/4), nonplastic to low	-
-				-	╢	╟	plasticity, moderate HCl reaction, fine	-
-				-	Ш	╟	gravel-sized fragments (<10%) <1/2" diameter, <10% very fine to fine	-
-				-	Ш	╟	sand-sized, dark brown organic material at 42.0'	-
-				-	1	╟	material at 42.0	1
40				-	1	╟		1
2.3				_	111	╟	_	
-	R5-SN	NIA	NIA.	_	1			1
	10 ft 100%	NA	NA]
_				_	Ш			
_				_	Ш			
-				-	Ш			-
-				-	Ш	$\ \ $		-
-				-	╢	╟		-
				-	╢	╟		-
45 -2.8					╢	╟	_	-
-	40.0			-	╢	╟		-
-	46.0			46.0-56.0' - NA	Ш	╟	46.0-52.5' - Same as 36.0-46.0'	-
-				-	Ш	╟	except coarse grained sand-sized limestone fragments, dark brown	1
-				-		╟	organic mottling, 10% to >50% sand	
-				-			content, <10% fine gravel-sized limestone fragments	1
				-			•	1
				_				1
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PROJECT NUMBER:

33884.FL

BORING NUMBER:

I-06

SHEET 4 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723163.0 N, 457960.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 4.4	I1 bgs	on 3/6	5/07 START : 3/7/2007 END : 3/	10/2	007	LOGGER : C. Sump	
≥∩≎	(%)			DISCONTINUITIES	٥	L	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG		ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-7.8 - - - - - - - - - - - - - - - - - - -	R6-SN 10 ft 100%	NA	ZA	56.0-66.0' - NA			Limestone 52.5-52.8' - yellowish gray, (5Y 7/2), fossiliferous (significantly more molds than casts), numerous <1/32"-1/8" voids, very few small cavities 1/4"-1/2" diameter, full diameter core fragments; horizontal, smooth, planar partings; thin silty clay coating on fracture surface Sandy Lean Clay With Limestone Fragments (CL) 52.8-56.0' - 15-25% subangular to subrounded grayel-sized (1/2"-1")	- - - - - - - - - - - - - - - - - - -
- - - - 60 -17.8	R7-SN 10 ft 100%	NA	NA				subrounded gravel-sized (1/2"-1") limestone fragments 56.0-61.0' - Same as 52.8-56.0' except 10-20% gravel-sized moderate yellowish brown limestone fragments	- - - - - - -
	66.0			66.0-76.0' - NA			61.0-63.4' - light medium gray (clay), (N6), moderate to strong HCI reaction, few fossils or surface voids or cavities, dark brown/black laminated inclusions, thin partings every 1"-3" Disaggregated Limestone 63.4-66.0' - moderate yellowish brown, moderate to strong HCI reaction, mostly very fine sand-sized limestone fragments, with gravel-sized limestone fragments similar to 61.0-63.4' Limestone 66.0-66.9' - Same as 61.0-63.4'	Repeating sequences of
- - - - - 70							except thin bedding and clayey silt interbeds Limestone Fragments 66.9-68.7' - fine gravel-sized (4"-6") particles, sandy silt, carbonate derived	mostly thinly bedded limestone with silty clay / clayey silt interbeds (1-2") with larger zones of sandy silt +/- clay with gravel sized limestone fragments (3-5")



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-06	SHEET	5	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723163.0 N, 457960.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

Dillary Personal Control of Contr	WATER	LEVELS : 4.4	11 bgs	on 3/6	6/07 START: 3/7/2007 END: 3/	10/200	D7 LOGGER : C. Sump	
R8-SN 10 m 100% NA NA	≥0 <i>≎</i>	. (%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
R8-SN 10 ft 100% NA NA	DEPTH BELOV SURFACE AN ELEVATION (f	CORE RUN, LENGTH, AND RECOVERY (%	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
76.0-86.0' - NA 76.0-86.0' - NA 76.0-83.0' - 20-50% gravel-sized limestone fragments, dark brown organic silt laminae, coarse sand 76.0-83.0' - 20-50% gravel-sized limestone fragments, dark brown organic silt laminae, coarse sand 76.0-86.0' - NA PO.SN 10 ft 100% NA NA 100% NA NA 100% NA NA 100% NA NA 100% NA NA 100% Ref. 0-86.0' - NA Ref. 0-86.0' - NA Ref. 0-86.0' - NA Ref. 0-86.3' - yellowish gray, coarse sand to coarse gravel-sized fragments (1/4" to >3") Ref. 0-86.0' - NA Ref. 0-86.0' - NA Ref. 0-86.3' - yellowish gray to dusky yellow, (SY7/2 to 5Y64), fragments 3' diameter 83.3-89.5' - moderate yellowish brown, moderate HCI reaction, 30-50% gravel-sized limestone fragments, flat intenstone flat intenstone flat intenstone flat intenstone flat inte	-27.8 - - - - - - - - - - - - - - - - -	R8-SN 10 ft					- 68.7-73.5' - thin bedding, similar to 66.9-68.7' except increasing interbed thickness with depth (<1"-6"), limestone partings - Disaggregated Limestone - 73.5-76.0' - moderate HCl reaction, 10-20% gravel-sized (1/2"-1") limestone fragments, carbonate	- - - - - -
R9-SN NA NA NA NA NA NA NA NA NA NA NA NA NA	1 -	76.0			76.0-86.0' - NA		76.0-83.0' - 20-50% gravel-sized limestone fragments, dark brown	casing, lost drilling fluid
83.0-86.0' - yellowish gray, coarse sand to coarse gravel-sized fragments (1/4" to >3") 86.0 86.0-96.0' - NA 86.0-86.3' - yellowish gray to dusky yellow, (5Y7/2 to 5Y6/4), fragments 3" diameter 86.3-89.5' - moderate yellowish brown, moderate HCl reaction, 30-50% gravel-sized limestone fragments, friable, 30-40% small voids (1/32"-1/8"), with coarse sand-sized matrix, thin silty zones		10 ft		NA	_		- - - -	- - - - - -
86.0-96.0' - NA 86.0-96.0' - NA 86.0-86.3' - yellowish gray to dusky yellow, (5Y7/2 to 5Y6/4), fragments 3" diameter 86.3-89.5' - moderate yellowish brown, moderate HCl reaction, 30-50% gravel-sized limestone fragments, friable, 30-40% small voids (1/32"-1/8"), with coarse sand-sized matrix, thin silty zones	-42.8	86 O			_		 83.0-86.0' - yellowish gray, coarse sand to coarse gravel-sized 	- - - - -
90 - With thirt (1/4 - 1/2) dark brown to black organic layers	-	55.0			86.0-96.0' - NA		yellow, (5Y7/2 to 5Y6/4), fragments 3" diameter 86.3-89.5' - moderate yellowish brown, moderate HCl reaction, 30-50% gravel-sized limestone fragments, friable, 30-40% small voids (1/32"-1/8"), with coarse sand-sized matrix, thin silty zones with thin (1/4"-1/2") dark brown to	Driller's Remark: Difficult advancing 6" casing; no drilling mud circulation



PROJECT NUMBER:

33884.FL BORING NUMBER:

I-06 SHEET 6 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723163.0 N, 457960.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 4.4	11 bgs	on 3/	6/07 START: 3/7/2007 END: 3/	10/20	07 LOGGER : C. Sump	
> 0 00	(9)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-47.8	R10-SN 10 ft 100%		NA	- - - - -		Limestone Fragments 89.5-96.0' - moderate yellowish brown, (10YR 5/4), fine grained, strong (R4), >3" diameter limestone fragments with 6"-10" spacing, clayey silt interbeds are mottled pale brown (5YR 5/2) to light olive gray (5Y 5/2), dark brown / black organic laminations/mottling sparse except at 92.0-92.5', gravel-size limestone fragments range from 1/2"-1" diameter and become yellowish gray to light olive gray with depth, few zones of material similar to 86.3-89.5', few fragments with 30-40% voids (1/16"-1/8")	- - - - - - -
	96.0 R11-SN 10 ft 100%	NA	NA	96.0-106.0' - NA		96.0-98.0' - grayish orange pink with olive gray staining on fracture surfaces, (5YR 7/2 with 5Y 5/2), irregular zones of small voids (1/32"-1/8") with fossil molds and casts, fine sand-sized limestone particles 98.0-98.4' - Same as 96.0-98.0' except silty clay infilling on 1"-2" horizontal partings Disaggregated Limestone With Limestone Fragments 98.4-106.0' - moderate yellowish brown at 99.0', 90% gravel-sized (1/4"-3/4" diameter) limestone fragments, large (>3" to full core diameter) fragments on approximately 1.0' spacing with fine grained disaggregated interbeds in	- - - - - - - - - - -
	106.0			106.0-116.0' - NA		between, the percentage of larger fragments increases at end of run (>50%)	Driller's Remark: Difficulty establishing correct amount of tube when driving 6" casing (stuck at 5000); difficulty for previous 3 runs (86-116') may increase potential for drill induced breakage and/or segregation of disaggregated material in retrieved cores



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-06	SHEET	7	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723163.0 N, 457960.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DISCONTINUITIES DISCONTINU	WATER LEVELS: 4.4	11 bgs	on 3/6	6/07 START: 3/7/2007 END: 3	/10/20	07 LOGGER : C. Sump	
116.0 116.	≥∩a -			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
Disagregated Limestone Total Co. 0-116.0	DEPTH BELON SURFACE AN ELEVATION (f CORE RUN, LENGTH, AND RECOVERY (9	Ø	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
120 -77.8 R13.SN 10.11 100% NA NA NA R13.SN 10.11 100% NA NA R13.SN 10.11 100% NA NA R13.SN 10.11 100% NA NA NA R13.SN 10.11 100% NA NA R13.SN 10.11 100% NA NA NA R13.SN 10.11 100% NA NA NA R13.SN 10.11 100% NA NA NA R13.SN 10.11 100% NA NA NA R13.SN 10.11 100% NA NA NA R13.SN 10.11 100% NA NA NA R13.SN 10.11 100% NA NA NA R13.SN 10.11 100% NA NA NA R13.SN 10.11 100% NA NA NA R13.SN 10.11 100% NA NA NA NA R13.SN 10.11 100% NA NA NA NA NA NA R13.SN 10.11 100% NA NA NA NA NA NA NA NA NA NA NA NA NA	R12-SN - 10 ft 100% - 100% - 115 -72.8		NA	_		Disaggregated Limestone 106.0-116.0' - moderate yellowish brown, (10YR 5/4), moderate HCl reaction, fragments (3"-4") comprise >50% of core at top of run, decreasing with depth to 15-30% as core material becomes more disaggregated, matrix is disaggregated limestone and smaller (<1") limestone fragments, fragments exhibit small voids (25-30% of surface) and few (<5%) fine black horizontal (possibly organic) laminae (3/16"-3/8" long), interval at 114.0-114.5' is pale yellowish brown (10YR 6/6) fine grained limestone, strong (R4), with no small voids or	- - - - - - - -
Silt 122.0-123.5' - dusky yellowish brown limestone, medium strong (R3), very thin to thin bedding, few small voids (1/32"-1/8"), 5% dark yellowish gray horizontal banding, horizontal partings 2"-4" with clayey carbonaceous silt interbeds (1"-3"), contains limestone fragments <1" Limestone Fragments With Disagregated Limestone 126.0-136.0' - NA 126.0-136.0' - NA 126.0-127.0' - coarse sand-sized carbonate derived material grading to silty fine sand with 3"-4" limestone fragments 127.0-127.7' - yellowish gray, (5Y 7/2), medium strong to strong (R3 to R4), trace small voids (1/32"-1/8")			NA	116.0-126.0' - NA		116.0-122.0' - Same as 106.0-116.0' except limestone fragments (3"-4") are irregularly shaped, angular to subangular, gravel-sized limestone fragments (30-80%), in silt-sized to sand-sized disaggregated limestone	
	-82.8 126.0 			- 126.0-136.0' - NA		Silt 122.0-123.5' - dusky yellowish brown limestone, medium strong (R3), very thin to thin bedding, few small voids (1/32"-1/8"), 5% dark yellowish gray horizontal banding, horizontal partings 2"-4" with clayey carbonaceous silt interbeds (1"-3"), contains limestone fragments <1" Limestone Fragments With Disaggregated Limestone 123.5-126.0' - Same as 116.0-122.0' except limestone fragments with sandy silt with gravel Limestone 126.0-127.0' - coarse sand-sized carbonate derived material grading to silty fine sand with 3"-4" limestone fragments 127.0-127.7' - yellowish gray, (5Y 7/2), medium strong to strong (R3 to R4), trace small voids (1/32"-1/8")	- - - - - - - - - - - - -



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-06	SHEET	8	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723163.0 N, 457960.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DISCONTINUITIES DISCRIPTION DESCRIPTION DEPTH TYPE QUESTATION, POCKANES, POCKANES POCKANE	WATER	LEVELS: 4.4	11 bgs	on 3/6	6/07 START: 3/7/2007 END:	3/10/20	07 LOGGER : C. Sump	
R14.SN 10 ft NA NA	≥∩≘	_ (%			DISCONTINUITIES	ပွ	LITHOLOGY	COMMENTS
R14.SN 10 ft NA NA	DEPTH BELO SURFACE AN ELEVATION (I CORE RUN, LENGTH, ANG RECOVERY (I		Ø	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
Diller's Remark: Advancing 6" casing becoming easier (better rock) 136.0-146.0" - NA 136.0-146.0" - NA 136.0-146.0" - NA 136.0-141.0" - medium gray, (N6 with 57 7/2), moderate to strong HCI reaction, medium strong (R3), fragmented, fossiliferous (molds & casts), large bustong (12" wide, 3"-4" long), voids in irregular zones (up to 30% surface), carylar color, fragments 1"-4" diameter/length, fragments 1"-4" diameter/length in interval at 140.0-140.4" which is medium brown in Grained disaggregated limestone (5-10% silica grains) with moderate HCI reaction 141.0-143.4" - with limestone fragments up to 3", intact core sections up to 0.3" in length Disaggregated Limestone 143.4-144.6" - mild to moderate HCI reaction 144.0-147.6" - wery coarse grained, with >50% of length silica grains) solica grains No Recovery 144.6-146.0" NR 146.0-156.0" - NA 146.0-156.0" - NA Limestone Fragments 147.0-147.6" - very coarse grained, with >50% of length silica grains) recommendation of larger, grading to coarse sand-sized with 2"-3" limenone fragments, all carbonate derived 147.6-147.9" - yellowish brown, 1-1/2"-2" thick, no interbor, similar to 147.6-147.9", bedding plane parting evident 12"-34" thick, no interbor is mild to 147.6-147.9", bedding plane parting evident	-87.8 - - - - - - - - 135	R14-SN 10 ft 100%		NA			- 127.7-133.0' - limestone fragments 2"-4" diameter with varying amounts of fine grained disaggregated limestone, interval at 128.5-129.0' has 3 full size core fragments with fragments in between and exhibits fine (1/10"-1/2") bedding planes 133.0-134.9' - yellowish gray, (5Y 7/2), similar to 127.0-127.7', horizontal partings vary from 1"-7", light gray clayey silt infilling on partings - 134.9-136.0' - limestone fragments with sandy silt to gravel-sized fragments, angular to subangular,	- - - - - - -
145		R15-SN 10 ft		NA	136.0-146.0' - NA		similar to above except more silt to sand-sized particles 136.0-141.0' - medium gray intermixed with yellowish gray, (N6 with 5Y 7/2), moderate to strong HCl reaction, medium strong (R3), fragmented, fossiliferous (molds & casts), large burrows (1/2" wide, 3"-4" long), voids in irregular zones (up to 30% surface), cavities (1/2" diameter, circular), fragments 1"-4" diameter/length, lack of fines except in interval at 140.0-140.4' which is medium brown, fine grained disaggregated limestone (5-10% silica grains) with moderate HCl reaction 141.0-143.4' - with limestone fragments up to 3", intact core	Advancing 6" casing – becoming easier (better
	-102.8 - - - - - - -	146.0		NR	146.0-156.0' - NA		143.4-144.6' - mild to moderate HCl reaction, 10-20% silica grains No Recovery 144.6-146.0' Limestone Fragments 146.0-147.6' - very coarse grained, with >50% of fragments 1/4" or larger, grading to coarse sand-sized with 2"-3" limestone fragments, all carbonate derived 147.6-147.9' - yellowish brown, 1-1/2"-2" thick, no interbed 147.9-151.0' - similar to 147.6-147.9', bedding plane parting evident	- - - - - - - - - - -



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-06	SHEET	9	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723163.0 N, 457960.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 4.4	1 bgs	on 3/0	6/07 START : 3/7/2007 END : 3/	10/20	107 LOGGER : C. Sump		
>00	(9)			DISCONTINUITIES	ß	LITHOLOGY	COMMENTS	
ANE N (ft	ZAN ZAND ⊗D		ES	DESCRIPTION	3.50	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) _Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND	
LEV.	ORE	Ø	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	√MB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.	
_оош -107.8	074	œ	╙╙	THICKNESS, SUNFACE STAINING, AND HOTTINESS	S	CHARACTERISTICS		
-107.8	D40 01				Ħ	-	-	
1 -	R16-SN 10 ft		NA	-	₽	- - ,;	-	
1 -	100%			-	₽	Limestone 151.0-151.8' - medium strong to	-	
1 -				-	厂	strong (R3 to R4), fossiliferous (molds & casts), voids (1/32"-1/8") <	-	
					上	(moids & casts), voids (1/32 - 1/8) <	_	
1 -				-	╁	Limestone Fragments 151.8-153.9' - Same as 151.0-151.8'	-	
1 -					F	except 1" thick	-	
1 4				-	Ħ	Disaggregated Limestone	_	
1 4				-	Ľ	_ 153.9-155.0' - with gravel-sized	-	
155_ -112.8				_	₽	limestone fragments, some dark brown mottling, possible organics	_	
-112.0				-	Н	_ Limestone	-	
1 4	156.0			156.0-166.0' - NA	I	155.0-155.4' - Same as 151.0-151.8' Disaggregated Limestone	-	
1 -				150.0-100.0 - IVA	上	_ 155.4-156.0' - Same as 153.9-155.0	-	
1 -				-	╁╴	Limestone Fragments 156.0-166.0' - moderate yellowish	-	
-				-	F	brown to medium light gray, (10YR	-	
-				-	H	5/4 to N6), strong (R4), with thin yellowish gray/dark brown sandy silt	-	
-				-	Ł	layer (1-1/2"-2" thick) at 158.0' and 159.0', few full core diameter	-	
-				-	₽	limestone fragments 2"-3" thick at	-	
-				-	Н	161.0-163.0' with smaller fragments in between, disaggregated limestone	-	
160_ -117.8				_	Ħ	increasing with depth at 164.5-166.0',	-	
-117.0	R17-SN			-	士	fragments are medium strong to strong (R3 to R4), with trace small	-	
-	10 ft		NA	-	╁╴	voids (1/32"-1/8") and cavities (<3/4"	-	
-	100%			-	H	diameter) at 161.4-162.6' and 165.5-166.0', fragments are generally	-	
1 -				-	F	 thin, partial disc shaped fragments 	-	
-				-	Ľ	that appear to be breaking on bedding plane surfaces, full core	-	
-				-	₽	 diameter limestone fragments at 	-	
-				-	F	158.6-159.0'	-	
-				-	厂	}	-	
				-	仜	}-	-	
165 -122.8				_	士	 -	-	
1 1				-	+	 	-	
+	166.0			166.0-176.0' - NA	F		Driller's Remark:	
-				-	Ħ	166.0-166.9' - with gravel-sized	Segregated by drilling -	
-				-	世	limestone fragments Limestone Fragments	-	
-				-	╀	 166.9-167.7' - yellowish gray to light olive gray, medium strong to strong 	-	
-				-	F	(R3 to R4), 1"-3" partings, clayey	-	
-				-	口	silt-sized infilling Limestone Fragments With	-	
-				-	世	Disaggregated Limestone	-	
170				-	┢	- 167.7-169.3' - fragments 1"-1-1/2" diameter, angular to subangular	-	
170					f	dameter, angular to subangular	-	
					L			



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-06	SHEET	10	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723163.0 N, 457960.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 4.4	1 bgs	on 3/6	6/07 START : 3/7/2007 END : 3/	10/200	D7 LOGGER : C. Sump	
30€	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-127.8 - - - - - - 175 -132.8	R18-SN 10 ft i 100%		NA			Limestone Fragments 169.3-171.6' - limestone with clayey silt light gray (N4) interbeds, limestone 1"-3" thick with interbeds 1"-2" thick 171.6-176.0' - limestone fragments (2"-4") with variable amounts of disaggregated limestone, full core diameter, limestone fragments from 173.1-173.3' and 175.4-176.0' are 2-1/2"-3" thickness	- - - - - -
- - - - - 180 -137.8 - -	R19-SN 10 ft I 100%		NA	176.0-186.0' - NA		176.0-176.2' - dense, hard, well rounded cobble-sized limestone fragments, spherical to lenticular, 1"-2" diameter, very fine crystal faces suggest recrystallization, strong HCI reaction when scratched 176.2-183.4' - limestone fragments are fine grained and angular to subangular, increasing disaggregation with depth	- - - - - - - - -
-185 -142.8 	186.0			186.0-196.0' - NA		Disaggregated Limestone With Limestone Fragments 183.4-184.3' - gray clayey silt-sized limestone fragments with gravel-sized limestone fragments (3/4"-1-1/2") 184.3-185.3' - 2"-3" partings/fractures with clayey silt-sized limestone interbeds Disaggregated Limestone 185.3-186.0' - with gravel-sized limestone fragments 186.0-187.0' - disaggregated limestone Limestone With Limestone Fragments 187.0-188.9' - medium strong (R3), fragments are 2"-4" size, fossiliferous (molds and casts), cavities (1/2")	Driller's Remark: Segregation due to drilling



PROJECT NUMBER:

338884.FL BORING NUMBER:

I-06 SHEET 11 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723163.0 N, 457960.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER I	_EVELS : 4.4	1 bgs	on 3/6	6/07 START: 3/7/2007 END: 3	/10/20	07 LOGGER : C. Sump	
≥0≎	- ©			DISCONTINUITIES	၂ ဖွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-147.8 	R20-SN 10 ft 100%		NA	THICKNESS, SURFACE STAINING, AND TIGHTNESS		Limestone 188.9-189.7' - strong (R4), trace fossils/voids Limestone Fragments 189.7-192.0' - coarse sand-sized grading downward to gravel-sized limestone fragments (2"-4") 192.0-192.2' - medium strong to strong (R3 to R4), moderate yellowish brown limestone breccia 192.2-196.0' - limestone fragments with coarse sand/fine gravel-sized disaggregated limestone, full core diameter limestone fragments at 192.0' and 196.0'	- - - - - -
	R21-SN 10 ft 100%		NA	196.0-206.0' - NA		Limestone With Limestone Fragments 196.0-206.0' - moderate yellowish brown to grayish yellow, medium strong to strong (R3 to R4), limestone and fragmented limestone, fossiliferous with molds & casts to 10%, voids (1/32"-1/8") variable with depth and occurring in discreet zones (up to 40% of surface area), cavities roughly circular with diameters to 1", fine grained strong (R4) rock at 201.0-201.4'	
205 -162.8 -162.8 -	206.0					Limestone Fragments 206.0-207.5' - light olive gray, (5Y 5/2), fossiliferous, fragmented (2 full core diameter fragments), fossil molds and small cavities (<3/4") aligned horizontally along bedding planes, fragments are disc shaped 1/2"-3/4" thick with clayey silt on parting surfaces (thin beds)	- - - - - - -



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-06	SHEET	12	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723163.0 N, 457960.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 4.4	11 bgs	on 3/6	S/07 START: 3/7/2007 END: 3/	10/200	7 LOGGER : C. Sump	
≥0 <i>€</i>	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
ELO N (f	ANE 37 (3		ZES T	DESCRIPTION	121	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) Q	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEPT SURF	SORE	RO	'RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	3×ME	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-167.8	016	ш.			100	Limestone Fragments	
-	R22-SN		NA	-	H	- 207.5-214.5' - silty to sandy	-
-	10 ft			-	H	gravel-sized limestone fragments, fragments vary from to 50 to >90% of	-
-	85%			-	Н	 core and range in size from 1/2" to 	-
-				-	Ш	>3" diameter, medium brown silt layer at 213.5' (organics)	-
_				-	団	- layer at 213.3 (organics)	-
-				-	H	-	-
-				-	Ħ	-	-
-				-	H	_	-
-				-	Ш	_	-
215				_	₽₽		_
-172.8 -			NR		口	No December 044 5 040 0	_
	216.0		\square	040.0.000.01. NA	Ш	No Recovery 214.5-216.0'	_
_				216.0-226.0' - NA	Н	Limestone - 216.0-225.0' - similar to 207.5-216.0',	
_				_	Ħ	repeating sequence of (2"-4")	_
_				_	Ħ	angular limestone fragments and few full core diameter disc shaped	_
				_	Ш	fragments with sandy to silt with	_
_				_	Н	gravel-sized limestone fragment - layers (1.0-2.0' thick)	_
_				_	Д	Limestone Fragments	
				_	Ш	217.2-217.6' - light olive gray, highly fossiliferous limestone fragments,	l .
220					Н	large molds and casts (>1/2")	
-177.8			NA	_	Н	(brachiopods), dark gray/black pyritic surface staining on parting surfaces	
_	R23-SN 10 ft			_	月	and often restricted to fossil molds	_
_	90%	1.0		_	Н	217.6-219.3' - highly fragmented limestone, few fossils/voids	_
_				_	Н	Limestone Breccia 219.3-219.6' - light yellowish gray,	_
				_	Н	medium strong (R3), with olive gray	_
				_	Д	angular clasts, pyrite on fracture surfaces	
				_	Ш	Disaggregated Limestone	
					Н	220.0-222.4' - with gravel-sized limestone fragments (<1")	_
				-	H	Limestone	_
225			\square		口	222.4-222.8' - 1" thick limestone — beds	_
-182.8			NR	-	H	Disaggregated Limestone	_
	226.0				Н	222.8-225.0' - with gravel-sized - limestone fragments (1/4" to >1"	_
				226.0-236.0' - NA -	Щ	_ diameter), large (>3") fragments,	_
				-	口	olive gray highly fossiliferous limestone at end of run (225.0')	_
					Ш	No Recovery 225.0-226.0'	_
				-	H	Limestone - 226.0-227.0' - solution cavities	_
				-	뭐	(1/4"-1/2" diameter up to 1"	_
				-	Ħ	length/depth) and/or burrows, very fossiliferous, with molds	_
				-	H	(brachiopods) exhibiting horizontal	_
230					Н	alignment (bedding plane orientation)	
			\Box				I.



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-06	SHEET	13	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723163.0 N, 457960.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 4.4	1 bgs	on 3/6	6/07 START: 3/7/2007 END: 3	/10/20	D7 LOGGER : C. Sump	
≥∩≘	_ ()			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-187.8 - - - - - 235_ -192.8	R24-SN 10 ft 100%	NA	NA	_		Limestone 227.0-228.0' - fine grained, few fossils or cavities exhibiting pronounced bedding plane parting (1/4"-1/2" thick), highly fragmented 228.0-236.0' - disaggregated, coarse sand and fine gravel-sized (<1/2"), limestone fragments (1"-3") silt and fine sand-size percentage varies but is <15%, except medium brown sandy silt with <10% small (<1/4") limestone fragments at 232.0-232.5'	_
- - - - - 240 -197.8	236.0 R25-SN 10 ft 100%	NA	NA	236.0-246.0' - NA		236.0-246.0' - Same as 228.0-236.0' except medium brown with gravel-sized fragments (<15%)	_
-245 -202.8 202.8 	246.0			 246.0-256.0' - NA		- 244.2-245.4' - few larger (>1") limestone fragments, moderate HCI reaction	Driller's Remark: 6" casing advanced very easily
250						-	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-06	SHEET	14	OF	14	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723163.0 N, 457960.6 E (NAD83)

ELEVATION: 42.3 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 4.4	1 bgs	on 3/6	5/07 START: 3/7/2007 END:	3/10/2	2007	LOGGER : C. Sump	
≥ □€	(%			DISCONTINUITIES	_	2 L	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLICLOG	1	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
TH B FACI	E RU STH, OVE	R Q D (%)	FOCT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	200		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP. SURI	COR	ROI	FRA(PER	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNES	s Z	2	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-207.8			NA				246.0-254.5' - Same as 236.0-246.0'	
1 1	R26-SN				+	╁	except except single full size diameter limestone fragment at	-
1 1	10 ft 85%	NA			F	7	252.0', cone shaped with very thin	-
1 1	3373				Ħ	7	dark brown horizontal laminations (< 1/32"), 1/6" total thickness, 1"	-
1 1					#	╪	diameter limestone fragment	
1 7					1	┇	immediately above has dark gray/black pyritic coating on two	
					上	1	fracture faces; medium yellowish brown sandy silt with fine	
					\perp	_	gravel-sized fragments (<10%,	
					\perp	4	1/4"-1/2" diameter) at 253.4-253.5'	_
255 -212.8					尸	4	No Recovery 254.5-256.0'	_
1 -			NR		早	4		-
	256.0			256.0-266.0' - NA	口	4	Limestone	Driller's Remark: Drilling 6"
-				200.0-200.0 - NA	中	ᅡ	256.0-265.2' - disaggregated, with	casing advanced very -
-					占	╬	limestone fragments, same as 253.4-253.5', fragments 1"-3"	easily
-					\pm	╁	diameter	-
-					\pm	╁		-
-					\Box	+		-
1 1					F	7		-
260					Ħ	#		
-217.8					7	1	_	
	R27-SN 10 ft		NA]	1		
	92%	INA			H	Ⅎ		
					\perp	Ⅎ.		_
					\perp	4		_
1 -					$ \square$	4		_
1 -					\perp	4		-
-					上	ᅷ		-
					巾	ᅡ		-
265 -222.8					+	十	- No December 205 2 202 21	-
-	266.0		NR		\Box	士	No Recovery 265.2-266.0'	-
†	200.0				+	十	Bottom of Boring at 266.0 ft bgs on	
1					1	t	3/10/2007	1
1					1	Ī]
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PROJECT NUMBER: BORING NUMBER: 338884.FL **I-07** SHEET 1 OF 16

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723097.8 N, 458026.5 E (NAD83)

DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache ELEVATION: 42.4 ft (NAVD88)

DRILLIN	RILLING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical									
WATER	LEVELS	: 4.41 bg	s on 3/6/0)7 S	TART : 2/27/2007 END : 3/7/2007 LOGGER	₹ : (С.	Sump, J. Burkard		
300				STANDARD	SOIL DESCRIPTION	ي	ا و	COMMENTS		
AND	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	OO! NAME LIGOO OPOUR SYMPOL OOLOR	-	3	DEDTH OF CACING DRILLING DATE		
ACE TIO		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	2		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND		
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SO I DI IOMAS		INSTRUMENTATION		
 42.4	0.0			(N)	Topsoil	1/2		Note: Retrieved core appears compressed		
- - - - -	0.0	5.0	R1-SN		0.0-0.7' - dark brownish black, (5YR 2/1), fine silica sand, organic matter Poorly Graded Sand Grading To Poorly Graded Sand With Silt (SP/SP-SM) 0.7-4.8' - brownish black grading to light gray mottled with dark yellowish orange, (5YR 2/1 to N7 with 10YR 6/6), no HCl reaction, fine silica sand, fines increase to 10% with depth, organics decrease with depth			(larger diameter >6"); actual recovery is likely closer to 100% "Water level is based on Ground Water Monitoring at LNP site (FSAR Table 2.4.12.08)" Water levels not recorded during drilling		
					- -			Coring run times not recorded for I-07		
5 37.4 - -	7.0				Silty Sand / Sandy Silt (SM/ML) 4.8-5.0' - yellowish gray, (5Y 7/2), strong HCl reaction, very fine to fine sand, nonplastic fines, carbonate materials No Recovery 5.0-7.0'					
-	7.0				Poorly Graded Sand (SP)	╨	Щ	Retrieved core greater than 10.0 ft;		
-					7.0-8.3' - no HCl reaction, fine silica sand, may be			1.3 ft silica sand may be slough from run R1 SN		
-					slough material			-		
10_ 32.4 -		10.0	R2-SN		Silt With Sand (ML) 8.3-17.0' - grayish orange, (10YR 7/4), nonplastic to low plasticity, strong HCl reaction, <5% coarse sand to fine gravel (1/8"-1/4"), carbonate materials, at 8.0-9.0' are two 4"-5" diameter spherical, hard limestone fragments, with concentric layering/banding, light gray/light olive brown, possible re-crystallization indicated by fine "sparkling" reflective grains	-		Two stromatolite-like semi-spherical structures with concentric layering, nodule at base, fine tube-like branching structures on surface (1/16" wide >1.0" in length), fine dimple pattern on surface		
- - -					- - -			- - -		
15 27.4					- -			- - -		
-					1	$\ \ $		-		
-	17.0				7	$\ \ $		1		
-	17.0				17.0-27.0' - Same as 8.3-17.0' except grades to silty sand with gravel-sized limestone fragments at 19.0-22.0', grades back to silt with sand from 22.0-27.0', fragments are very friable and fossiliferous, with small (1/16") surface voids over 30-40% of surface, strong HCl reaction for both the silt and the limestone fragments, all material carbonate	- - - - -		- - - - -		
20					_	╨	Щ	-		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-07	SHEET	2	OF	16	

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DRILLING METHOD AND EQUIPMENT: Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel

ORIENTATION: Vertical

					START: 2/27/2007 END: 3/7/2007 LOGGER: C. Sump, J. Burkard	
WATER	LLVELO	: 4.41 bg	3 011 3/0/0		SOIL DESCRIPTION COMMENTS	\neg
≷ 9€	SAMDIE	INTERVA	I (ft)	STANDARD PENETRATION	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SOMMENTO DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION	\dashv
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMELL			TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,	
FAC		RECOVE			MOISTURE CONTENT, RELATIVE DENSITY OR ONSISTENCY, SOIL STRUCTURE, MINERALOGY E INSTRUMENTATION	
SUR			#TYPE	6"-6"-6" (N)	SONOIDTENOT, SOIL OTTOOTONE, WIINELYALOOT	
22.4					iIII	\neg
-					1	- 1
-					1	- 1
-						_
-		10.0	R3-SN		-	- 1
-						-1
-						-1
-						-1
-						-1
25						- 1
17.4					-	┨
-						- 1
-						- 1
-	27.0					- 1
-	21.0				Silty Sand With Limestone Fragments (SM) Core "hot" immediately following drilling,	- 1
-					27.0-29.5' - grayish orange, (10YR 7/4), fine grained, with gravel-sized (1/4"-3/4") limestone fragments	- 1
-					(similar to fragments described for 19.0-22.0' above).	- 1
-					gravel fragments are <15% of sample, clayey zone at 29.0' with dark brown silt layer (possible organics), all	1
-					carbonate materials	- 1
30					Limestone	- 1
12.4					29.5-36.6' - pale yellowish brown, (10YR 6/2), core is fragmented, with one piece 8" in length, fossiliferous	П
-					(casts/molds), small (1/16"-1/8") surface voids over	- 1
-					10-15% of surface, horizontal partings roughly 1"-2-1/2" apart, yellowish gray (5YR 7/2) clayey silt	1
		0.6	D4 CN		interbeds between partings, interbeds average <1" and are compacted, between 34.0-35.0' and	1
		9.6	R4-SN		36.0-36.7' there are some 12" thick clay/silt interbeds	1
					with 10% coarse sand and fine gravel-sized particles	1
]]
					\square]
]
35						
7.4					$oxed{\mathbb{H}}$	
_					\Box	
_					Top of rock estimated to be approximately 37' below ground surface	
_					No Recovery 36.6-37.0'	
-					Begin Rock Coring at 37.0 ft bgs See the next sheet for the rock core log	
-						
-]]	_
_]]	
_]]	
40						



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-07	SHEET	3	OF	16

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATE	R LEVELS : 4.	41 bgs	on 3/6	5/07 START: 2/27/2007 END: 3/3	7/200	D7 LOGGER : C. Sump, J. Burkard	
≥∩ ::	_ (9			DISCONTINUITIES	Ö	LITHOLOGY	COMMENTS
AN E	AND 3≺ (3	_	'ES ⊤	DESCRIPTION	200	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) 🛭	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
DEP	COR	A Q	FRA	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYM	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
40_2.4 452.6	37.0 	NA	NA	37.0-47.0' - NA		Silt And Limestone Fragments (ML) 37.0-47.0' - moderate yellowish brown, (10YR 5/4), strong HCl reaction, with limestone in 1.0' thick interbeds at 4.0' intervals, limestone fragments (1"-3") subangular to slightly subrounded, contains numerous small voids (1/16"-1/8") and are friable (easily broken by hand), all carbonate materials	Start of rock coring Coring run times not recorded for I-07 NA = Not Applicable NR = No Recovery
50_ -7.6	47.0 	NA	NA NR	47.0-57.0' - NA		Disaggregated Weak Limestone 47.0-54.5' - moderate yellow brown, (10YR 5/4), trace (<5%) limestone fragments (1/2"-3/4" in diameter), similar to above except zones containing thin dark brown/black lamination (possible organics) Limestone 54.5-55.3' - moderate yellowish brown, with light yellowish gray silty clay interbeds, horizontal partings 1/2"-1" with clayey interbeds 1/4"-1/2" thick	Limestone not full core diameter, possible drill induced breakage



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-07	SHEET	4	OF	16

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 4.4	1 bgs	on 3/6	6/07 START : 2/27/2007 END : 3/	7/2007	LOGGER : C. Sump, J. Burkard	
≥∩≘	_ (%			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-60 -17.6 - - - - - - - - - - - - - - - - - - -	R7-SN 10 ft 95%	NA	NA	57.0-67.0' - NA		Disaggregated Weak Limestone 55.3-56.2' - Same as 47.0-54.5' No Recovery 56.2-57.0' Disaggregated Limestone 57.0-63.0' - very fine grained, <5% limestone fragments (1/4"-3/4" in diameter), few large limestone fragments at 57.4' and 60.0' may represent thin harder limestone interbeds Limestone Fragments 63.0-63.5' - fragments are 1"-1-1/2" thick with silty (carbonate derived) material on surfaces, friable, fossiliferous (casts/molds), numerous small (1/16"-3/16") voids covering 50-60% of surface Disaggregated Limestone 63.5-66.5' - pale yellowish brown, changing with depth to limestone	
-			NID		$\vdash\vdash\vdash$	 fragments 1/4"-2" in diameter, dark 	
	R8-SN 10 ft 96%	NA	NR NA	67.0-77.0' - NA		brown/black thin organic rich lamination No Recovery 66.5-67.0' Limestone Fragments 67.0-76.6' - interbedded sequences, 4.0-5.0' of limestone fragments (2"-4" size) and disaggregated limestone with <5% small (<1/2") limestone fragments, thinly bedded (1/2"-3/4"), limestone with fine silt material and bedding plane parting 69.0-69.5', very friable, (mild to no HCl reaction on faces, mild reaction on partings), 1/2" thick, dark black laminated organic layer at 74.5' at top of upward fining sequence (silt zone)	
_	77.0		NR			No Recovery 76.6-77.0'	



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	I-07	SHEET	5	OF	16	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 4.4	1 bgs	on 3/	6/07 START: 2/27/2007 END: 3/	7/200	7 LOGGER : C. Sump, J. Burkard	
≥ ∩ ∷	(9)			DISCONTINUITIES	Ğ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ACE	RUI TH.,	(%) _Q	E CO	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SOLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
EPT SURF	SORE	ROD	RAC	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YME	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
БОШ	0716	Ľ	шш		0)	Limestone Fragments	Lost circulation between
-				-	F	- 77.0-83.3' - Same as 67.0-76.6'	77.0-87.0'
-				77.0-87.0' - NA	Ħ	except gravel-sized limestone fragments with depth (locally up to	-
-				-	世	- 4")	-
-				-		-	-
80				-		-	-
-37.6				-	匚	_	_
-				-	匚	-	-
-				-	口	=	-
	R9-SN	NIA.	NIA	-	\parallel		-
1	10 ft 100%	NA	NA		\perp		_
					\vdash	_	_
					F	- 83.3-85.6' - 4"-5" limestone	
				_	F	fragments, light gray clayey silt with	_
_				_	H	15% small (1/4"-3/4") limestone fragments	_
85 <u>-</u> 42.6				_	片	_	
-42.6				-	世	_	_
-				-	⊬	Limestone	-
-				-	F	 dense, fine grained, fossiliferous 	-
-	87.0			-	╓	(casts/molds), small voids (1/16"-1/8"), 10-15% small cavities	-
-				-	匚	 (1/2"), 8"-9" core fragment, light gray clayey interbed 	-
-				87.0-97.0' - NA	世	Disaggregated Limestone	-
-				-	丗	 87.0-92.5' - carbonate derived very fine sand, dark brown/black organic 	-
-				-	┢	layers (1"-2" thick), limestone	-
90				-	├	_ fragments, subangular with few subrounded, 75% of limestone	-
-47.6				_	F	fragments are <1" in diameter with large (2"-4") fragments from	_
-				-		91.5-92.5'	-
					岸		_
	R10-SN 10 ft		NA		片		
	100%	INA	INA	_	H	_	_
				_	\vdash	Limestone – 92.5-97.0' - moderate yellowish	_
					尸	brown, (10YR5/4), fine grained,	-
-					戸	moderately strong to strong (to R4), fossiliferous limestone, with variable	-
-					口	percentages small surface voids (1/16"-1/8"), small circular solution	-
95 <u> </u>				_	口	— cavities (<1/2"), clayey silt and	_
-					士	limestone interbeds 94.0-94.5' and 94.6-95.0'	-
-				-		<u> </u>	-
-	07.0			-	F	-	-
	97.0				F		



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	I-07	SHEET	6 ()F	16	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 4.4	1 bgs	on 3/0	6/07 START : 2/27/2007 END : 3/	7/200	7 LOGGER : C. Sump, J. Burkard	
≷ □≎	- (·)			DISCONTINUITIES	g	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
100 -57.6	R11-SN 10 ft 196%	NA	NA	97.0-107.0' - NA		Limestone 97.0-98.8' - grayish orange, (10YR 7/4), fine grained, trace surface voids or cavities, fine bedding lamination visible in discrete zones, irregularly shaped fragments 98.8-104.1' - moderate yellowish brown, (10YR 5/4), variable density of small (1/16"-1/8") surface voids with few small (<3/4") cavities Limestone Fragments 104.1-106.6' - large (2"-4") and fine gravel-sized limestone fragments (1/4"-3/4" in diameter), silty and sandy matrix (disaggregated	SC-1 collected at 99.2- 100.0'
- - - - - 110 -67.6	107.0		NR			limestone), very weak (R1) at 105.0-106.0' No Recovery 106.6-107.0' Disaggregated Limestone 107.0-108.0' - with limestone fragments 1/4"-3/4" in diameter Limestone 108.0-110.9' - pale yellowish gray, (5Y 7/2), fossiliferous (molds & casts) (5%), small voids (1/16"-1/8") 30-40%, roughly circular cavities 1/2"-3/4" in diameter	"Sandy" material at top of run may be the result of segregation during drilling
-07.0	R12-SN 10 ft 1 100%	NA	NA	- - - - -		Limestone Fragments 110.9-113.1' - Same as 108.0-110.9' except larger fragments (3"-4"), with irregular subangular shape Limestone	Possible drill induced breakage
115 -72.6	117.0					113.1-113.9' - Same as 108.0-110.9' except less fragmented Limestone Fragments 113.9-114.4' - very friable Limestone 114.4-117.0' - Same as 113.9-114.4' except less fragmented	SC-3 collected at 115.8- 116.6' -



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-07	SHEET	7	OF	16	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DISCONTINUATIES CONCENTION CONCENTS	WATER	LEVELS : 4.4	I1 bgs	on 3/6	6/07 START : 2/27/2007 END : 3/	7/2007	LOGGER : C. Sump, J. Burkard	
Disaggregated Limestone With Limestone Fragments 117.0-127.0' - NA 117.0-127.0'								COMMENTS
Disaggregated Limestone With Limestone Fragments 117.0-127.0' - NA 117.0-127.0'	DEPTH BELOV SURFACE AND ELEVATION (ff	CORE RUN, LENGTH, AND RECOVERY (%	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LO	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
Limestone 125.4 127.0' - Same as 108.0-110.9' except moderate yellowish brown, fragmented at 126.5-127.0' Disaggregated Limestone With Limestone Fragments 127.0-128.0' - moderate yellowish brown, (1078.54), moderate HCI reaction, carbonate derived Limestone 128.0-137.0' - pale yellowish brown, (1078.6/2), fine to medium grained, strong HC reaction, limestone beds and fragments, fossiliferous, voids (<1/16*) over 75% of surface at 128.0-128.9', 10% voids 128.0-128.9', 10% voids 128.0-128.9', 10% voids 128.0-128.9', 10% voids 138.0-137.0', interbedded with clay at 133.0-134.0'	- - - - 120	R13-SN 10 ft l			117.0-127.0' - NA		Limestone Fragments 117.0-121.2' - moderate yellowish brown, (10YR 5/4), moderate to strong HCl reaction, gravel-sized fragments are friable limestone, fragments range from 1/4"-1-1/4" with few large 2"-4" fragments Limestone 121.2-122.0' Limestone Fragments 122.0-125.4' - moderate yellowish brown, (10YR 5/4), fragments of fine grained limestone in a light gray	
127.0-137.0' - NA 127.0-138.0' - moderate yellowish brown, (10'R 5/4), moderate HCl reaction, carbonate derived Limestone 130 - 87.6		127.0			- - - -		125.4-127.0' - Same as 108.0-110.9' except moderate yellowish brown, fragmented at 126.5-127.0'	- - - - - -
	-87.6 - - - - - - - 135	10 ft 100%		NA	127.0-137.0' - NA		Limestone Fragments 127.0-128.0' - moderate yellowish brown, (10YR 5/4), moderate HCI reaction, carbonate derived Limestone 128.0-137.0' - pale yellowish brown, (10YR 6/2), fine to medium grained, strong HCI reaction, limestone beds and fragments, fossiliferous, voids (<1/16") over 75% of surface at 128.0-128.9', 10% voids 128.9-133.0', trace voids on surface 134.0-137.0', interbedded with clay at	
						П		



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-07	SHEET	8	OF	16	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DEPTH BELOW SURFACE AND SURFACE AND CO. 10 O. 10	CORE RUN, LENGTH, AND M. # 50		FRACTURES PER FOOT	DISCONTINUITIES DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS 137.0-147.0' - NA		ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS Limestone Fragments 137.0-137.9' - pale yellowish brown, (10YR 6/2), moderate HCI reaction, fragments are well graded gravel-size, carbonate derived Limestone 137.9-138.6' - pale yellowish brown,	COMMENTS SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
140	R15-SN 10 ft	RQ		DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	H H H H H SYMBOLIC LO	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS Limestone Fragments 137.0-137.9' - pale yellowish brown, (10YR 6/2), moderate HCI reaction, fragments are well graded gravel-size, carbonate derived Limestone	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
140	R15-SN 10 ft		NA	137.0-147.0' - NA		- 137.0-137.9' - pale yellowish brown, (10YR 6/2), moderate HCl reaction, fragments are well graded gravel-size, carbonate derived Limestone	- - -
- - - 145 -102.6			NR			- (10YR 6/2), medium to fine grained, 25-50% voids on surface, possible alteration zone - 138.6-143.0' - light bluish gray grading to pale yellowish brown, (5B-7/1 to 10YR 6/2), fine grained, strong HCl reaction, no voids, fossiliferous - 143.0-143.9' - medium grained, strong HCl reaction, 25-50% voids (<1/16") on surface Limestone Fragments - 143.9-145.5' - grayish orange, (10YR 6/2), silty sand-sized disaggregated limestone with gravel-sized limestone fragments - No Recovery 145.5-147.0'	Core barrel quickly dropped while drilling
150 -107.6 - - - - - - - - - - - - 155 -112.6	47.0 R16-SN 10 ft 100%		NA	147.0-157.0' - NA		Disaggregated Limestone 147.0-147.4' - pale yellowish brown, (10YR 6/2), strong HCI reaction Limestone 147.4-152.9' - pale yellowish brown, (10YR 6/2), medium grained, moderate to strong HCI reaction, voids over 5-15% of the surface, fragments vary in size from 1"-6", slight color change (medium bluish gray [5B 7/1]) and possible alteration zone at 151.2-151.6', increase in surface voids to 25-50% at 152.6-152.9' 152.9-154.4' - light brownish gray, (5YR 6/1), medium to fine grained, with fragments ranging from sand-size to 1" in diameter 154.4-155.6' - pale yellowish brown, (10YR 6/2), strong HCI reaction, interbedded clays, trace voids Limestone Fragments 155.6-157.0' - Same as 154.4-155.6' except fragmented	SC-4 collected at 147.6- 148.4'



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-07	SHEET	9	OF	16	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 4.4	11 bgs	on 3/6	5/07 START: 2/27/2007 END: 3/3	: 3/7/2007 LOGGER : C. Sump, J. Burkard					
≥∩ ⊊	(%			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS			
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	(%) Q	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND			
DEPTI SURF, ELEV	CORE LENG RECO	RQD	FRAC PER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS		AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.			
-				-	H	Disaggregated Limestone With Limestone Fragments	_			
-				157.0-167.0' - NA	H	157.0-157.8' - pale yellowish brown, (10YR 6/2), sand-sized	-			
-				-	岸	 disaggregated limestone material, with gravel-sized limestone 	-			
					片	fragments - Limestone				
160_ -117.6				_	厈	157.8-158.3' - yellowish gray, (6Y7/2), fine to medium grained, strong	_			
-117.0				-		HCl reaction 158.3-160.9' - light olive gray, (5YR)	-			
-				-	┢	5/2), fine to medium grained, strong	-			
	R17-SN 10 ft		NA		」	 HCl reaction, delayed HCl reaction, fragmented 				
-	90%	INA		- -	上	160.9-164.6' - light olive gray, (5Y 5/2), fine to medium grained, strong	_			
-				-	厈	HCl reaction, partially broken into disc-shaped fragments, numerous	-			
-				-	扞	_ small solution cavities	-			
-						-				
165 -122.6						164.6-166.0' - Same as 160.9-164.6' except more fragmented, with silt at	_			
-122.0				-	片	bottom of section	-			
-				-	Ħ	No Recovery 166.0-167.0'	-			
	167.0		NR		Ħ	_	_			
-				-	昷	Disaggregated Limestone With Limestone Fragments	Possible drill induced breakage 167.3-171.0' -			
-				167.0-177.0' - NA	士	167.0-167.3' - pale yellowish brown, (10YR 6/2), fragments are	-			
-				-	世	- gravel-sized Limestone	-			
					ፗ	167.3-175.5' - yellowish gray, (5Y – 7/2), medium grained, partially				
170_ -127.6				_	尸	broken into disc-shaped fragments, voids (<1/16") over 10-25% of	_			
-127.0				-		 surface, with some small solution cavities (<5), HCL reaction is 	-			
-			NA	-	Œ	delayed	-			
	R18-SN 10 ft	NA			H	_	_			
-	85%	INA		-	片	_	Possible drill induced breakage 172.0-173.0' -			
-				-	岸	_ _	-			
-				-	厈	_	-			
					\Box	-]			
175_ -132.6				-		<u> </u>	_			
-132.0				-	世	No Recovery 175.5-177.0'	-			
-			NR	-	口	-	-			
	177.0				⊭	-	_			



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-07	SHEET	10	OF	16	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 4.4	1 bgs	on 3/6	6/07 START : 2/27/2007 END : 3/	7/2007	LOGGER : C. Sump, J. Burkard	
≥∩≘	_ (6			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-180 -137.6 	R19-SN 10 ft 100%		NA	177.0-187.0' - NA		Limestone Fragments 177.0-180.0' - light olive gray, (5Y 5/2), fine to medium grained, moderate to strong HCl reaction, fragmented, voids (1/16") over 75% of surface, fossiliferous Limestone Fragments With Disaggregated Limestone 180.0-185.3' - moderate yellowish brown, (10YR 5/4), large (up to 1" thick) limestone fragments, with silt and sand-sized disaggregated limestone, at 181.3-181.6' the limestone fragments are light olive gray (5YR 5/2), very fine grained, with moderate HCl reaction Limestone	
	R20-SN 10 ft 1 94%		NA	187.0-197.0' - NA		185.3-187.0' - light olive gray, (5Y 5/2), fine to medium grained, moderate to strong HCl reaction, fragmented, voids (1/16") over 10-40% of surface, fossiliferous Limestone Fragments 187.0-196.4' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2), fine to medium grained, mild to moderate HCl reaction, fragmented (1/4"-1"), with disc-shaped fragments up to 3" thick, poorly fossiliferous, voids vary from 0-30% coverage	
	197.0		NR		\square	NO Recovery 196.4-197.0	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-07	SHEET	11	OF	16

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DESCRIPTION ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS PLANARITY, INFILLING MATERIAL AND CHARACTERISTICS Disaggregated Limestone 197.0-198.2' - coarse grained, carbonate derived, few (<10%) DESCRIPTION ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS SIZE AND DESCRIPTION Disaggregated Limestone 197.0-198.2' - coarse grained, carbonate derived, few (<10%) materials	MMENTS EPTH OF CASING, CORING RATE AND ESS, CAVING ROD
□ Disaggregated Limestone Possible drill □ 197.0-198.2' - coarse grained, segregation of carbonate derived, few (<10%) materials	CORING RATE AND
□ Disaggregated Limestone Possible drill □ 197.0-198.2' - coarse grained, segregation of carbonate derived, few (<10%) materials	ST RESULTS, ETC.
197.0-207.0' - NA 197.0-207.0' - NA 197.0-207.0' - NA 197.0-207.0' - NA 197.0-207.0' - NA 197.0-207.0' - NA 197.0-207.0' - NA 198.2-203.0' - yellowish gray to dusky yellow, (5Y 7/2 to 5Y 6/1), abundant voids, thin (1/16" thick) light olive gray (5Y 5/2) convoluted bedding lamination with variable spacing (1/16"-1/2"), horizontal parting surfaces, also thin zones of limestone fragments with little or no surface voids or fossils visible 198.2-203.0' - yellowish gray to fracture surfamatch) 198.2-203.0' fracture surfamatch) 198.	of core - 2/28/07 - I may have ring drilling - (parting/ aces do not -
207.0-208.0' - yellowish gray, (57 Possible drill breakage of 1"-4" diameter angular to subangular fragments 208.0-215.4' - moderate yellowish brown to light olive gray, (10YR 5/4 to 5Y 5/2), fine grained, medium strong (R3), fragmented (34"-2" diameter) with few pieces of full diameter core, highly fossiliferous (molds/casts), abundant voids, zone of less competent rock at 213.5', fine grained fossil-poor zone at 211.5' No Recovery 215.4-217.0'	I induced



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	I-07	SHEET	12	OF	16	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 4.4	1 bgs	on 3/6	6/07 START : 2/27/2007 END : 3/	7/2007	LOGGER : C. Sump, J. Burkard	
≥∩≘	_ (%			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- 220 -177.6	R23-SN 10 ft i 100%	NA	NA	217.0-227.0' - NA		Limestone Fragments 217.0-219.5' - yellowish gray, (5Y 7/2), fine grained, fragmented, thin light olive gray (5Y 5/2) to medium gray (N5) lamination, well defined bedding plane partings (smooth, planar, 1/2"-1" spacing) on many fragments, other fragments are typically angular to subangular 219.5-227.0' - medium to coarse grained, fragmented, with increasing percentage of sand-size material (carbonate derived), highly fossiliferous (casts/molds), fragments include medium gray angular inclusions (1/2"-1") at 222.0-224.0' (possible limestone breccia zone)	Possible limestone breccia zones
230 -187.6 - - - - - - - - - - - - - - - - - - -	227.0 R24-SN 10 ft 100%		NA	227.0-237.0' - NA		227.0-237.0' - yellowish gray, (5Y 8/1), fine grained, with light olive gray (5Y 6/1) lamination, fragmented to coarse sand- and gravel-sized irregular-shaped fragments (large [>1"] fragments make up 10-20% of volume), fragments exhibit strong bedding plane features (beds 1/2"-1" thick) at 230.0-232.0', some fragments exhibit dark gray surface coating that appear partially recrystallized (fine reflective crystal faces)	Possible drill induced breakage



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-07	SHEET	13	OF	16	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 4.4	1 bgs	on 3/6	6/07 START : 2/27/2007 END : 3/	7/2007	LOGGER : C. Sump, J. Burkard	
≥∩≘	_ (6			DISCONTINUITIES	၂ ပွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
240 -197.6 - - - - - - 245 -202.6	R25-SN	NA	NA	237.0-247.0' - NA		Limestone Fragments 237.0-247.0' - Same as 227.0-237.0' except 6" of medium brown silt with gravel at 240.0', increasing percentage of sand-sized material with depth, limestone fragments are more friable and tend to decrease in size with depth	Possible drill induced "disaggregation"
250 -207.6 - - - - - - - - - - - - - - - - - - -	247.0 R26-SN 10 ft 100%		NA	247.0-257.0' - NA		247.0-257.0' - Same as 237.0-247.0' except limestone fragments vary from 30-70% over most of interval except sandy silt zone at 253.0-254.0'	Repeating upward fining sequences.



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-07	SHEET	14	OF	16

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 4.4	I1 bgs	on 3/6	6/07 START: 2/27/2007 END: 3/	7/200 ⁻	7 LOGGER : C. Sump, J. Burkard		
≥∩≘	(9)			DISCONTINUITIES	G	LITHOLOGY	COMMENTS	
ELO.	AND 37 (%	_	ES T	DESCRIPTION	CLO	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,	
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.	
					H	Limestone Fragments - 257.0-267.0' - Same as 247.0-257.0'		
_					F	except consisting of sand to	_	
-				257.0-267.0' - NA -	H	gravel-size (1") limestone fragments, with fragments decreasing and	-	
-				-	П	becoming more friable with depth, few large fragments of more	-	
260	_			-	H	 competent fine grained limestone, silt zone is absent 	-	
-217.6				-	H	Zone is absent		
					H]	
_				_	H	_	_	
-	R27-SN 10 ft		NA	-	Н	_	-	
-	100%			-	Н	_	-	
-				-	\vdash	_	-	
-				-	Н	_	-	
-	65_ 2.6_		Ш	 				
265					Ш			
-222.6					Н	-	-	
-				-	H		-	
-	007.0			-	+++	-		
-	267.0			-	H	267.0-277.0' - Same as 257.0-267.0'	Material appears drier than	
					Н	 except with gravel-sized fragments (1/4"-1-1/2") and sand-sized 	similar zone at boring I-02 drilling with mud	
-				267.0-277.0' - NA	H	fragments of varying percentages, few large (>3") limestone fragments	Repeating upward fining sequences (3-4' thick) -	
-				-	H	few large (>3") limestone fragments at 267.0' and 269.5' that exhibit fine bedding laminations (1/8"-1/2") and		
-				-	H	 bedding plane partings, medium 	-	
270_ -227.6				_	世	brown silty zone at 275.0'	-	
-				-	H	_	-	
					Ħ]	
-	R28-SN 10 ft		NA	<u>-</u>	Ħ	_]	
-	100%			-	Ħ	_	-	
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-				-	H		-	
1 -				-	Ħ	-		
275_	275 232.6				H]	
-232.6					H	_		
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-	077.0			-	H	_	-	
-	277.0				Ħ			
					L			



PROJECT NUMBER: BORING NUMBER:

338884.FL I-07

SHEET 15 OF 16

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel

ORIENTATION : Vertical

WATER	LEVELS : 4.4	1 bgs	on 3/6	6/07 START : 2/27/2007 END : 3/7	7/2007	LOGGER : C. Sump, J. Burkard	
				DISCONTINUITIES	П	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - 280 -237.6	R29-SN	NA SN		- 277.0-287.0' - NA - - - - -		Disaggregated Limestone 277.0-283.4' - with gravel-size limestone fragments (20-40%)	4" core penetration slow (hard) upper 5-6 ft of run, very rapid in bottom 3 ft 6" casing driving very hard entire length of run Lost core material may have been poorly graded sand sized material that fell out of core barrel or (less probably) a void from 284-287, based on difficulty of driving 6" casing
285 -242.6	10 ft 64%	NA	NR	- - - - - -		No Recovery 283.4-287.0'	- - - - - - -
-	287.0			-		Disaggregated Limestone 287.0-290.0' - with gravel-size (1/4"-3/4") limestone fragments	Core from 287-291.5' recovered during 1st
-			NA	287.0-297.0' - NA -		(10-15%), fragments are angular to subangular in shape, sand-sized material has strong HCl reaction, silty material has mild to moderate HCl reaction	attempt coring 287.0-297.0' (45% recovery), bottom half of run assumed to have fallen out of core barrel 6" casing driven to 292'
290_ -247.6 - - -	R30-SN 10 ft		NR	- - - -		Limestone 290.0-291.5' - light olive gray, (5Y 5/2), fossiliferous, small (1/16"-1/8") voids over (15-30%) of surface, few larger (<3/4") cavities, horizontal partings 1"-1-1/2" thick, fragments (2"-4"), few fragments are full core	with difficulty, 4" core barrel with difficulty, 4" core barrel retrieved and 6" casing advanced to 297 (causing slough to accumulate in hole)
295 -252.6	95%		NA	- - - - -		- diameter No Recovery 291.5-292.0' Disaggregated Limestone With Limestone Fragments 292.0-297.0' - moderate HCl reaction, gravel-sized (1/2") limestone fragments 5-10%, HCL reaction is delayed	- - - - - -
	297.0				囯	-	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-07	SHEET	16	OF	16	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723097.8 N, 458026.5 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

	LEVELS : 4.4			6/07 START : 2/27/2007 END : 3/1	7/200	7 LOGGER : C. Sump, J. Burkard	
				DISCONTINUITIES		LITHOLOGY	COMMENTS
AND (#)	ZNN ZNN ZNN ZNN		ES	DESCRIPTION	SLOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE AACE ATIC	THU.	(%) O	TUR OF	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SOLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	ROD	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	016	IL.	шш		0)	Disaggregated Limestone With	20 ft long 4" core barrel
-				-	F	Limestone Fragments	used to core to 307.0',
-					Ħ	297.0-297.8' - Same as 292.0-297.0' except limestone fragments are up to	bottom 10ft is representative of 297.0-
-				-		- 3/4" diameter and make up 10% of	307.0'; about 6 ft of – additional material
-				-		Disaggregated Limestone	recovered represents a
300				-	団	297.8-298.8' - light gray, (N6), compacted, with friable clasts 1/16"-	disturbed sample from – 292-297' plus slough
-257.6				_	\Box	3/16" in length, fine bedding structure visible with lighter clasts oriented	material from advancing the 6" casing from 292.0-
					\vdash	along bedding / lamination planes,	297.0'
					H	distinctive downward curving laminations may represent	Core material at 292.0-
1 -	R31-SN 10 ft		NA	_	F	subsidence feature	297.0' is from 2nd attempt
1 -	100%	, .	, `	-	H	Clayey Silt (ML) - 298.8-299.0' - dark brown and black,	and is disturbed
-				-	H	no HCl reaction, finely laminated, vitreous sheen on laminae surfaces,	_
-				-	H	- organics	-
-				-	H	Disaggregated Limestone With Limestone Fragments	-
				-	H	299.0-306.0' - mottled yellowish gray,	-
305 <u> </u>				_	H	light olive gray, and light gray, (5Y 7/2, 5Y 5/2, and N6), strong HCl	_
-				-	F	 reaction, compacted, with gravel-sized limestone fragments 	-
-				-	\blacksquare	(<10%)	Similar quartz crystals
-	307.0			-	匚	 306.0-307.0' - Same as 299.0-306.0' except clear subhedral quartz (silica) 	observed at depth >300.0' - in boring I-02
-						crystals (<1/16"-1/4") in discrete irregular zones (possible void	Total depth of boring is \\307.0'
						\infilling)	507.0
_				_		Bottom of Boring at 307.0 ft bgs on 3/7/2007	_
-				-		-	=
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	l I-08	SHEET	1	OF	14	

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723055.0 N, 458076.8 E (NAD83)

DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache ELEVATION: 42.5 ft (NAVD88)

START. 3/13/2007 END: 3/16/2007 LOGGER: Prochaeka C. Sump START. 3/13/2007 SOIL DESCRIPTION SOIL DESCRIPTION SOIL DESCRIPTION RECOVERY on THE FIGURE FITTER 1. POSSITION TO SOIL NAME. USCS GROUP SYMBIOL. COLOR. MINISTRUMENTATION FITTER FIGURE SOIL NAME. USCS GROUP SYMBIOL. COLOR. MINISTRUMENTATION SOIL NAME. USCS GROUP SYMBIOL. SOIL SAME. SAME SAME SAME SAME SAME SAME SAME SAME	DRILLIN	G METH	DD AND	EQUIPM	ENT : Rotosonic	S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical
SMIPLE INTERVAL ID PERCENTATION RECOVERY OF 0°-6°-6° APYRED 0°-8°-6° APYRED 0°-8°-8° APYRED 0	WATER	LEVELS	: 3.5 ft bo	gs on 3/13	3/07	START : 3/13/2007 END : 3/15/2007 LOGGER : L. Prochaska, C. Sump
Road Base Limestone On 1-0 - very page orange, (10YR 8/2), dry, fragments (-3" diameter) imported fill Sility Sand (SM) 1-02-5" - dark gray, (N3), moist, fine to medium grained, not Hot reaction, <20% fines, organice-woodfrootets, slica 2-5-3-0". Same as 10-2-5" except brownish black, Grade State of State of State of State of State or State of State or State	> 0 0 1					SOIL DESCRIPTION COMMENTS
Road Base Limestone On 1-0 - very pale orange, (10YR 8/2), dry, fragments (-3" diameter) imported fill Sitiy Sand (SM) 1-0-25'- dark gray, (N3), moist, fine to medium grained, net for lenacion, *20% fines, organic-wood/models, slica approximately 3.5' below ground surface based on moisture content increase 2-5-3-0''. Same as 10-2.5' except drusky brown, (5YR 2/2), highly organic - noticets up to 20%, up to 40% fines - 20%, increase sity Sand (SM) 5-15-2' Same as 10-2.5' except drusky brown, (5YR 2/2), highly organic - noticets up to 20%, up to 40% fines - 20%,	A A N	SAMPLE	INTERVA	L (ft)		O DEPTH OF CACING PRILLING PATE
Road Base Limestone On 1-0 - very pale orange, (10YR 8/2), dry, fragments (-3" diameter) imported fill Sitiy Sand (SM) 1-0-25'- dark gray, (N3), moist, fine to medium grained, net for lenacion, *20% fines, organic-wood/models, slica approximately 3.5' below ground surface based on moisture content increase 2-5-3-0''. Same as 10-2.5' except drusky brown, (5YR 2/2), highly organic - noticets up to 20%, up to 40% fines - 20%, increase sity Sand (SM) 5-15-2' Same as 10-2.5' except drusky brown, (5YR 2/2), highly organic - noticets up to 20%, up to 40% fines - 20%,	H H H H H H		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
Road Base Limestone On 1-0 - very pale orange, (10YR 8/2), dry, fragments (-3" diameter) imported fill Sity Sand (SM) 1-0-2.5" - dark gray, (N3), moist, fine to medium graned, no HCI reaction, *20% fines, organica-woodroodes, sica or provided fill Sity Sand (SM) 1-0-2.5" - dark gray, (N3), moist, fine to medium graned, no HCI reaction, *20% fines, organica-woodroodes, sica or provided fill Sity Sand (SM) 1-0-2.5" - dark gray, (N3), moist, fine to medium graned, no HCI reaction, *20% fines, sica or provided fill Sity Sand (SM) 5-0-8.5" - Same as 10-2.5" except dusky brown, (5YR 2/2), highly organic - rootlets up to 20%, up to 40% fines Sity Sand (SM) 5-2-6.5" - Same as 10-2.5" except dusky brown, (5YR 2/2), highly organic - rootlets up to 20%, up to 40% fines Sity Sand (SM) 6-0-8.2" - pale yellowish brown, (10YR 4/2), fine grained, no HCI reaction, fine silica sand, 10-20% fines grades to Faic Cay (CH) 7-3-3" - (10) - pale blue, motted pale yellowish brown, (10 R 6/2), moist, extremely high plasticity, no dilatancy, no HCI reaction, rise silica sand, 10-20% fines grades to Faic Cay (CH) 9-3-10.5" - spale blue, motted pale yellowish brown, (10 B 6/2, 10YR 5/4), moist, extremely high plasticity, no dilatancy, no HCI reaction, rise silica sand, 10-20% fines grades to fine silica sand, 10-20% fines grades are silication, and fines are silication, no HCI reaction, rise silica sand, 10-20% fines grades fines silica sand, 10-20% fines grades fines silication, no HCI reaction, rise silication, no HCI reaction, no HCI reaction, rise silication, no HCI reaction, no HCI reaction, no HCI reaction, no HCI reaction, rise silication, no HCI reaction, no	EV.			#TYPE		CONSISTENCY, SOIL STRUCTURE, MINERALOGY
0.0-1.0' - very pale orange, (10YR 8/2), dry, fragments (c3' diameter) imported fill Sitiy Sand (SM) 10.2.5' - dark gray. (N3), moist, fine to medium grained, no HCl reaction, <20% fines, organics-woodrontotist, silica 2.5-3.0'. Same as 10.2.5' except thorwish black, (5/R 27), 30.50% fines and organic 2.5-3.0'. Same as 10.2.5' except provinish black, (5/R 27), 30.50% fines and organic 2.5-3.0'. Same as 10.2.5' except dusky brown, (5/R 27), 8.10% fines and organic 2.5-3.0'. Same as 10.2.5' except dusky brown, (5/R 27), 8.10% fines grained, provinish for the fines of the f		0.0			(N)	
S.2-5.8" - Same as 1.0-2.5" except dark yellowish brown, (10YR 4/2), 15-30% sill Poorty Graded Sand (SP) 5.8-6.0" - white, (N7), medium grained, silica sand, Irace fines Sility Sand (Se) 6.0-8.2" pale yellowish brown, (10YR 4/2), fine grained, no HCI reaction, fine silica sand, 10-20% fines grades to Fat Clay (CH) 8.2-9.3" - Same as 6.0-8.2" except pale blue, (5B 6/2), moist, extremely high plasticity, no dilatancy, no HCI reaction, <10% very fine silica sand Fat Clay (CH) 9.3-10.9" - pale blue, motited pale yellowish brown, (5B 6/2, 10YR 5/4), moist, extremely high plasticity, no dilatancy, -10% fine silica sand, up to 10%, calcareous grave-iszed fragments up to 1/2", trace fossil structure 10.9-11.0" - Same as 9.3-10.9" except grading to Silt (ML), very pale orange (10YR 8/2), moist, nonplastic, moderate to rapid dilatancy, stropl HCI reaction, (~10% very fine sand-sized carbonate materials) Begin Rock Coring at 11.0 ft bgs See the next sheet for the rock core log			6.0	R1-SN		0.0-1.0' - very pale orange, (10YR 8/2), dry, fragments (<3" diameter) imported fill Sity Sand (SM) 1.0-2.5' - dark gray, (N3), moist, fine to medium grained, no HCl reaction, <20% fines, organics-wood/rootlets, silica 2.5-3.0' - Same as 1.0-2.5' except brownish black, (5YR 2/1), 30-50% fines and organic 3.0-5.1' - Same as 1.0-2.5' except moderate yellowish brown, (10YR 4/2), no organics 5.1-5.2' - Same as 1.0-2.5' except dusky brown, (5YR 2/2), highly organic - rootlets up to 20%, up to 40%
	32.5 - - - - - 15 27.5 - - - -					5.2-5.8' - Same as 1.0-2.5' except dark yellowish brown, (10YR 4/2), 15-30% silt Poorly Graded Sand (SP) 5.8-6.0' - white, (N7), medium grained, silica sand, trace fines Silty Sand (SM) 6.0-8.2' - pale yellowish brown, (10YR 4/2), fine grained, no HCl reaction, fine silica sand, 10-20% fines grades to Fat Clay (CH) 8.2-9.3' - Same as 6.0-8.2' except pale blue, (5B 6/2), moist, extremely high plasticity, no dilatancy, no HCl reaction, <10% very fine silica sand Fat Clay (CH) 9.3-10.9' - pale blue, mottled pale yellowish brown, (5B 6/2, 10YR 5/4), moist, extremely high plasticity, no dilatancy, <10% fine silica sand, up to 10% calcareous gravel-sized fragments up to 1/2", trace fossil structure 10.9-11.0' - Same as 9.3-10.9' except grading to Silt (ML), very pale orange (10YR 8/2), moist, nonplastic, moderate to rapid dilatancy, strong HCl reaction, <10% very fine sand-sized carbonate materials Begin Rock Coring at 11.0 ft bgs
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PROJECT NUMBER:

33884.FL

BORING NUMBER:

I-08

SHEET 2 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723055.0 N, 458076.8 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 3.5	ft bgs	s on 3/	13/07 START : 3/13/2007 END : 3/	15/2	2007	LOGGER : L. Prochaska, C. Sum	р
≥□₽	<u> </u>			DISCONTINUITIES] g	R L	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLICLOG		ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - - - 15 27.5	R2-SN* 10 ft 100%	NA	NA	11.0-16.0' - NA			Fat Clay (CH) 11.0-11.3' - Same as 10.9-11.0 Silty Sand And Limestone (SM) 11.3-16.0' - very pale orange, (10YR 8/2), dry, strong HCl reaction, extremely fine to very fine sand-sized, very friable fragments up to 4" in diameter	NA = Not Applicable NR = No Recovery R2: 9 minutes, 6' slough at top of core (discarded)
- - - - - 20 22.5 -	R3-SN 10 ft 100%	NA	NA	16.0-26.0' - NA			16.0-21.6' - Same as 11.3-16.0' except fragments up to 4" in diameter from 19.8-20.6', predominately gravel-sized fragments (<1/2"), voids (<1/16") covering 30-40% of surface, fossiliferous (molds and casts)	Note: Installed 30' of 8" casing during run
25 17.5	26.0			- - - - - - 26.0-36.0' - NA			except strong HCl reaction, 20-30% sand-sized particles, 30% gravel-sized fragments (<2"), carbonate materials 24.4-26.0' - Same as 16.0-21.6' except grayish orange, (10YR 7/4)	R3: 26 minutes
- - - - - 30_ 12.5	R4-SN			- - - -	-	-	26.0-31.8' - grayish orange, (10YR 7/4), very fine to fine grained, nonplastic, carbonate (similar to 24.4-26.0')	- - - - -



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-08	SHEET	3	OF	14	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723055.0 N, 458076.8 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 3.5	ft bgs	s on 3/	/13/07 START: 3/13/2007 END: 3	/15/2	200	7 LOGGER : L. Prochaska, C. Sun	пр
≥∩ ∵	_ (0)			DISCONTINUITIES	ڻ		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	_	FRACTURES PER FOOT	DESCRIPTION	SYMBOLICLOG	ر ا	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BI	E RU STH, OVEF	(%) Q	TUF	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	S		MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
SUR!	COR	ROI	FRA(PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	2	AND ROCK MASS CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	10 ft	NA	NA		П			
-	100%				Ш	╟		-
-					1		Silt With Sand (ML) 31.8-32.3' - pale yellowish brown,	1
-					11		mottled dusky yellowish brown, (10YR 6/2, 10YR 4/2), fine to	1
]		medium grained, nonplastic, rapid]
_							dilatancy, dusky yellowish brown material has no HCl reactivity; pale	
-							yellowish brown material is calcium carbonate, dusky yellowish brown is	_
35 7.5				-	-[]	-	organics and moderate HCl reaction	R4: 11 minutes
'.5 -					-	-	Silty Sand And Limestone Fragments (SM)	N4. 11 minutes
-	36.0			36.0-46.0' - NA	#		32.3-32.5' - Same as 24.4-26.0' 32.5-36.0' - Same as 24.4-26.0'	
-					F	7	except light gray, (N7), moist, strong	-
-					F	7	HCl reaction, friable fragments up to 4" in diameter comprised of very fine	-
-					F	7	to fine sand-sized particles, carbonate materials	-
					F		Limestone Fragments]
					ľ		36.0-46.0' - pale yellowish brown, (10YR 6/2), moist, very fine to fine]
_					F	7	grained, strong HCl reaction, very	
40 2.5				-	丰	1	weak (R1), very friable; 36.0-36.8' — fragments up to 3-1/2" in diameter	 Driller's Remark: Broke
2.5	R5-SN				上	#	and 2" in length of medium strong (R3) rock, voids up to 3/16" covering	threads on 6" casing during -
-	10 ft	NA	NA		七	╬	approximately 20% of the surface, no fossils; 36.8-37.2': fracture zone	run _ 41.1-42.0' Possible
-	100%				世	╁	same as 36.0-36.8' except maximum	carbonized organics
-					世	╁	2" diameter; 37.2-37.5': fragment zone same as 36.8-37.2' except	-
-					世	Ⅎ	gravel fragments up to 1/2"; 41.1-42.0': black (N1) mottling,	-
-					H	Ⅎ	organics	1
					\mathbb{H}	\pm]
-					F	4]
45 -2.5				-	尸	4	_	R5: 11 minutes
-2.5					\mathbb{P}	4		End drilling 3/13/07
-	46.0			46.0-56.0' - NA	\mathbb{H}	4	Disaggregated Weak Limestone	Resume drilling on 3/14/07
-					乜	4	With Limestone Fragments	-
-					乜	中	46.0-56.0' - grayish orange, (10YR 7/4), <10% gravel (<1-1/2"), dark	-
-					뉟	\dagger	brown/black mottling and thin layer at irregular intervals (organics),	-
-					뉟	₫	moderate reaction to HCl (slow to start, especially given fine grain	1
					上	↲	size), gravel-sized limestone]
-					占	4	fragments of weak (R2) and friable material, carbonate derived with	
50				_	占	_	possible trace silica fine sand-sized	
-7.5 -	D0 01				-	-	grains	-
<u> </u>	R6-SN				F	4		
$\overline{}$					_	_		•



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-08	SHEET	4	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723055.0 N, 458076.8 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 3.5	ft ba	s on 3	/13/07 START : 3/13/2007 END : 3/1	15/20	07 LOGGER : L. Prochaska, C. Sum	ip.
				DISCONTINUITIES	O	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)		ES	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
H BE ACE ATIO	TH,	Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	SOLIC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS,	FLUID LOSS. CORING RATE AND
EPT URF LEV	ORE	OΩ	RAC ER F	PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	YMB	AND ROCK MASS CHARACTERISTICS	SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
ООШ	0∃ ≧ 10 ft	ı∝ NA	ΠA	THIORNESS, SON ACE STAINING, AND HOTTINESS	S	CHARACTERISTICS	
_	100%	14/ (INA	-	H	_	Lligher nersentege of send
_				-	H	_	Higher percentage of sand- sized particles at top of
_				-	H	_	run, possible segregation _ during drilling or slough
_				-	Ш	_	material -
_				-		_	-
-				-	$\vdash\vdash$	_	-
_				_	\Box	_	-
55 -12.5					H		D0: 44in-t
-12.5				_	Ш	_	R6: 11 minutes
-	56.0			56 0 66 0' NA	Ш	Diogrammento di Importante Milita	-
-				56.0-66.0' - NA -	Ш	Disaggregated Limestone With Limestone Fragments	-
-				-	Ш	56.0-66.0' - similar to 46.0-56.0' (carbonate derived) from 56.0-61.0',	Drillor's Romark: Slightly
-				-	Ш	- thin limestone beds (1" thick) with	Driller's Remark: Slightly more difficulty advancing -
_				-	H	light gray clayey silt interbeds (1/2"-1" thick) from 61.0-62.0', from	6" casing
_				-	H	 62.0-66.0 grayish orange (10YR 7/4) 	-
_				-	H	sandy-silt with gravel-sized limestone fragments as described above from	-
-				-	Ш	 56.0-61.0', fragments angular to 	-
60 <u> </u>					Н	subangular and most (90%) are <3/4" diameter	-
-17.5	D7 CN			-	П	-	-
-	R7-SN 10 ft	NA	NA	-	Ш	_	-
-	100%			-		_	-
-				-	$\vdash\vdash$	_	-
-				-			-
-				-	H		-
-				-	H		-
-				-	Н		-
-				-	Ш		-
65 <u> </u>					Ш		R7: 15 minutes
				-	Ш	_	-
-	66.0			- 66.0-76.0' - NA	Н	Limestone	-
-				-	\Box	- 66.0-69.5' - thinly bedded (3/4"-2")	-
-				-		with silty sand material on parting surfaces, highly fossiliferous (mold,	Silty sand interbeds
-				-	H	 casts, brachiopods), numerous small 	washed out during drilling -
-				-	Ш	voids (1/32"-1/8") over 40-50% surface area, few voids/molds filled	Continued repeating
-				-	Ю	 with black platy soft material 	sequences of thin -
-				-	囯	(possible organics) 69.5-71.0' - thin beds with finer	limestone beds with fine grained interbeds
				-	Ш	 clayey soft interbed material (1/2"-1" 	separated by silty sands -
70 <u> </u>							with limestone fragment zones 4.0-6.0' thick
-	R8-SN			-	\vdash	 brown/black shining on parting 	-
					F	surfaces	-



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	I-08	SHEET	5	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723055.0 N, 458076.8 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 3.5	ft bgs	on 3/	13/07 START: 3/13/2007 END: 3	/15/20	D7 LOGGER : L. Prochaska, C. Sun	np
30€	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - - 75 -32.5	10 ft 100%	NA	NA	_		Disaggregated Limestone 71.0-76.0' - with gravel-sized limestone fragments (all carbonate derived), becoming more coarse with depth to gravel-sized limestone fragments, 10% gravel-sized fragments >1" diameter (upward fining sequence)	- - - - - - - - - - - - -
	R9-SN 10 ft 100%	NA	NA	76.0-86.0' - NA		Disaggregated Limestone With Limestone Fragments 76.0-83.9' - coarse sand-sized with bi-modal gravel-sized limestone fragments, fine gravel-sized fragments (1/4"-3/4") with few (<10%) 1"-2" fragments, all carbonate derived (moderate to strong reaction with HCI), silt dominated zones at 78.0-78.5' and 80.8-81.4', black tacky clayey layer approximately 3" thick at 81.2'	Driller's Remark: Difficulty driving 6" casing, tight, (80.0-81.0') medium coarse sand causing problems
	86.0 R10-SN			- 86.0-96.0' - NA		Limestone And Limestone Fragments 83.9-86.0' - medium strong (R3), 1"-3-1/2" fragments and full diameter for core fragments, yellowish gray, fossiliferous (molds>casts), small voids over 20% of surface 86.0-87.4' - Same as 83.9-86.0' 87.4-88.5' - coarse grained, sandy gravel-sized limestone fragments (1-3" diameter), increasing clay content Limestone 88.5-91.4' - 1"-4" thick with light gray (N7) clayey silt interbeds (1/2"-2" thick)	Fine interbed material possibly washed out during drilling R9: 18 minutes Driller's Remark: Lost drilling fluid (bentonite mud) circulation
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PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-08	SHEET	6	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723055.0 N, 458076.8 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DISCONTINUITIES DESCRIPTION Section DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DESCRIPTION DUBINISS DUBINISS DESCRIPTION DUBINISS DUBINISS DESCRIPTION DUBINISS WATER	LEVELS: 3.5	ft bgs	on 3/	13/07 START : 3/13/2007 END	D : 3/15/2	2007	LOGGER : L. Prochaska, C. Surr	np	
100	30€	<u>(</u> %			DISCONTINUITIES	ე	Ł	LITHOLOGY	COMMENTS
100%	DEPTH BELO' SURFACE AN ELEVATION (f	CORE RUN, LENGTH, AND RECOVERY (R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	, SYMBOLIC LC		MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
	95 -52.5 -100 -57.5 -105 -62.5	96.0 R11-SN 10 ft 92%	NA	NA	96.0-106.0' - NA	ESS NS S S S S S S S S S S S S S S S S S		Limestone Fragments 91.4-94.0' - yellowish gray, silty coarse sandy gravel-sized with 3"-5" silt zones with 1"-1-1/2" black, tacky clayey layers (organics) matrix 94.0-96.0' - pale yellowish brown to light olive gray, (10YR 6/2 to 5Y 5/2), 3"-4" in diameter, 2"-2-1/2" thick, fossiliferous, numerous small voids (1/32"-1/8") (approximately 30-40% of surface), grayish yellow (5Y 8/4) 4" thick silt with 1/2"-1" gravel sized limestone fragments at 96.0' Limestone And Limestone Fragments 96.0-98.7' - yellowish gray, variable small cavities (1/4"-3/4"), 2-3 linear worm boring type features (1/2" wide X 1-1/2"-2" long), 14" long core piece with high angle fracture running nearly entire length, limestone fragments are finer grained and contain no small voids/cavities Disaggregated Limestone With Limestone Fragments 98.7-102.9' - moderate yellowish brown, (10YR 5/4), fine grained, gravel-sized fragments varies from <5% small fragments (<1/2") to larger fragments (3/4"-1-1/2") comprising approximately 50% of material, larger limestone fragments >3" in diameter, fossiliferous (molds & casts), irregular zones of small voids (1/32"-1/8" diameter) and increased fossil density Limestone Fragments 102.9-105.2' - increasing clay content, large fragments (>3") separated by finer <1-1/2" fragments with silt and sand, all carbonate derived No Recovery 105.2-106.0' Limestone 106.0-115.0' - with clayey silt with gray N7), limestone beds, bedding plane partings range from 1"-4" in length with clayey interbeds ranging from <1/2" to >6", limestone yellowish gray (5Y 7/2) with small voids (1/16"-1/8") across 20-30% of	R10: 26 minutes R11: 25 minutes R11: 25 minutes Approximately 50% of run



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-08	SHEET	7	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723055.0 N, 458076.8 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 3.5	ft bgs	s on 3/	13/07 START: 3/13/2007 END: 3/	15/20	D7 LOGGER: L. Prochaska, C. Sum	p
≥□£	<u> </u>			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - -	10 ft 100%	NA	NA				- - - - -
115 -72.5 -	116.0			116.0-126.0' - NA		Disaggregated Limestone 115.0-116.0' - with gravel-sized limestone fragments as found in 106.0-115.0' (sharp contact) Fragmented Limestone	R12: 16 minutes -
	R13-SN 10 ft 78%		NA			116.0-123.8' - moderate yellowish brown, (10YR 5/4), moderate to strong HCI reaction, medium strong (R3), with coarse sandy fines and fine gravel-sized limestone in zones (1/4"-1"), large limestone fragments are fossiliferous with numerous small voids (1/32"-1/8") over 20-40% of the surface, large cavities (1/2") associated with large fossil molds, few worm borings (1/4" diameter, 1"-3" long). End of run: limestone fragment with fine grained angular clasts 1/4" thick, 1"-1-1/2" across (may be rip-up clasts) with mild reaction to HCI when scratched, clasts are hard and contain at least 10% silica (fine quartz grains visible in fracture corners), clasts are finely laminated with alternating light and dark layers (1/32"-1/8" thick)	Driller's Remark: 118.0- 120.0' & 121.0-123.0' possible voids based on penetration rate
-12582.5	126.0		NR	126.0-136.0' - NA		- No Recovery: 123.8-126.0	R13: 29 minutes
130 -87.5 -	R14-SN		NA				



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	1-08	SHEET	8	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723055.0 N, 458076.8 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 3.5	ft bgs	s on 3/	13/07 START: 3/13/2007 END: 3	/15/20	07 LOGGER : L. Prochaska, C. Sun	пр
₹ □ <i>⊊</i>	<u> </u>			DISCONTINUITIES	ا ا	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - - - - - - - - - - - - - - - -	10 ft 93%	NA	NR	136.0-146.0' - NA		Limestone Fragments 126.0-135.3' - alternating 1.0-2.0' intervals of large limestone fragments (>3") and coarse sandy gravel-sized limestone fragments (1/2"-2") with finely laminated (1/16"-1/6") argillaceous fragments from 132.3-133.9', fragments exhibit well defined bedding plane parting (smooth and planar) and react moderately to HCI when scratched (poorly when not), fine quartz grains visible on fresh fracture faces and corners (10-15% quartz) no fossils or voids, siliceous, well bedded, finely laminated, calcareous, silty sandy limestone material below No Recovery 135.3-136.0' Limestone Fragments 136.0-144.6' - mild HCI reaction, medium strong (R3), limestone fragments with coarse sand and gravel-sized fragments of limestone (1/4"-1"), larger limestone fragments (>3" diameter), at 136.8 finely bedded limestone, 1/4" bedding planes, smooth & planar, fine alternating light/dark laminations, quartz (silica) grains visible on fracture edges (approximately 10%)	Driller's Remark: Possible void at 131.0-133.0' based on 4" core penetration rate R14: 18 minutes R14: 18 minutes
145102.5	146.0		NR			Limestone 146.0-146.3' - light olive gray, (5Y 5/2), fine grained, mild to moderate HCl reaction, fine silica grains, drusy calcite, fine, clear yellowish recrystallized grains, poorly fossiliferous, sharp contact with underlying rock 146.3-148.0' - yellowish grey, (5Y 7/2), strong HCl reaction, fossiliferous, with small voids (1/32"-1/8") over 10% of surface	R15: 37 minutes



PROJECT NUMBER:	BORING NUMBER:		
338884.FI	I-08	SHEET	9 OF 14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723055.0 N, 458076.8 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 3.5	ft bgs	on 3/	13/07 START : 3/13/2007 E	ND : 3/15/	200	7 LOGGER : L. Prochaska, C. Sum	ıp .
≥∩≘	_ (6			DISCONTINUITIES		္ 📗	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHT	SS,) TNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
155 -112.5 -117.5 -112.5 -112.5 -112.5 -112.5 -112.5 -112.5 -112.5 -112.5 -112.5 -112.5 -112.5 -112.5 -112.5 -112.5 -112.5 -112.5	100% R17-SN 10 ft 100% 166.0	O W NA	B B FRAC P PERF	PLANARITY, INFILLING MATERIAL AND	TNESS		AND ROCK MASS	
-170 -127.5 -	R18-SN		NA				- - -	- - - - -



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-08	SHEET	10	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723055.0 N, 458076.8 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

### DEPTH TYPE, ORIENTATION, ROUGHNESS, PLANARTY, INFELLING MATERIALA, NO THICKNESS, AND TIGHTNESS AND THICKNESS, SURFACE STAINING, AND TIGHTNESS. 10	WATER	LEVELS : 3.5	ft bgs	s on 3	13/07 START: 3/13/2007 END: 3/	15/20	07 LOGGER : L. Prochaska, C. Sum	np
10.0 NA 78% NA 10.0 Limestone And Limestone Fragments 16.0 -173.8 - ilght olive gray, (5Y 5/2), with intervals of completely disaggregated limestone material, silty sand-sized fragments (all carbonate derived) to silty-sandy gree-liszed limestone fragments, limestone at top of run has moderately-sized direction, better silty-sandy gree-liszed limestone fragments, limestone core (6") at 169.5 exhibits, silty sand-sized plane partings, limestone core (6") at 169.5 exhibits, silty sand-sized plane partings, limestone core (6") at 169.5 exhibits, were fine bedding plane partings, on top of core (finely aminated <1,72°), few small (1/2°) cavities (sharp contact with above), bedding planes not visible over core length, amount of disaggregated sand-sized and smaller limestone fragments increasing with depth, slightly plast (light gray N7) at end of run NR covery 173.8-176.0' Limestone Fragments 176.0-179.0 -191h olive gray, (5Y 5/2), slow to moderate HCI reaction, subangular to parting, limestone tragments increasing with depth, slightly plast (light gray N7) at end of run NR covery 173.8-176.0' Limestone Fragments NA NA NA NA NA NA NA NA NA NA NA NA NA	₹ Ω <i>⊊</i>	(%			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
10.0 NA 78% NA 10.0 Limestone And Limestone Fragments 16.0 -173.8 - ilght olive gray, (5Y 5/2), with intervals of completely disaggregated limestone material, silty sand-sized fragments (all carbonate derived) to silty-sandy gree-liszed limestone fragments, limestone at top of run has moderately-sized direction, better silty-sandy gree-liszed limestone fragments, limestone core (6") at 169.5 exhibits, silty sand-sized plane partings, limestone core (6") at 169.5 exhibits, silty sand-sized plane partings, limestone core (6") at 169.5 exhibits, were fine bedding plane partings, on top of core (finely aminated <1,72°), few small (1/2°) cavities (sharp contact with above), bedding planes not visible over core length, amount of disaggregated sand-sized and smaller limestone fragments increasing with depth, slightly plast (light gray N7) at end of run NR covery 173.8-176.0' Limestone Fragments 176.0-179.0 -191h olive gray, (5Y 5/2), slow to moderate HCI reaction, subangular to parting, limestone tragments increasing with depth, slightly plast (light gray N7) at end of run NR covery 173.8-176.0' Limestone Fragments NA NA NA NA NA NA NA NA NA NA NA NA NA	DEPTH BELOV SURFACE ANI ELEVATION (fi	CORE RUN, LENGTH, AND RECOVERY (9	Ø	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
length, amount of disaggregated sand-sized and smaller limestone fragments increasing with depth, slightly plastic clayey silt (light gray N7) at end of run No Recovery 173.8-176.0' Limestone Fragments 176.0-179.0'- light olive gray, (5Y 5/2), slow to moderate HCI reaction, subangular to angular, coarse sandy/gravel-sized carbonate disaggregated material (drilling induced), fragments are 2"-4" and larger in diameter, coarse sand and gravel-sized unconsolidated material is moderate yellowish brown (10YR 5/4), reacts strongly to HCI and is well rounded (gravel-sized <1") Limestone 179.0-179.8'- dark yellowish orange to grayish orange, (10YR 6/6, 10YR 7/4), strong HCI reaction, small voids (1/32"-1/16") over 5-10% of surface, poorly fossiliferous with few molds (1/2"), fine recrystallization, Limestone Fragments		. 78%	NA	NR			Fragments 166.0-173.8' - light olive gray, (5Y 5/2), with intervals of completely disaggregated limestone material, silty sand-sized with gravel-sized fragments (all carbonate derived) to silty-sandy gravel-sized limestone fragments, limestone at top of run has moderately developed bedding plane partings, limestone core (6") at 169.5' exhibits very fine bedding plane partings on top of core (finely laminated <1/32"), few small (1/2") cavities (sharp contact with above),	R18: 16 minutes
179.0-179.8' - dark yellowish orange to grayish orange, (10YR 6/6, 10YR 7/4), strong HCI reaction, small voids (1/32"-1/16") over 5-10% of surface, poorly fossiliferous with few molds (1/2"), fine recrystallization, Limestone Fragments		R19-SN 10 ft		NA	176.0-186.0' - NA		length, amount of disaggregated sand-sized and smaller limestone fragments increasing with depth, slightly plastic clayey silt (light gray N7) at end of run No Recovery 173.8-176.0' Limestone Fragments 176.0-179.0' - light olive gray, (5Y 5/2), slow to moderate HCI reaction, subangular to angular, coarse sandy/gravel-sized carbonate disaggregated material (drilling induced), fragments are 2"-4" and larger in diameter, coarse sand and gravel-sized unconsolidated material is moderate yellowish brown (10YR 5/4), reacts strongly to HCI and is well rounded (gravel-sized <1")	void from 177.0-181.0' based on advancement of 4" core barrel, void not suggested based on 100%
186.0 186.0-196.0' - NA 186.0-	- - - - - - - 190				186.0-196.0' - NA		179.0-179.8' - dark yellowish orange to grayish orange, (10YR 6/6, 10YR 7/4), strong HCI reaction, small voids (1/32"-1/16") over 5-10% of surface, poorly fossiliferous with few molds (1/2"), fine recrystallization, Limestone Fragments 179.8-181.7' - silty sandy gravel-sized material, carbonate derived, yellowish gray (5Y 7/2) fines 181.7-182.7' - moderate brown grading to pale yellowish brown, (5YR 4/4 to 10YR 6/2), moderate HCI reaction, very fine sand/salt with gravel-sized limestone fragments (<10%), trace silica sand 182.7-183.8' - Same as 179.0-179.8' Limestone And Limestone Fragments 183.8-186.0' - strong HCI reaction,	R19: 38 minutes
		K2U-5IN				╫	-	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-08	SHEET	11	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723055.0 N, 458076.8 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 3.5	ft bgs	on 3/	13/07 START : 3/13/2007 END :	3/15/20	07 LOGGER : L. Prochaska, C. Sum	np
\$□₽	<u> </u>			DISCONTINUITIES	_ ¤	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNES:	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - 195 -152.5 -	10 ft 100%	NA	NA	196.0-206.0' - NA	- 1	Limestone Fragments - 186.0-196.0' - alternating sequences of fragmented limestone and fossiliferous limestone fragments, fragmented limestone exhibit fine laminations (1/32"-3/4") and planar bedding plane partings, silty sand and gravel-sized limestone fragments at 192.5-193.0' and 195.0-196.0', sharp contact between fragmented finely laminated limestone and coarse fossiliferous limestone with large (1/2") fossil casts/molds at 194.0' - 196.0-205.0' - with coarse sand/fine gravel-sized material (<10%), limestone fragments alternating between fine grained finely bedded	R20: 25 minutes
- 200 -157.5 - -	R21-SN 10 ft 90%		NA			limestone (argillaceous) and fossiliferous massive limestone with small voids (1/32"-1/8") over 10-15% of surfaces, fine grained limestone forms very angular fragments and are typically <3" in size and are <3/4" thick, fine grained limestone is light olive gray (5Y 5/2) with slow mild HCl reaction, fossiliferous limestone is yellowish gray to grayish orange (5Y 7/2 to 10YR 7/4) with moderate HCl reaction and is typically associated with coarse sand-sized material, coarse moderately graded sand-sized material at top of run (196.0-196.7'), possibly segregated during drilling	- - - - - - - - -
-162.5 -162.5 -162.5 - - - - - - - - - - - - - - - - - - -	206.0 R22-SN		NR	206.0-216.0' - NA		No Recovery 205.0-206.0' Limestone Fragments 206.0-216.0' - silty sandy gravel-sized well graded limestone fragments 1/2"-3" and larger in diameter with fines grading to coarse sand and silt-sized (<5%), fragments are subangular, fossiliferous (more molds than casts), and exhibit small voids (1/32"-1/8") over 10-20% over the surface	R21: 18 minutes Finished drilling on 3/14/07 Resume drilling on 3/15/07
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-08	SHEET	12	OF	14

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723055.0 N, 458076.8 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 3.5	ft bgs	s on 3/	13/07 START : 3/13/2007 END : 3/	15/20	007 LOGGER : L. Prochaska, C. Sur	np
≥∩ ≘	_ (6			DISCONTINUITIES	၂ ပွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
215 -172.5 -177.5 	10 ft 100%	∑ NA	NA				R22: 11 minutes
	10 ft 100%	NA	NA	226.0-236.0' - NA		drilling method 226.0-236.0' - well graded coarse sandy gravel-sized limestone fragments, mostly less than 1" with few exceptions, 20-30% of gravel-sized clasts are very friable and composed silt to sand-sized carbonate material	R23: 26 minutes



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	I-08	SHEET	13	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723055.0 N, 458076.8 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER LEVELS: 3.5 ft bgs on 3/13/07			s on 3/	/13/07 START: 3/13/2007 END: 3	3/15/20	07 LOGGER : L. Prochaska, C. Su			
≥∩≘	. ©			DISCONTINUITIES	၂ ဖွ	LITHOLOGY	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.		
- - - 235 -192.5 - - -	10 ft 100%	NA	NA	236.0-246.0' - NA		Limestone Fragments 236.0-246.0' - Same as 226.0-236.0' except increasing percentage silt and fine sand-sized component, medium yellowish brown (10YR 5/4) silty zones	R24: 27 minutes		
240 -197.5 - - - - - - - - - - - - - - - - - - -	R25-SN 10 ft i 100%		NA	-					
 250 -207.5	246.0 R26-SN			246.0-256.0' - NA		246.0-256.0' - Same as 236.0-246.0' except decreasing percentage of silt-sized material (similar to 226.0-236.0'), increasing percentage of coarse, sand-sized material, all carbonate	- - - - - - -		



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	1-08	CHEET	11	OE	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723055.0 N, 458076.8 E (NAD83)

ELEVATION: 42.5 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 3.5	ft bgs	s on 3/		D: 3/15/2	200	7 LOGGER : L. Prochaska, C. Sum	ıp
≥∩ ≘	_ (6			DISCONTINUITIES	ဖွ		LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNE	Ιÿ		ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
255 -212.5 - - - 260 -217.5 - - - - - - - - - - - - - - - - - - -	256.0 R27-SN 10 ft 100%	NA	A PEI	256.0-266.0' - NA	ESS & So			Boring at total planned depth 3/15/07 R27: 29 minutes Water level on 3/20/07 is about 3' below ground surface Install and grout 4" schedule 40 PVC casing in boring Bottom of casing tagged at 267.0'
					-	+		-



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	l I-09	SHEET	1	OF	14	

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722958.6 N, 457888.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DRILLIN	G METH	OD AND	EQUIPM	ENT : Rotosonic S	S/N SR-116, sonic, 6" outer casing and 4" core barrel		ORIENTATION : Vertical
WATER	LEVELS	: 4.41 bg	s on 3/6/0	07 S	TART : 3/11/2007 END : 3/12/2007 LOGGEF	R : C.	Sump, L. Prochaska
STANDARD					SOIL DESCRIPTION	ر ن	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	AL (ft)	STANDARD PENETRATION TEST RESULTS		SYMBOLIC LOG	
L BE		RECOVI	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	OLIC	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND
PTF PRFA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	/MB	INSTRUMENTATION
E S E				(N)			
42.4	0.0				Sandy Organic Topsoil 0.0-1.0' - dark brown	1 7 7 7 7 7 7 7 7 7 7 1 7 1 7 1 7 1 7 1	Water level above ground surface due to pressure head from sonic tooling
-					-	` <u>`</u>	"Water level is based on Ground Water
-					Poorly Graded Sand (SP) 1.0-4.0' - grayish yellow, (5Y 5/4), fine grained, no HCl		Monitoring at LNP site (FSAR Table 2.4.12.08)"
_					reaction, silica sand		_
_					_		_
_		6.0	R1-SN		_		_
_		0.0			_		
_					_		
					4.0-6.0' - Same as 1.0-4.0' except yellowish gray, (5Y 8/1)		
5					6/1)		
37.4							Coring run times not recorded for I-09
	6.0				_]
					6.0-16.0' - Same as 1.0-4.0' except yellowish gray,]
					(5Y 8/2 to 5Y 8/1), very poorly graded, yellowish gray from 6.0-10.0' becoming lighter shade of yellowish		
-					gray from 10.0-16.0'		_
-					-	1	_
-					-		_
-					-		-
-					-		-
10 -					-		-
10 32.4					-		_
-					-		-
-		10.0	R2-SN		-		-
-					-		-
-					-	1	-
-					-	-	-
-					-		-
-					-		-
-					-	-	-
-					-	1	-
15 <u> </u>						-	_
					-		_
-	16.0				40.0.00.41. 0 4.0.0.01		_
-					16.0-20.4' - Same as 4.0-6.0' except very poorly graded		-
-					-		_
_					<u>-</u>		_
_					_		_
_					_		
_					_		
					_		
20							



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-09	SHEET	2	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722958.6 N, 457888.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

			s on 3/6/0	7 5	START : 3/11/2007 END : 3/12/2007 LOGGER : C. Sump, L. Prochaska
300				STANDARD	SOIL DESCRIPTION g COMMENTS
N S S S S S S S S S S S S S S S S S S S	SAMPLE	INTERVA		STANDARD PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY
H BE		RECOVE			MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
22.4				, ,	
-	1	10.0	R3-SN		Poorly Graded Sand (SP) 20.4-26.0' - pale yellowish brown to pale brown, (10YR 6/2 to 5YR 5/2), silica sand
]	10.0	K9-SIN		(10YR 6/2 to 5YR 5/2), silica sand
-					
-	-				
-	-				
-	-				
-	-				
25_	-				
17.4	1				
-	26.0				
					26.0-31.5' - Same as 20.0-26.0' except mottled dusky yellowish brown, (10YR 2/2), moist, fine grained
-					yellowish brown, (10 th 2/2), moist, fine grained
-	-				
-	-				
-					
-	-				
30	-				
12.4	1				-
-	1		R4-SN		
		5.5	K4-5IN		
-					No Recovery 31.5-36.0'
-	-				
-	-				
-	-				
-	-				
35	1				[
7.4	1				
					Begin Rock Coring at 36.0 ft bgs See the next sheet for the rock core log
-					
-	-				.
-	-				
-	1				
-	1				
40	1				



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-09	SHEET	3	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722958.6 N, 457888.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER LE	VELS : 4.4	1 bas	on 3/6	6/07 START : 3/11/2007 END : 3/1	12/2	2007	Z LOGGER : C. Sump, L. Prochask	a
				DISCONTINUITIES		Т	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG		ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	R5-SN 10 ft 100%	NA	NA	36.0-46.0' - NA			Sand (SP) 36.0-37.7' - Same as 26.0-31.5' except pale yellowish brown to dusky yellowish brown, (10YR 6/2 to 10YR 2/2), mottled Silt (ML) 37.7-38.9' - dark yellowish brown to dusky yellowish brown, (10YR 4/2 to 10YR 2/2), moist, <10% sand, nonplastic, rapid dilatancy, no HCI reaction, siliceous, heavily mottled Limestone 38.9-46.0' - yellowish gray, (5Y 7/2), dry, very fine to fine grained, strong HCI reaction, extremely weak (R0), unconsolidated and very fine grained from 41.7-41.9'	NA = Not Applicable NR = No Recovery
50 -7.6 - - - - - - - - - - - - - - - - - - -	R6-SN 10 ft 100%	NA	NA	46.0-56.0' - NA			Silty Sand (SM) 46.0-47.1' - brownish gray, (5YR 4/1), wet, fine to coarse grained, very poorly graded, gravel-size fragments up to 2", fine grained silica and carbonate sand mixture (20-30%) Silt (ML) 47.1-51.0' - pale yellowish brown, (10YR 6/2), moist, nonplastic, slow dilatancy, strong HCl reaction, <10% poorly graded sand, all carbonate Silt With Sand (ML) 51.0-52.5' - pale yellowish brown, (10YR 6/2), wet, nonplastic, rapid dilatancy, moderate HCl reaction, 10-20% medium grained sand, all carbonate 52.5-56.0' - Same as 51.0-52.5' except moist, strong HCl reaction, very fine to medium grained sand, gravel-sized calcareous rock fragments up to 3" in diameter	- - - - - - - - - - - - - - - - - - -



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-09	SHEET	4	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722958.6 N, 457888.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DESCRIPTION ROCK TYPE, COLOR, MINERALOGY, TEXTURE, FLUID LOSS, CORING SMOOTHNESS, CAVI	WATER	LEVELS: 4.4	1 bgs	on 3/6	5/07 START: 3/11/2007 END: 3/	12/200	7 LOGGER : C. Sump, L. Prochask	а
Comparison	≥0£	(%				၂ ဗွ	LITHOLOGY	COMMENTS
Comparison	DEPTH BELO SURFACE AN ELEVATION (1	CORE RUN, LENGTH, ANE RECOVERY (R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LO	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
66.0-76.0' - NA 65.6-66.0' - pale yellowish brown, (10YR 6/2), moderate HCI reaction, extremely weak (R0), clay interbeds up to 1" Disaggregated Limestone 66.0-66.5' - dark yellowish brown, (10YR 4/2), moderate HCI reaction, 10-20% poorly graded fine to medium grain sand, calcareous Limestone 66.5-67.5' - Same as 56.0-56.3' except fragments up to 4" in diameter Disaggregated Limestone 67.5-69.5' - Same as 56.3-57.9' Limestone 69.5-76.0' - pale yellowish brown, (10YR 6/2), moderate HCI reaction, 10-20% poorly graded fine to medium grain sand, calcareous Limestone 67.5-69.5' - Same as 56.3-56.3' except fragments up to 4" in diameter Disaggregated Limestone 67.5-69.5' - Same as 56.3-57.9' Limestone 69.5-76.0' - pale yellowish brown to grayish orange, (10YR 6/2 to 10YR 7/4), very fine to fine grained, strong HCI reaction, gravel-sized rock	- - - - - - - - - - - - - - - - - - -	R7-SN 10 ft	NA		56.0-66.0' - NA		 56.0-56.3' - dark yellowish brown, (10YR 4/2), moderate HCl reaction, weak to medium strong (R2 to R3), fragments up to 3" in diameter Disaggregated Limestone 56.3-57.9' - dark yellowish brown, (10YR 4/2), strong HCl reaction, staining, organics, moderate dilatancy, carbonate 57.9-65.6' - dark yellowish brown, (10YR 4/2), strong HCl reaction, 20-30% poorly graded sand-sized, all 	_
75 -32.6 -76.0	-27.6 - - - - - - -	R8-SN 10 ft 100%	NA	NA	66.0-76.0' - NA		65.6-66.0' - pale yellowish brown, (10YR 6/2), moderate HCl reaction, extremely weak (R0), clay interbeds up to 1" Disaggregated Limestone 66.0-66.5' - dark yellowish brown, (10YR 4/2), moderate HCl reaction, 10-20% poorly graded fine to medium grain sand, calcareous Limestone 66.5-67.5' - Same as 56.0-56.3' except fragments up to 4" in diameter Disaggregated Limestone 67.5-69.5' - Same as 56.3-57.9' Limestone 69.5-76.0' - pale yellowish brown to grayish orange, (10YR 6/2 to 10YR 7/4), very fine to fine grained, strong HCl reaction, gravel-sized rock	_



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-09	SHEET	5	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722958.6 N, 457888.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 4.4	11 bgs	on 3/6	5/07 START: 3/11/2007 END: 3	/12/20	D7 LOGGER: C. Sump, L. Prochasl	a		
200	(9)			DISCONTINUITIES	<u>ن</u>	LITHOLOGY	COMMENTS		
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.		
-				76.0-86.0' - NA		Disaggregated Limestone 76.0-76.8' - Same as 66.0-66.5' except limestone fragments up to 1" in diameter 76.8-79.0' - Same as 56.3-57.9' 79.0-83.2' - Same as 66.0-66.5' except few extremely weak (R0) limestone fragments, up to 4" in	- - - - -		
80 -37.6 - - - - -	R9-SN 10 ft 100%	NA	NA	NA NA	NA NA	_	diameter		
- 85_ -42.6 -	86.0			86.0-96.0' - NA		except dry, one fragment (up to 1") with organic staining, few limestone fragments (up to 2" diameter)	- - Driller's Remark: Loss of circulation -		
90 -47.6	R10-SN 10 ft 100%		NA	-		limestone fragments up to 1" diameter, 1" lens of staining dark yellowish brown (10YR 4/2) Limestone 87.5-88.0' - subangular rock fragments 2"-4" in diameter 88.0-88.4' - yellowish gray, (5Y 8/1), weak (R2), fossiliferous (molds/casts), small voids/cavities (<1/2") due to fossil molds, 1"-2" thick irregular horizontal partings, rough to undulating bedding planes, little to no infilling or staining Disaggregated Limestone 88.4-90.7' - gravel-sized limestone fragments, >50%, ranging in size from 1/4"-1" Limestone With Clayey Silt 90.7-94.0' - grayish yellow to yellowish brown, voids (1/16"-1/8") across 15-20% of surface and concentrated in irregular zones, small black inclusions (1/16"-1/8"),	- - - - - - - - - - - - - - - - - - -		
95_ -52.6 -	96.0			-		horizontal partings/beds, 1"-4" in thickness with light gray to medium gray (N7 to N5) gravel-sized clayey silt fragments, interbeds (1"-2" thick)			



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-09	SHEET	6	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722958.6 N, 457888.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

MOOF REALDOST, TEXTURE, S DEPTH, TYPE, ORIENTATION, ROUGHNESS, LAVING ROLL WEATHERING, HARDNESS, SMOOTHNESS, CAVING ROLL WEATHERING, HARDNESS, SMOOTHNESS, CAVING ROLL WEATHERING, HARDNESS, CAVING ROLL WEATHERING,	WATER	LEVELS: 4.4	1 bgs	on 3/6	6/07 START : 3/11/2007 END : 3/	12/200	7 LOGGER: C. Sump, L. Prochask	a
100	≷∩ລ	_ (%			DISCONTINUITIES	ا ي	LITHOLOGY	COMMENTS
100	DEPTH BELOV SURFACE ANI ELEVATION (fi	CORE RUN, LENGTH, AND RECOVERY (%	Ø	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
106.0 106.0-116.0' - NA	-57.6	R11-SN 10 ft		NA	96.0-106.0' - NA		94.0-96.0' - Same as 86.0-87.5' except 10% fewer gravel-sized limestone clasts 96.0-97.6' - Same as 66.0-66.5' except 20-40% poorly graded sand-sized calcareous grains, 20% gravel-sized limestone clasts from 3/16"-3" Limestone 97.6-98.4' - Same as 69.5-76.0' except subangular rock fragments up to 3" in diameter Disaggregated Limestone 98.4-99.3' - Same as 56.3-57.9' 99.3-100.0' - Same as 66.0-66.5' except 10% gravel-size calcareous fragments up to 1/2" in diameter Limestone With Clayey Silt 100.0-102.8' - Same as 90.7-94.0' except no black inclusions Disaggregated Limestone 102.8-103.5' - Same as 99.3-100.0' 103.5-104.5' - Same as 56.3-57.9' Limestone With Clayey Silt	_
116.0	-67.6 - - - - - - - - 115	R12-SN 10 ft			106.0-116.0' - NA		Limestone 106.0-108.0' - Same as 87.5-87.8' except with some silt 20-30%, up to 3" in diameter Disaggregated Limestone 108.0-108.6' - Same as 99.3-100.0' except 30-50% gravel-sized rock fragments up to 1-1/2" Limestone With Clay And Silt 108.6-114.7' - Same as 90.7-94.0' except no black inclusions and sandy silt (ML-SP) beds, same as 99.3-100' from 101.3-101.5' and 102.3-103.0'	_
	_	116.0			-	H	-	



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	1-09	CHEET	7	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722958.6 N, 457888.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

VVAIEK	LEVELS: 4.4	1 bgs	on 3/6	6/07 START : 3/11/2007 END : 3/	12/200	D7 LOGGER : C. Sump, L. Prochask	a
≥∩≘				DISCONTINUITIES	اي	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	R13-SN 10 ft 40%		NA NR	116.0-126.0' - NA		Disaggregated Limestone 116.0-117.0' - dark yellowish brown, (10YR 4/2), coarse grained, calcareous Limestone With Clay And Silt 117.0-120.0' - Same as 108.6-114.7' except fine to medium grained, moderate HCI reaction, pale yellowish brown (10YR 6/2) sandy silt (ML-SP) from 119.0-119.3', 10-20% limestone fragments up to 1" in diameter No Recovery 120.0-126.0'	
-82.6 - - - - - 130 -87.6 - - - - -	126.0 R14-SN 10 ft 95%		NA	126.0-136.0' - NA		Limestone 126.0-126.5' - grayish orange, (10YR 7/4), moderate HCI reaction, fossiliferous (molds/casts), voids (1/16"-1/8") over 25-30% of surface, cavities (up to 1/2"), associated with fossil molds 126.5-130.5' - 80% angular to subangular limestone fragments >2" in diameter, few pieces up to 4", highly fragmented portion comprised of fine grained limestone with few fossils or voids, little fine material (silt/clay), thin medium brown coatings Disaggregated Limestone 130.5-135.5' - moderate yellowish brown, (10YR 5/4), mild to moderate HCI reaction, gravel-sized fragments of limestone in silty sand-sized matrix, <10% siliceous sand, 15% gravel-sized fragments typically <1" in thin (<1") zones, thin dark brown horizontal layers	- - - - - - - - - - - - - - - - - - -
-92.6	136.0		NR			No Recovery 135.5-136.0'	
					1 1		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-09	SHEET	8	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722958.6 N, 457888.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

### 140	DESCRIPTION DESCRIPTION Section DESCRIPTION DEPTH, TYPE, GRIENTATION, ROUGHNESS, PLANARTY, NEILUR MATERIAL AND THORNESS, AND ROCK MANS NATION Section DEPTH, TYPE, GRIENTATION, ROUGHNESS, PLANARTY, NEILUR MATERIAL AND THORNESS AND ROCK MANS NATION DEPTH, TYPE, GRIENTATION, ROUGHNESS, PLANARTY, NEILUR MATERIAL AND THORNESS DEPTH, TYPE, GRIENTATION, ROUGHNESS, AND ROCK MANS NATION DEPTH, TYPE, GRIENTATION DEPTH, TYPE, GRIENTATION, ROUGHNESS, AND ROCK MANS NATION DEPTH, TYPE, GRIENTATION DEPTH, TYPE	VATER LEVELS : 4.4	11 bgs	on 3/6	5/07 START : 3/11/2007 END : 3/	12/200	D7 LOGGER : C. Sump, L. Prochask	a
140 -97.6 R15.SN 10 it I 146.0 - 156.0 '- NA 136.0-146.0' - NA 140.5-142.1' - Same as 136.0-140.5' except increasing percentage of silt-and sand-sized material increasing speceration percentage of silt-and sand-sized material increasing speceration percentage of silt-and sand-sized material increasing speceration percentage of silt-and sand-sized material increasing speceration percentage of silt-and sand-sized material increasing speceration percentage of silt-and sand-sized material increasing speceration percentage of silt-and sand-sized material increasing speceration percentage of silt-and sand-sized material increasing special increasing spec	140	\$0 a l a o s			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
140 -97.6 R15.SN 10 it I 146.0 - 156.0 '- NA 136.0-146.0' - NA 140.5-142.1' - Same as 136.0-140.5' except increasing percentage of silt-and sand-sized material increasing speceration percentage of silt-and sand-sized material increasing speceration percentage of silt-and sand-sized material increasing speceration percentage of silt-and sand-sized material increasing speceration percentage of silt-and sand-sized material increasing speceration percentage of silt-and sand-sized material increasing speceration percentage of silt-and sand-sized material increasing speceration percentage of silt-and sand-sized material increasing special increasing spec	140	SURFACE AN ELECVATION (F CORE RUN, LEGNOTH, AND RECOVERY (9)	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), strong HCI reaction, sharp contact, mottled appearance, 5-10% very fine grained sliica sand Interbedded Limestone 146.0-148.5' - yellowish gray to grayish orange, (5Y 7/2 to 10YR 7/4), with slit and clay, interbeds with gravel-sized limestone fragments, voids 1/16"-1/8" over <20% surface, few fossils (mold/casts), core and fragment thickness range from 1-1/2"-5" with light gray (N7) clayey slit with gravel interbeds 2"-4" thick Disaggregated Limestone 148.5-150.5' - moderate yellowish brown and dark yellowish brown, (10YR 5/4) and 10YR 4/2), very fine slity sand-sized Disaggregated Interbedded Limestone 150.5-155.3' - moderate yellowish brown, (10YR 5/4), with thin beds of gravel-sized limestone fragments, 6" limestone ped at 152.0-152.6', large limestone fragments every 6"-8" with clayey gravel (<2") Disaggregated Limestone	brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), strong HCI reaction, sharp contact, mottled appearance, 5-10% very fine grained silica sand Interbedded Limestone 146.0-148.5' - yellowish gray to grayish orange, (SY 7/2 to 10YR 7/4), with silt and clay, interbeds with gravel-sized limestone fragments, voids 1/16"-1/8" over <20% surface, few fossils (mold/casts), core and fragment thickness range from 1-1/2"-5" with light gray (N7) clayey silt with grave linterbeds 2"-4" thick Disaggregated Limestone 148.5-150.5' - moderate yellowish brown and dark yellowish brown, (10YR 5/4 and 10YR 4/2), very fine sity sand-sized Disaggregated Interbedded Limestone 150.5-155.3' - moderate yellowish brown, (10YR 5/4), with thin beds of gravel-sized limestone fragments, 6" limestone bed at 152.0-152.6', large limestone fragments every 6"-8" with clayey gravel (<2") Disaggregated Limestone	140 -97.6 - R15-SN 10 ft 100%			136.0-146.0' - NA		- 136.0-140.5' - coarse grained, 30% angular to subangular limestone fragments ranging in size between (1/4"-1") and 50% ranging in size from 2"-4" in diameter - 140.5-142.1' - Same as 136.0-140.5' except increasing percentage of siltand sand-sized material - 142.1-145.5' - mild to strong HCI reaction, increasing silt/clay content, limestone fragments up to 2"-4" in diameter on 2"-4" spacing with light gray (N7) silty, clayey, and gravelly	
130.0 Tob.0 Garrie do 140.0 Tob.0		150 		NA	146.0-156.0' - NA		brown to dark yellowish brown, (10YR 5/4 to 10YR 4/2), strong HCI reaction, sharp contact, mottled appearance, 5-10% very fine grained silica sand Interbedded Limestone 146.0-148.5' - yellowish gray to grayish orange, (5Y 7/2 to 10YR 7/4), with silt and clay, interbeds with gravel-sized limestone fragments, voids 1/16"-1/8" over <20% surface, few fossils (mold/casts), core and fragment thickness range from 1-1/2"-5" with light gray (N7) clayey silt with gravel interbeds 2"-4" thick Disaggregated Limestone 148.5-150.5' - moderate yellowish brown and dark yellowish brown, (10YR 5/4 and 10YR 4/2), very fine silty sand-sized Disaggregated Interbedded Limestone 150.5-155.3' - moderate yellowish brown, (10YR 5/4), with thin beds of gravel-sized limestone fragments, 6" limestone bed at 152.0-152.6', large limestone fragments every 6"-8" with clayey gravel (<2")	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-09	SHEET	9	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722958.6 N, 457888.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DEPTH BELOW SURFACE AND ELEVATION (ft) CORE RUN, LENGTH, AND	<u></u> 8			DISCONTINUITIES			
H BELOV ACE ANI ATION (f TEUN,	၌လ		$\overline{}$	BIOCONTINOTTIES	၂ ပ္	LITHOLOGY	COMMENTS
DEPT SURF ELEV CORE	RECOVERY	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
160 -117.6	R17-SN 10 ft 100%	NA	NA	156.0-166.0' - NA		Disaggregated Interbedded Limestone 156.0-157.5' - Same as described above except 2" silty, very fine, dark yellowish brown to dusky yellowish brown (10YR 4/2 to 10YR 2/2) sand-sized layer at 157.0' (similar to previously described), trace silica (quartz) grains; appears to be part of repeating sequence of gravel-sized fragments with few full core diameter limestone pieces with dark yellowish brown silty to very fine sandy layers on 25.0' spacing Limestone 157.5-158.5' - yellowish gray, (5Y 8/2), fine grained, mild to moderate HCI reaction, weak (R2), few fossils or voids Disaggregated Interbedded Limestone 158.5-162.0' - limestone fragments less than 2", increasing silt and clay-sized content with depth Disaggregated Limestone 162.0-162.4' - dark yellowish brown, (10YR 4/2), poorly graded Disaggregated Interbedded Limestone	
-	R18-SN 10 ft 100%	NA	NA	166.0-176.0' - NA		Limestone 166.0-169.9' - yellowish gray, (5Y 8/1), fine grained, weak (R2), limestone fragments (>2"), 1-3" core lengths, very thin clayey silt (<1/16") on parting surfaces, fine alternating light and dark laminae at 166.0-166.3', very fine iridescent grains (pyrite) on fresh surface, trace fine grained silica Disaggregated Interbedded Limestone 169.9-171.3' - light gray, (N7), with large (>3") fragments separated by silty to clayey gravel (<1-1/2" pieces), suggestive of interbeds 171.3-174.5' - with large limestone fragments (3"-4")	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-09	SHEET	10	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722958.6 N, 457888.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 4.4	1 bgs	on 3/6	S/07 START: 3/11/2007 END: 3/	12/200	17 LOGGER : C. Sump, L. Prochask	a
≥ ∩ ∷	(9)			DISCONTINUITIES	ڻ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - 180 - - 137.6 - - - - - - - - 185 - - 142.6	R19-SN 10 ft 100%		NA	176.0-186.0' - NA		Disaggregated Limestone 174.5-176.0' - moderate yellowish brown to yellowish gray, (10YR 5/4 to 5Y 8/1), very fine with few fine gravel-sized fragments (<5%), with darker brown mottled layer at 174.9' Limestone Fragments 176.0-178.3' - fine to coarse grained limestone fragments, trace fine silica sand, subangular with 20% subrounded fragments 1"-2" in diameter Limestone 178.3-183.6' - fractured limestone fragments 2"-4" with very few fines, highly fossiliferous fragments containing numerous molds (and few casts) 1/4"-1/2" in diameter Limestone Fragments 183.6-186.0' - limestone fragments, similar to 176.0-178.3', 50% limestone fragments (>2") exhibit bedding plane partings or fractures	
-190 -147.6 - - - - - - - - - - - - - - - - - - -	R20-SN 10 ft 100%		NA	186.0-196.0' - NA		Disaggregated Interbedded Limestone 186.0-196.0' - limestone fragments (1"-4" in diameter) with coarse sand to fine gravel-sized (1/4"-3/4") limestone fragments, 3.0' zones of large fragments (>2") with 1-2' thick zones of smaller limestone fragments (1/2"-1-1/25") and increased percentage of coarse sand to fine gravel-sized fragments	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-09	SHEET	11	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722958.6 N, 457888.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

Milleralog 1, Texture 5	WATER	<u> LEVELS : 4.4</u>	1 bgs	on 3/6	6/07 START : 3/11/2007 END : 3/	12/200	D7 LOGGER : C. Sump, L. Prochask	a
196.0-206.0' - NA	≥∩≘	. ©			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
196.0-206.0' - NA	DEPTH BELOV SURFACE AN ELEVATION (f	CORE RUN, LENGTH, AND RECOVERY (%	Ø	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
210 -167.6 R22-SN NO 10 ft 100% NA NA NA 100% NA NA NA 100% NA NA NA 100% NA NA NA 100% NA NA NA 100% NA NA NA NA NA NA NA NA NA NA NA NA NA	200 -157.6 -	R21-SN 10 ft			196.0-206.0' - NA		Limestone 196.0-206.0' - Same as 186.0-196.0' except repeating sequences of large limestone fragments separated by zones of coarse sand and finer gravel-sized limestone fragments, some bedding plane fractures	
216.0	210 -167.6 -	R22-SN 10 ft 100%		NA	206.0-216.0' - NA		 206.0-209.5' - coarse grained, all carbonate derived, more coarse with depth to poorly graded gravel-sized limestone fragments <1/2", angular 209.5-216.0' - angular to subangular limestone fragments more coarse with depth, from 211.0-216.0' fragments are 2"-5" in diameter, 4" diameter pieces from 213.2-214.2', 1"-2" thick limestone beds with silty 	



PROJECT NUMBER:

338884.FL BORING NUMBER:

1-09 SHEET 12 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722958.6 N, 457888.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER LEV	ELS: 4.4	1 bgs	on 3/6	5/07 START: 3/11/2007 END: 3.	12/20	D7 LOGGER : C. Sump, L. Prochask	а
30₽	<u> </u>			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ff)	LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - 220 -177.6 - - - - - - - 225 -182.6	R23-SN	NA	NA	216.0-226.0' - NA		Disaggregated Interbedded Limestone 216.0-226.0' - alternating 1.0-2.0' thick zones of coarse sandy gravel-sized limestone fragments and large (>3") limestone fragments, finer gravel-sized fragments (<3/4") are angular and some exhibit bedding plane fractures (smooth, planar), larger fragments are mostly irregular subangular in shape with undulating fracture surfaces	
230 -187.6 - - 235 -192.6	R24-SN 10 ft 100%	NA	NA	226.0-236.0' - NA		Limestone Fragments 226.0-231.0' - coarse sandy gravel-sized (<1/2") limestone fragments at top, more coarse to large (>3") limestone fragments at 231.0', fragments are angular to subangular, fragments <1-1/2" exhibit bedding plane fracture surfaces (smooth and planar) 1/4"-3/4" in thickness, fragments >2" are irregular 231.0-235.7' - coarse grained, less than 10% subangular to subrounded fragments 2" or greater	



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	I-09	SHEET	13	OF	14	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1722958.6 N, 457888.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 4.4	I1 bgs	on 3/6	6/07 START : 3/11/2007 END : 3/	D7 LOGGER : C. Sump, L. Prochask	a	
≥ ∩ ⊕	(,)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - 240 -197.6 - - - - -	R25-SN 10 ft 90%		NA	236.0-246.0' - NA		Disaggregated Limestone 235.7-236.0' - moderate yellowish brown, (10YR 5/4), <10% gravel Limestone Fragments 236.0-245.0' - similar to 231.0-235.7' except yellowish gray (5Y 8/1) silt (with gravel) <10%, <1/2" in diameter at 237.3-238.0'	- - - - - - - - - - - - - - - - - - -
-202.6 -			NR	-	┝	No Recovery 245.0-246.0'	
- 250207.6	246.0 R26-SN 10 ft 85%		NA	246.0-256.0' - NA		Limestone Fragments 246.0-254.5' - Same as 236.0-245.0' except limestone fragments	Extreme difficulty advancing 6" casing. Casing advanced to 250.0' then 4" casing and core retracted. Finished driving 6" and then cleared out the hole prior to coring to 266.0'.
255_ -212.6 -	256.0		NR			-	-



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-09	SHEET	14	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1722958.6 N, 457888.4 E (NAD83)

ELEVATION: 42.4 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

Sec Sec	WATER	LEVELS: 4.4	1 bgs	on 3/6	6/07 START: 3/11/2007 END: 3/	12/20	07 LOGGER : C. Sump, L. Prochask	a
256.0-266.0' - NA Limestone Fragments 256.0-254.5' 256.0' after retrieving 4" core sample (246.0-256.0'). Driller cleaned borehole and advanced 4" case from 256.0-266.0'. Sample fell out during retrieval. Used 20.0' core barrel with flapper bit to retrieve disturbed material. Bottom 10.0' logged as material from 256.0-266.0'. R27-SN	200	(3)			DISCONTINUITIES	ڻ	LITHOLOGY	COMMENTS
256.0-266.0' - NA Limestone Fragments 256.0-254.5' 256.0' after retrieving 4" core sample (246.0-256.0'). Driller cleaned borehole and advanced 4" case from 256.0-266.0'. Sample fell out during retrieval. Used 20.0' core barrel with flapper bit to retrieve disturbed material. Bottom 10.0' logged as material from 256.0-266.0'. R27-SN	DEPTH BELOV SURFACE ANI ELEVATION (fi	CORE RUN, LENGTH, AND RECOVERY (9	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD
	- - - 260 -217.6 - - -	R27-SN 10 ft 100%	2			\(\sigma \)	Limestone Fragments - 256.0-266.0' - Same as 246.0-254.5'	6" casing advanced to 256.0' after retrieving 4" core sample (246.0-256.0'). Driller cleaned borehole and advanced 4" case from 256.0-266.0'. Sample fell out during retrieval. Used 20.0' core barrel with flapper bit to retrieve disturbed material. Bottom 10.0' logged as



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	I-10	SHEET	1	OF '	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723172.2 N, 458130.7 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DRILLING METHOD AND EQUIPMENT: Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel

ORIENTATION: Vertical

						outer casing and 4" core ba		ORIENTATION : Vertical				
WATER	LEVELS	: 1.0 ft bo	gs on 03/2		START : 3/25/2007	END: 3/26/2007 SOIL DESCRIPTION	LOGGER	: J. l	Burkard COMMENTS			
≩Q∉	044451	· INITED: ::	1 (4)	STANDARD PENETRATION		JOIL DESURIF HUN		99	GOIVIIVIEN 13			
ON (SAMPLE	INTERVA	. ,	TEST RESULTS	SOIL NAME.	SOIL NAME, USCS GROUP SYMBOL, COLOR,		IC L	DEPTH OF CASING, DRILLING RATE,			
DEPTH BELOW SURFACE AND ELEVATION (#)		RECOVE			MOISTURE C	CONTENT, RELATIVE DEN	ISITY OR	SYMBOLIC LOG	DRILLING FLUID LOSS, TESTS, AND			
SUR!			#TYPE	6"-6"-6" (N)	CONSISTENCY	Y, SOIL STRUCTURE, MIN	ERALOGY	SYM	INSTRUMENTATION			
42.0	0.0			(. 1)	Poorly Graded S							
-					0.0-5.0' - grayish	brown to moderate yello 5/4), moist, fine grained,	wish brown, -		Water level is 1.0' below ground surface			
-					reaction, silica sa	and, one very pale orange	e (10YR		-			
-					8/2), round limes strong HCl reacti	tone fragment 3" diamete	er at 4.6' with –		-			
-					Strong From reacti	OH	-		-			
-							-		-			
-		5.0	R1-SN				-		Core run times not recorded for I-10			
-							-		-			
-							-		-			
5							-		-			
37.0					No Recovery 5.0)-6.0'						
-	6.0						-		-			
-	0.0				Poorly Graded S		-		-			
-					6.0-11.0' - moder	rate yellowish brown to ve /4 to 10YR 8/2), moist, fir	ery pale -		-			
-					strong HCl reacti	on, silica sand, with carb	onate fines		-			
-					in orange materia	al near bottom of interval	_		-			
-							_		-			
-							_		-			
-							-		-			
10							-		-			
32.0												
-							-		-			
-		9.0	R2-SN		Limestone Fragr	ments			-			
-					11.0-13.0' - mode	erate yellowish brown tra 10YR 5/4 to 5Y 7/2), stror	nsitioning to -	Н	-			
-					reaction, very fine	e grained to microcrystal	line,	H	-			
-					contains numero	us voids surfaces, colors ids, visible calcite crystal	vary – s with visible	Ħ	-			
-					cleavage planes		_		-			
-					13.0-14.4' - yellov	wish gray, (5Y 7/2), mild <1/16") on 20-40% of sur	HCI – face	H	-			
-							_	oxdot	-			
15					Silt (ML)	nale orange (10VD 0/0)	etrong HCI		-			
27.0					reaction, carbona		Silving TCI		_			
-	16.0				No Recovery 15.		-		-			
-					Silt (ML)		_		-			
-					16.0-16.5' - very reaction, carbona	pale orange, (10YR 8/2),	strong HCI	Ш	-			
-					Limestone Fragr	ments			-			
-						pale orange, (10YR 8/2), ne fragments up to 4" in o		\vdash	-			
-					with sections of p	oulverized rock less than	1" in	H	-			
-					diameter, voids (<1/16") on 20-40% of su	rface, poorly -		-			
-					1000111101000		_	H	-			
20							_	$\vdash\vdash$	-			



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	l I-10	SHEET	2	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723172.2 N, 458130.7 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

### STATE - SECOND FOR THE PAIR OF THE PAI	DRILLIN	PRILLING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel ORIENTATION : Vertical											
SOURCE INTERVAL (I) RECOVERY IV. SOUR NAME. USCS GROUP SYMBOL. COLOR. MOSITURE CONTENT, RELATIVE DENSITY OR MOSITURE CONTENT, RELATIVE DENSITY O	WATER	LEVELS	: 1.0 ft bo	s on 03/2	25/07	TART : 3/25/2007 END : 3/26/2007 LOGGER	≀: J.	Burkard					
Linestone Fragments 10.0 R3-SN 10.0 R3-SN					STANDARD	SOIL DESCRIPTION	ى ق	COMMENTS					
Linestone Fragments 10.0 R3-SN 10.0 R3-SN	AND Z	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS		2						
Linestone Fragments 10.0 R3-SN 10.0 R3-SN	BEI GE.		RECOVE	RY (ft)) 						
Linestone Fragments 10.0 R3-SN 10.0 R3-SN	PTH RFA			#TYPE	6"-6"-6"		MB(
Limestone Fragments 19.6-26.0 - garybi orange, (10VR 7/4), mild HCI reaction, fine sand-sized to line gravel-sized (up to 1*) Ineaction, fine sand-sized to line gravel-sized (up to 1*) Ineaction, fine sand-sized to line gravel-sized (up to 1*) Ineaction, carbonate materials 28.0 28.0 28.0 28.0-29.5 · Same as 19.6-26.0' except mild to no HCI reaction Driller's Remark: Drill rod dropped quickly between 28.0-31.0' in depth, possible void (nowever, 100% recovery achieved) 29.5-31.4' - moderate yellowish brown, (10YR 6/4), mild HCI reaction, fragments up to 7" with interbedded clays, poorly fossiliferous, volds (<1/16*) on 50-75% of surface 31.4-36.0' - light clive gray, (5Y 5/2), mild to moderate HCI reaction, fragments up to 3" with surface volds, moderately fossiliferous Disaggregated interbedded Limestone 38.0-41 · dark yellowigh brown, (10YR 4/2), mild to moderate HCI reaction, tragments up to 3" with surface volds, moderately fossiliferous signature or repealing alternating sequences of still and troken limestone fragments and core segments	SU ELE						SΥ						
28.0 28.0 28.0 28.0 28.0 28.0 28.0 28.0 28.0 28.0 28.0-29.5 - Same as 19.6-26.0' except mild to no HCl reaction reaction 29.5-31.4 - moderate yellowish brown, (10/R 5/4), mild HCl reaction, fragments up to 7' with interbedded clays, poorly fossiliferous, works (<1/6") on 50-75% of surface 10.0 R4-SN R4-SN Disaggregated Interbedded Limestone 36.0-41.4 - dark yellowish brown, (10/R 4/2), mild to moderate HCl reaction, fragments up to 3' with surface voids, moderate HCl reaction, fragments up to 3' with surface voids, moderate HCl reaction, fragments up to 3' with surface voids, moderate HCl reaction fragments up to 10' moderate HCl reaction, fragments up to 2' with surface voids, moderate HCl reaction fragments up to 3' with surface voids, moderate HCl reaction fragments up to 3' with surface voids, moderate HCl reaction fragments up to 3' with surface voids, moderate HCl reaction fragments and core segments	22.0					Limestone Fragments	${\mathbb H}$						
25. 17.0 28.0 29.5" - Same as 19.6-26.0' except mild to no HCI reaction as immediate mild HCI reaction, carbonate materials 26.0-29.5" - Same as 19.6-26.0' except mild to no HCI reaction 29.5-31.4" - moderate yellowish brown, (10/R 5/4), mild HCI reaction, fragments up to 7" with interbedded class, poorly fossiliferus, volds (<1/16") on 50-75% of surface 31.4.3 60" - light clive gray, (5Y 5/2), mild to moderate HCI reaction, fragments up to 3" with surface voids, moderate HCI reaction, fragments up to 3" with surface voids, moderate HCI reaction, fragments up to 3" with surface voids, moderate HCI reaction, carbonate materials 29.0 10 in depth, possible void (however, 100% recovery achieved) 29.5-31.4" - moderate with interbedded class, poorly fossiliferus, voids (<1/16") on 50-75% of surface 20.5 10 in depth, possible void (however, 100% recovery achieved) 29.5-31.4" - moderate voids, moderate with interbedded Limestone 36.0-41.4" - dark yellowish brown, (10/R 4/2), mild to moderate HCI reaction, carbonate materials part of repeating allements of sill and broken limestone fragments and core segments			100	DO ON		reaction, fine sand-sized to fine gravel-sized (up to 1")	ш	1					
25. 17.0 26.0-29.5' - Same as 19.6-26.0' except mild to no HCl reaction 26.0-29.5' - Same as 19.6-26.0' except mild to no HCl reaction 29.5-31.4' - moderate yellowish brown, (10YR 5/4), mild HCl reaction, fragments up to 7' with interbedded clays, poorly fossiliferous, volds (<1/16') on 50-78% of surface 31.4-36.0' - light clive gray, (5Y 5/2), mild to moderate HCl reaction, fragments up to 3'' with surface voids, moderately fossiliferous Driller's Remark: Drill rod dropped quickly between 28.0-31.0' in depth, possible void (however, 100% recovery achieved) 29.5-31.4' - moderate yellowish brown, (10YR 5/4), mild to moderate HCl reaction, fragments up to 3'' with surface voids, moderate HCl reaction, carbonate material, part of moderate HCl reaction, carbonate material, part of prepating allernating sequences of sill and broken limestone fragments and core segments			10.0	K3-5IV		limestone fragments, highly fossiliferous, limestone	H	-					
26.0-29.5' - Same as 19.6-26.0' except mild to no HCl reaction 26.0-29.5' - Same as 19.6-26.0' except mild to no HCl reaction Driller's Remark: Drill rod dropped quickly between 28.0-31.0' in depth, possible void (however, 100% recovery achieved) 10.0 R4-SN 10.0 R4-SN Driller's Remark: Drill rod dropped quickly between 28.0-31.0' in depth, possible void (however, 100% recovery achieved) 10.0 R4-SN 10.0 R4-SN Driller's Remark: Drill rod dropped quickly between 28.0-31.0' in depth, possible void (however, 100% recovery achieved) 10.0 R4-SN Driller's Remark: Drill rod dropped quickly between 28.0-31.0' in depth, possible void (however, 100% recovery achieved) 10.0 R4-SN Driller's Remark: Drill rod dropped quickly between 28.0-31.0' in depth, possible void (however, 100% recovery achieved) 10.0 R4-SN Driller's Remark: Drill rod dropped quickly between 28.0-31.0' in depth, possible void (however, 100% recovery achieved) 10.0 R4-SN Driller's Remark: Drill rod dropped quickly between 28.0-31.0' in depth, possible void (however, 100% recovery achieved) 10.0 R4-SN Driller's Remark: Drill rod dropped quickly between 28.0-31.0' in depth, possible void (however, 100% recovery achieved) 10.0 R4-SN Driller's Remark: Drill rod dropped quickly between 28.0-31.0' in depth, possible void (however, 100% recovery achieved) 10.0 R4-SN Driller's Remark: Drill rod dropped quickly between 28.0-31.0' in depth, possible void (however, 100% recovery achieved) 10.0 R4-SN Driller's Remark: Drill rod dropped quickly between 28.0-31.0' in depth, possible void (however, 100% recovery achieved) 10.0 R4-SN Driller's Remark: Drill rod dropped quickly between 28.0-31.0' in depth, possible void (however, 100% recovery achieved) 10.0 R4-SN Driller's Remark: Drill rod dropped possible void (however, 100% recovery achieved) 10.0 R4-SN Driller's Remark: Drill rod dropped possible void (however, 100% recovery achieved) 10.0 R4-SN Driller's Remark: Drill rod dropped possible void (however, 100% recovery achieved) 10.0 R4	-					nas immediate mild HCI reaction, carbonate materials -	H	-					
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26.0-29.5' - Same as 19.6-26.0' except mild to no HCl reaction 26.0-29.5' - Same as 19.6-26.0' except mild to no HCl reaction Driller's Remark: Drill rod dropped quickly between 28.0-31.0' in depth, possible void (however, 100% recovery achieved) 10.0 R4-SN 10.0 R4-SN Driller's Remark: Drill rod dropped quickly between 28.0-31.0' in depth, possible void (however, 100% recovery achieved) 10.0 R4-SN 10.0 R4-SN Driller's Remark: Drill rod dropped quickly between 28.0-31.0' in depth, possible void (however, 100% recovery achieved) 10.0 R4-SN Driller's Remark: Drill rod dropped quickly between 28.0-31.0' in depth, possible void (however, 100% recovery achieved) 10.0 R4-SN Driller's Remark: Drill rod dropped quickly between 28.0-31.0' in depth, possible void (however, 100% recovery achieved) 10.0 R4-SN Driller's Remark: Drill rod dropped quickly between 28.0-31.0' in depth, possible void (however, 100% recovery achieved) 10.0 R4-SN Driller's Remark: Drill rod dropped quickly between 28.0-31.0' in depth, possible void (however, 100% recovery achieved) 10.0 R4-SN Driller's Remark: Drill rod dropped quickly between 28.0-31.0' in depth, possible void (however, 100% recovery achieved) 10.0 R4-SN Driller's Remark: Drill rod dropped quickly between 28.0-31.0' in depth, possible void (however, 100% recovery achieved) 10.0 R4-SN Driller's Remark: Drill rod dropped quickly between 28.0-31.0' in depth, possible void (however, 100% recovery achieved) 10.0 R4-SN Driller's Remark: Drill rod dropped quickly between 28.0-31.0' in depth, possible void (however, 100% recovery achieved) 10.0 R4-SN Driller's Remark: Drill rod dropped quickly between 28.0-31.0' in depth, possible void (however, 100% recovery achieved) 10.0 R4-SN Driller's Remark: Drill rod dropped possible void (however, 100% recovery achieved) 10.0 R4-SN Driller's Remark: Drill rod dropped possible void (however, 100% recovery achieved) 10.0 R4-SN Driller's Remark: Drill rod dropped possible void (however, 100% recovery achieved) 10.0 R4	-					-		-					
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31.4-36.0' - light olive gray, (5Y 5/2), mild to moderate HCl reaction, fragments up to 3" with surface voids, moderately fossiliferous Disaggregated Interbedded Limestone 36.0-41.4' - dark yellowish brown, (10YR 4/2), mild to moderate HCl reaction, carbonate material, part of repeating alternating sequences of silt and broken limestone fragments and core segments	-							-					
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HCI reaction, fragments up to 3" with surface voids, moderately fossiliferous Disaggregated Interbedded Limestone 36.0-41.4' - dark yellowish brown, (10YR 4/2), mild to moderate HCI reaction, carbonate material, part of repeating alternating sequences of silt and broken limestone fragments and core segments	-					31.4-36.0' - light olive gray, (5Y 5/2), mild to moderate	Н	-					
Disaggregated Interbedded Limestone 36.0-41.4' - dark yellowish brown, (10YR 4/2), mild to moderate HCI reaction, carbonate material, part of repeating alternating sequences of silt and broken limestone fragments and core segments	-					HCl reaction, fragments up to 3" with surface voids,		-					
7.0 Disaggregated Interbedded Limestone 36.0-41.4' - dark yellowish brown, (10YR 4/2), mild to moderate HCl reaction, carbonate material, part of repeating alternating sequences of silt and broken limestone fragments and core segments	_					moderately fossiliferous	₽	_					
7.0 Disaggregated Interbedded Limestone 36.0-41.4' - dark yellowish brown, (10YR 4/2), mild to moderate HCl reaction, carbonate material, part of repeating alternating sequences of silt and broken limestone fragments and core segments	-					-	\Box	_					
7.0 Disaggregated Interbedded Limestone 36.0-41.4' - dark yellowish brown, (10YR 4/2), mild to moderate HCl reaction, carbonate material, part of repeating alternating sequences of silt and broken limestone fragments and core segments	_					_		_					
7.0 Disaggregated Interbedded Limestone 36.0-41.4' - dark yellowish brown, (10YR 4/2), mild to moderate HCl reaction, carbonate material, part of repeating alternating sequences of silt and broken limestone fragments and core segments	_					_	\vdash	-					
7.0 Disaggregated Interbedded Limestone 36.0-41.4' - dark yellowish brown, (10YR 4/2), mild to moderate HCl reaction, carbonate material, part of repeating alternating sequences of silt and broken limestone fragments and core segments							F						
7.0 Disaggregated Interbedded Limestone 36.0-41.4' - dark yellowish brown, (10YR 4/2), mild to moderate HCl reaction, carbonate material, part of repeating alternating sequences of silt and broken limestone fragments and core segments	35					-	片]					
Disaggregated Interbedded Limestone 36.0-41.4' - dark yellowish brown, (10YR 4/2), mild to moderate HCl reaction, carbonate material, part of repeating alternating sequences of silt and broken limestone fragments and core segments	7.0					_	dash	-					
Disaggregated Interbedded Limestone 36.0-41.4' - dark yellowish brown, (10YR 4/2), mild to moderate HCl reaction, carbonate material, part of repeating alternating sequences of silt and broken limestone fragments and core segments		36.0				-	ш	⁻					
moderate HCI reaction, carbonate material, part of repeating alternating sequences of silt and broken limestone fragments and core segments	-	55.0				Disaggregated Interbedded Limestone		·					
repeating alternating sequences of silt and broken limestone fragments and core segments	-					36.0-41.4' - dark yellowish brown, (10YR 4/2), mild to	F	-					
limestone fragments and core segments	-					repeating alternating sequences of silt and broken	Ħ	-					
40	-					limestone fragments and core segments	⊬	-					
40	-					-	\blacksquare	-					
40	-					-	団	-					
40	-					-	\vdash	-					
	-					-		-					
	40						H						



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	l I-10	SHEET	3	OF	14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723172.2 N, 458130.7 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

DRILLING METHOD AND EQUIPMENT: Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel

ORIENTATION: Vertical

					START : 2/05/2007		LOCOED		ORIENTATION: VEITICAL
WATER	LEVELS	. 1.υ π છα	gs on 03/2			<u>D : 3/26/2007</u> SCRIPTION	LOGGER	. J.	Burkard COMMENTS
≷Q₽	CANADI	INTERVA	I (#)	STANDARD PENETRATION	SOIL DE	JOAN HON		90	OCIVIIVILIAIO
DN (SAMPLE		` '	TEST RESULTS	SOIL NAME. USCS G	ROUP SYMBOL, COLO	OR.	.IC	DEPTH OF CASING, DRILLING RATE,
H B ATIO		RECOVE	RY (ft)		MOISTURE CONTENT	Γ, RELATIVE DENSITY	OR	BOL	DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (ft)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL S	TRUCTURE, MINERAL	LOGY	SYMBOLIC LOG	INSTRUMENTATION
2.0				(11)					
-							-	-	-
-		10.0	R5-SN					_	-
-					Limestone Fragments				-
-					41.4-42.7' - moderate yell mild HCl reaction, fragme	lowish brown, (10YR	5/4),		-
-					on 15-30% of surface, po	orly fossiliferous	1/10)	\perp	-
-					Disaggregated Interbedo 42.7-44.2' - Same as 36.0	ded Limestone	-		-
-					42.7-44.2 - Same as 30.0	J-4 1.4		\top	-
-							-		-
-					Limestone Fragments	4 40 7!	-		-
45 -3.0					44.2-44.9' - Same as 41.4 44.9-46.0' - dark yellowisl		_		
-5.0					moderate to strong HCl re	eaction, carbonate ma	aterials, _	\perp	-
-	46.0				coarse sand-sized to gray fragments	vel-sized limestone	- 4	\mathbf{I}	-
-					46.0-56.6' - pale yellowish	brown to moderate		Т	_
-					yellowish brown, (10YR 6 strong HCl reaction, fine			\top	_
-					fine to coarse gravel-size	d limestone fragment			_
-					varying amounts through limestone core segment (strona -		_
_					HCl reaction and voids (<	1/16") covering 50-75	5% of		_
-					surface, black (N1) organ	ic staining at 53.9-54	.3'		_
_								I	_
50								Т	
-8.0									_
_		10.0	R6-SN						_
_		10.0	110-011						_
l _								\perp	_
l _								\perp	_
l _								Т	_
1 -							7	Ŧ	
1 -							7		
55							1	_	
-13.0									
1 -							1		
1 -					Begin Rock Coring at 56.	0 ft bgs			
					See the next sheet for the	e rock core log	1		_
1 -							1		
1 -							1		_
1 -							1		_
1 -							1		_
1 -							1		_
60							1		_



PROJECT NUMBER:	BORING NUMBER:				
338884 FI	I_10	QUEET	4 0	E 14	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723172.2 N, 458130.7 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 1.0	ft bgs	s on 03	3/25/07 START: 3/25/2007 END: 3/	26/20	07 LOGGER : J. Burkard				
≥o.⊋	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS			
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.			
	56.0		NA	56.0-66.0' - NA	ш					
-						Limestone Fragments With Silt 56.6-64.0' - moderate yellowish brown, (10YR 5/4), strong HCI reaction	- - - - -			
60	R7-SN 10 ft 100%	NA	NA	_		Limestone Fragments 64.0-66.0' - moderate yellowish	NA = Not Applicable NR = No Recovery			
6523.0 	R8-SN 10 ft 100%	NA	NA	66.0-76.0' - NA		brown, (10YR 5/4), moderate to strong HCl reaction, limestone fragments up to 3", voids (<1/16") on 50-75% of surface of fragments 66.0-66.5' - light olive gray, (5Y 5/2), fine grained, moderate HCl reaction, fragments up to 3", trace voids on surface of fragments 66.5-76.0' - moderate yellowish brown, (10YR 5/4), moderate to strong HCl reaction, fragments and core segments (up to 3") with pulverized rock, poorly fossiliferous, voids (<1/16") on 50-75% of surface of fragments	Rock fragments are most likely pulverized due to drilling method			
- - - - - 75 -33.0	76.0			_			-			



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-10	SHEET	5	OF	14

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723172.2 N, 458130.7 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 1.0	ft bgs	s on 03	3/25/07 START : 3/25/2007 END : 3/	26/200	7 LOGGER : J. Burkard	
≥∩ ∷	(9)			DISCONTINUITIES	ڻ [LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - 80 -38.0 -	R9-SN 10 ft 100%	NA	NA	76.0-86.0' - NA		Limestone Fragments 76.0-86.0' - Same as 66.5-76.0' except pulverized rock fragments <1/4" in diameter	Pulverized rock most likely is more cohesive rock that has been broken up as a result of the sonic drilling method
-43.0 43.0 	86.0			86.0-96.0' - NA			
-90 -48.0 - - - - - - - -	R10-SN 10 ft 100%		NA			Disaggregated Limestone 88.6-89.2' - dusky yellowish brown, (10YR 2/2), strong HCI reaction, carbonate material Limestone Fragments 89.2-96.0' - moderate yellowish brown, (10YR 5/4), moderate HCI reaction, fragments and core segments with pulverized gravel-sized particles, voids (<1/16") on 25-50% of fragment surfaces, poorly to non fossiliferous	Gravel-sized particles most likely part of cohesive rock but broken by drilling method
-53.0	96.0					-	



PROJECT NUMBER:

338884.FL

BORING NUMBER:

I-10

SHEET 6 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723172.2 N, 458130.7 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS : 1.0) ft bg:	s on 03	3/25/07 START: 3/25/2007 END: 3/2	26/20	D7 LOGGER : J. Burkard	
≥ ∩ ⊙	6)			DISCONTINUITIES	Ō	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-				96.0-106.0' - NA - -		Limestone Fragments - 96.0-106.0' - Same as 89.2-96.0'	Lost circulation during run at 96.0-106.0'
-100 -58.0 	R11-SN 10 ft 100%	NA NA	NA				- - - - - - - - - - - - -
-110 -68.0 - - - - - - - - - - - - - - - - - - -	R12-SN 10 ft 100%	NA	NA	106.0-116.0' - NA		106.0-116.0' - dark yellowish orange, (10YR 6/6), moderate to strong HCI reaction, voids (<1/16") on 25-50% of surface, fragments and core segments up to 5" in length, with sections of pulverized rock that is gravel to coarse sand-sized particles	Pulverized rock most likely is more cohesive rock that has been broken up as a result of the sonic drilling method



PROJECT NUMBER:

338884.FL

BORING NUMBER:

I-10

SHEET 7 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723172.2 N, 458130.7 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 1.0	ft bgs	on 00	3/25/07 START : 3/25/2007 END : 3/2	26/20	07 LOGGER : J. Burkard	
≩ Ω⊋	(°)			DISCONTINUITIES	၅	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	R13-SN 10 ft 100%		NA	116.0-126.0' - NA		Limestone Fragments 116.0-116.8' - dark yellowish orange, (10YR 6/6), mild to no HCl reaction, pulverized limestone fragments, coarse to medium sand-sized particles 116.8-119.5' - light olive gray, (5Y 5/2), fine grained, mild HCl reaction, trace voids on surface, fragments are up to 4" 119.5-124.8' - yellowish gray, (5Y - 7/2), mild HCl reaction, extremely weak (R0), fragments with sections of pulverized limestone particles that are coarse to medium sand-sized up to 1-1/2" in length, voids (<1/16") on 25-50% of surfaces Silt (ML) 124.8-126.0' - yellowish gray to pale	End coring for the day 3/25/07 at 116.0'
	R14-SN 10 ft 95%		NA	126.0-136.0' - NA		greenish yellow, (5Y 7/2 to 10YR 8/2), strong HCI reaction, carbonate material Limestone Fragments 126.0-134.0' - dusky yellow and yellowish gray, (5Y 6/4 and 5Y 7/2), mild HCI reaction, core segments and fragments of limestone with sections of pulverized rock, voids (<1/16") on 15-25% of surface	Sharp lithologic contact between the two types of limestone, 126.0-134.0' and 134.0-135.5'
	136.0		NR		H		
					\Box		



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-10	SHEET	8	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723172.2 N, 458130.7 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 1.0	ft bgs	s on 03	3/25/07 START : 3/25/2007 END : 3/	26/200	D7 LOGGER : J. Burkard	
\$0₽	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-140 -98.0 - - - - - - - - - - - - - - - - - - -	R15-SN 10 ft 100%		NA	136.0-146.0' - NA		Limestone Fragments 134.0-135.5' - yellowish gray and medium gray, (5Y 8/1 and N5), mild to moderate HCl reaction, limestone fragments and core segments up to 6" in length, sharp color contact on some core segments and fragments, poorly fossiliferous, few cavities (1/4"-1/2" in size) present on core between 135.0-135.5' No Recovery 135.5-136.0' Limestone Fragments 136.0-137.5' - yellowish gray, (5Y 7/2), mild HCl reaction, gravel-sized rock fragments, voids (<1/16") on 15-25% of surface with small (1/4") surface cavities (possible solution cavities) 137.5-140.2' - light olive gray to yellowish gray, (5Y 5/2 to 5Y 7/2), fine grained, mild HCl reaction, fragments up to 8" in length, consisting of void-rich limestone (light olive gray), interbedded with fine grained limestone (yellowish gray) in intervals up to 1" thick, up to 20% coverage of small (1/16") voids 140.2-144.5' - dusky yellow, (5Y 6/4), mild HCl reaction, pulverized	-
150 -108.0 - 155 -113.0	R16-SN 10 ft 100%		NA	146.0-156.0' - NA		limestone in medium to fine sand-size particles and rock fragments up to 3" in diameter 144.5-146.0' - light olive gray, (5Y 6/1), moderate HCl reaction, core segments up to 4" in length, trace voids on surface 146.0-147.9' - light olive gray, (5Y 6/1), mild to moderate HCl reaction, trace voids on surface 147.9-152.0' - dusky yellow, (5Y 6/4), moderate HCl reaction, gravel-sized limestone fragments with pulverized limestone (silt-sized particles) 152.0-153.3' - light olive gray to medium bluish gray, (5Y 6/1 to 5B 5/1), core segments up to 5" in length 153.3-154.5' - Same as 147.9-152.0' except contains a core segment up to 4" in length 154.5-156.0' - Same as 152.0-153.3'	Repeating alternating sequences from 147.9-156.0'



PROJECT NUMBER:	BORING NUMBER:					
338884.FI	I-10	SHEET	9	OF	14	

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1723172.2 N, 458130.7 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 1.0	ft bgs	s on 03	3/25/07 START : 3/25/2007 END : 3/	26/20	D7 LOGGER : J. Burkard	
≥∩≘	_ (%			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - 160 -118.0				156.0-166.0' - NA		Limestone Fragments 156.0-161.2' - dusky yellow, (5Y 6/4), mild HCl reaction, fragments up to 4" in diameter, voids (<1/10") on 25-50% of surface, sections of coarse to medium sand-sized particles of pulverized limestone	-
- - - - - - 165 -123.0	R17-SN 10 ft 100%		NA			161.2-166.0' - light olive gray, (5Y 5/2), dense, fine grained, mild HCI reaction, fragments and core segments up to 2" in length, trace voids on surface	
-	166.0			166.0-176.0' - NA		Limestone 166.0-168.8' - dusky yellow, (5Y 6/4), coarse to medium grained, mild HCl reaction, cavities (1/4" in diameter) present on surface, fragments up to 8" in length	
170 -128.0 - - - -	R18-SN 10 ft 100%		NA			Limestone Fragments 168.8-175.7' - dusky yellow, (5Y 6/4), fine grained, mild HCl reaction, gravel-size particles and core fragments up to 6" long, trace voids on surface	- - -
- - 175 -133.0	176.0			- - - -		- - - - -	- - - -



PROJECT NUMBER: BORING NUMBER:

338884.FL I-10 SHEET 10 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723172.2 N, 458130.7 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 1.0	ft bgs	on 03	8/25/07 START : 3/25/2007 END : 3/	26/200	7 LOGGER : J. Burkard	_
≥∩≘	_ (6			DISCONTINUITIES	اي	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-138.0 -138.0 -138.0 -138.0 -138.0 -138.0	R19-SN 10 ft 100%		NA	176.0-186.0' - NA		Disaggregated Limestone 175.7-176.0' - moderate yellowish brown, (10YR 5/4), strong HCI reaction, carbonate sand with 10-20% silica content Limestone Fragments 176.0-179.9' - moderate yellowish brown, (10YR 5/4), strong HCI reaction, gravel-sized particles between 1/4"-1" in diameter, all carbonate materials 179.9-185.0' - dusky yellow, (5Y 6/4), strong HCI reaction, core segments up to 4", voids (<1/16") over 50-75% of surface, numerous cavities on surface, poorly to highly fossiliferous, some interbedded clay between 184.1-185.0'	-
	R20-SN 10 ft 87%		NA	186.0-196.0' - NA		6/1), fine grained, mild HCI reaction, core segments up to 3" in length Disaggregated Limestone 186.0-186.5' - light olive gray, (5Y 6/1), strong HCI reaction, silt-sized with coarse sand-sized particles, possibly slough material, all carbonate material Limestone Fragments 186.5-187.5' - light olive gray, (5Y 6/1), dense, fine grained, mild HCI reaction, core segments up to 2" in length, fragments 1/4"-1" in diameter 187.5-194.7' - yellowish gray, (5Y 7/2), mild to moderate HCI reaction, core segments up to 3" in length, fragments 1/2"-2" in diameter, moderate to highly fossiliferous, numerous surface cavities present on limestone	
-153 <u>.0</u> -	196.0		NR			-	-



PROJECT NUMBER: BORING NUMBER:

338884.FL I-10 SHEET 11 OF 14

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723172.2 N, 458130.7 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER LEVE	LS: 1.0	ft bgs	on 03	3/25/07 START: 3/25/2007 END: 3	/26/20	07 LOGGER : J. Burkard	
≥0≈	_ @			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft) CORE RUN,	LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
200_ -158.0 - - - - - - - - - - - - - - - - - - -	R21-SN 10 ft 100%	NA	NA	196.0-206.0' - NA		Limestone Fragments 196.0-198.0' - light olive gray, (5Y 5/2), strong HCI reaction, silt with sand-sized particles and gravel-sized limestone fragments, all carbonate 198.0-200.0' - light olive gray, (5Y 6/1), fine grained, mild HCI reaction, fragments 1/2"-4" in diameter, several surface cavities (1/4"-1/2") at 198.2-198.5', fracture at 45 deg through one cavity 200.0-205.0' - fragments range from 1/4"-3", possible breccia zone, matrix appears as for material from 196.0-198.0', clasts appear as for material from 198.0-200.0'	
210 -168.0 -173.0 -216.0	R22-SN 10 ft 100%	NA	NA	206.0-216.0' - NA		reaction, fragments and core segments up to 4" in diameter 206.0-216.0' - light olive gray, (5Y 6/1), strong HCI reaction, coarse sand-sized particles and rock fragments up to 4", highly fossiliferous, voids (<1/16") over 25-50% of surface, with isolated sections of fine grained, dense, yellowish gray (5Y 7/2) core segments and fragments, with strong HCI reaction, at 210.0-210.4', 211.3-211.4' and 214.6-215.0'	



PROJECT NUMBER: BORING NUMBER:

338884.FL I-10

ROCK CORE LOG

SHEET 12 OF 14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723172.2 N, 458130.7 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

PLAMARTY, NRTLLINE MATERIAL, AND Second Control of the part of	WATER	LEVELS: 1.0	ft bgs	s on 03	3/25/07 START: 3/25/2007 END: 3	/26/200	D7 LOGGER : J. Burkard	
Limestone Fragments 216.0-226.0' - NA Limestone Fragments 216.0-276.1' ight olive gray, (5Y 671), strong HC reaction, with sand-sized particles and gravet-sized markets and sized particles and gravet-sized particles and gravet-	30€	(°)			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
Limestone Fragments 216.0-226.0' - NA Limestone Fragments 216.0-276.1' ight olive gray, (5Y 671), strong HC reaction, with sand-sized particles and gravet-sized markets and sized particles and gravet-sized particles and gravet-	DEPTH BELO' SURFACE AN ELEVATION (f	CORE RUN, LENGTH, AND RECOVERY (R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LC	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS	FLUID LOSS, CORING RATE AND
225183.0 226.0 -236.0' - NA 226.0 -236.0' - Oaft yellowish gray (5Y 772), moderate HCI reaction, carbonate material Limestone Fragments are most likely observe rock that has been broken up by the sonic drilling method stands are seasily distinguished a either fire grained, yellowish gray (6Y 772), dense, and poorly lossilierous with moderate HCI reaction or the sonic drilling method stands are sold only policy similar or sold only, yellowish gray (6Y 772), ponty fossilierous, with moderate HCI reaction or as void not, yellowish gray (6Y 772), ponty fossilierous, with mild to moderate HCI reaction	- - - - - - 220				216.0-226.0' - NA		 216.0-217.5' - light olive gray, (5Y 6/1), strong HCl reaction, with sand-sized particles and gravel-sized rock fragments, all carbonate material 217.5-219.2' - yellowish gray, (5Y 7/2), dense, fine grained, moderate HCl reaction, fragments up to 4" in diameter, poorly fossiliferous 219.2-221.4' - yellowish gray, (5Y 7/2), mild to moderate HCl reaction, 	
225.0-226.0" - yellowish gray, (5Y 7/2), moderate HCI reaction, carbonate material Limestone Fragments 226.0-236.0" - Vark yellowish orange, (10YR 6/6), sand-sized particles to gravel-sized immestone fragments, strong HCI reaction for the silt and sand-sized particles, mild to moderate HCI reaction for gravel-sized fragments, limestone fragments are most likely ones of the silt and sand-sized particles, mild to moderate HCI reaction for gravel-sized fragments, limestone fragments are easily distinguished as either fine grained, yellowish gray (5Y 7/2), dense, and poorty fossiliferous with moderate HCI reaction, or as void rich, yellowish gray (5Y 7/2), poorly fossiliferous, with mild to moderate HCI reaction. R24-SN 10 ft NA 100% N			NA	NA			- 222.2-225.0' - Same as 219.2-221.4' - -	- - - - - -
	230 -188.0 - - - - - - - - - - - - - - - - - - -	R24-SN 10 ft		NA	226.0-236.0' - NA		 225.0-226.0' - yellowish gray, (5Y 7/2), moderate HCI reaction, carbonate material Limestone Fragments 226.0-236.0' - dark yellowish orange, (10YR 6/6), sand-sized particles to gravel-sized limestone fragments, strong HCI reaction for the silt and sand-sized particles, mild to moderate HCI reaction for gravel-sized fragments, limestone fragments are easily distinguished as either fine grained, yellowish gray (5Y 7/2), dense, and poorly fossiliferous with moderate HCI reaction, or as void rich, yellowish gray (5Y 7/2), poorly fossiliferous, 	fragments are most likely cohesive rock that has been broken up by the



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	I-10	SHEET	13	OF	14

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723172.2 N, 458130.7 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

WATER	LEVELS: 1.0	ft bg	s on 03	3/25/07 START: 3/25/2007 END: 3/	26/200	D7 LOGGER : J. Burkard	
≥∩ ≘	_ (6			DISCONTINUITIES	ပ္ခ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
	R25-SN		NA	236.0-246.0' - NA		Limestone Fragments 236.0-246.0' - Same as 226.0-236.0' except with isolated sections of fine grained and void-rich limestone	
250 -208.0 -255 -213.0	246.0 R26-SN 10 ft 1 100%		NA	246.0-256.0' - NA		246.0-256.0' - Same as 236.0-246.0' except less void-rich limestone (only trace to 10% coverage of small [<1/16"] voids)	Original page of field log (246.0-256.0') "lost", page re-written by original logger J. Burkard on 2/7/08 based on photographs of recovered material



PROJECT NUMBER:	BORING NUMBER:					
338884 FI	I_10	QUEET	11	OE	11	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1723172.2 N, 458130.7 E (NAD83)

ELEVATION: 42.0 ft (NAVD88) DRILLING CONTRACTOR: Prosonic, Ocala, FL; Driller: N. Gamache

CORING METHOD AND EQUIPMENT : Rotosonic S/N SR-116, sonic, 6" outer casing and 4" core barrel

ORIENTATION : Vertical

WATER	LEVELS: 1.0	ft bgs	s on 03	3/25/07 START : 3/25/2007 END : 3/	26/20	D7 LOGGER : J. Burkard	
≥□₽	(%			DISCONTINUITIES	၂ ဗွ	LITHOLOGY	COMMENTS
DN (#	ANE RY (6		ZES IT	DESCRIPTION	O LC	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
				256.0-266.0' - NA	\blacksquare	Limestone Fragments - 256.0-266.0' - Same as 226.0-236.0'	
					Ħ	- 256.0-266.0' - Same as 226.0-236.0'	1
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	R27-SN			-	丗	-	1
-	10 ft 100%	NA	NA		\Box		1
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-					╁	-	-
-				-	\vdash	-	-
265					\Box	-	-
-223.0				_	\vdash		Completed drilling hole at
	266.0				\mathbb{H}		16:40 on 3/26/07 to 266.0', however total depth tagged
]]						Bottom of Boring at 266.0 ft bgs on - 3/26/2007	on 3/27/07 at 267.0' below ground surface
						-	-
-					$\mid \cdot \mid$	_	-
-				-	1	-	Borehole grouted to
-				-	1	_	surface with 4" schedule 40 - PVC pipe down hole; depth
					1	F	inside PVC pipe re-tagged
]	_	at 267'3" below ground – surface after grouting
					1	_]
					1	-	-
					1	_	-
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	IT-01	SHEET	1	OF	8

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1705495.9 N, 457735.8 E (NAD83)

ELEVATION: 20.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 75 S/N 252437, mud rotary, auto hammer, NW rods, 3-7/8" tri-cone bit ORIENTATION: Vertical WATER LEVELS: 42.0 ft bgs on 6/28/07 START: 6/27/2007 END: 6/29/2007 LOGGER: J. Schaeffer, D. Thomas SOIL DESCRIPTION COMMENTS STANDARD P06 DEPTH BELOW SURFACE AND ELEVATION (#) PENETRATION TEST RESULTS SAMPLE INTERVAL (ft) SYMBOLIC SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE, RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND CONSISTENCY, SOIL STRUCTURE, MINERALOGY INSTRUMENTATION #TYPE 6"-6"-6" (N) 20.9 0.0 Topsoil 0.0-0.2' - roots 1-5-10 SS-1 1.2 Sandy Silt With Limestone Fragments (ML) (15)0.2-1.2' - grayish orange, (10YR 7/4), orange, dry to 1.5 moist, medium stiff, nonplastic, strong HCl reaction, SS-1 looks like fill, mixed chunks of material 30 % fine to coarse sand-sized material, 30% fine to coarse gravel-sized material Driller's Remark: Sand at 3.0-3.5' 5.0 15.9 Poorly Graded Sand With Silt (SP-SM) 5.0-5.6' - moderate yellowish brown, (10YR 5/4), 2-3-4 0.6 SS-2 moist to wet, loose, no to moderate HCl reaction, fine (7) silica sand, trace medium grained carbonate sand, 6.5 trace nonplastic fines 10 10.0 Poorly Graded Sand With Silt (SP-SM) 10.9 10.0-10.3' - Same as 5.0-5.6' except dark yellowish 3-3-3 0.6 SS-3 brown, (10YR 4/2), mottled, 5-10% nonplastic fines, (6)trace medium sand-sized carbonate sand 11.5 **Poorly Graded Sand With Silt And Organics** 10.3-10.6' - grayish brown, (5YR 3/2), moist, loose, no HCl reaction, fine silica sand, 15-20% fines that appear to be very fine grained organics, nonplastic fines 15.0 5.9 Poorly Graded Sand (SP) 15.0-15.8' - dark yellowish brown, (10YR 4/2), white, moist, medium dense, nonplastic, no HCl reaction, 5-7-11 SS-4 0.8 (18)fine silica sand 16.5 20



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	IT-01	SHEET	2	OF	8

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1705495.9 N, 457735.8 E (NAD83)

ELEVATION: 20.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

DRILLIN	G METH	OD AND	EQUIPM	ENT : CME 75 S/	N 252437, mud rotary, auto hammer, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical
WATER	LEVELS	: 42.0 ft b	gs on 6/2	28/07	START : 6/27/2007 END : 6/29/2007 LOGGER : J. Schaeffer, D. Thomas
 ≥∩≘ i				STANDARD	SOIL DESCRIPTION COMMENTS
N (# ON	SAMPLE	E INTERVAL (ft)		PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
H B ATIC		RECOVE			MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND DRILLING FLUID LOSS, TESTS, AND
DEPTH BELOW SURFACE AND ELEVATION (#)			#TYPE	6"-6"-6" (N)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
0.9	20.0				Poorly Graded Sand With Silt (SP-SM)
1 1		0.9	SS-5	11-10-13 (23)	20.0-20.9' - pale yellowish brown, (10YR 6/2), dark yellowish brown (10yr 4/2), moist, medium dense, fine
1 1	21.5			(20)	silica sand, trace carbonate sand in first 0.2', trace nonplastic fines, no HCl reaction in silica, mild in
					\range \
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					_
25 -4.1	25.0				Poorly Graded Sand (SP)
		0.8	SS-6	4-5-5	25.0-25.8' - dark yellowish brown, (10YR 4/2),
1 -		0.0	33-0	(10)	mottled, wet, loose, no HCl reaction, fine silica sand, /
	26.5				
					-
					1 1
					1 1
1 1					1
1 1					1
30	30.0				
-9.1				2-3-4	Poorly Graded Sand (SP) 30.0-30.9' - Same as 25.0-25.8' except mottled and
		0.9	SS-7	(7)	banded
	31.5				1 1
-					
-					-
-					-
-					
-					Driller's Remark: Very soft at 33.0', possible
35	35.0				change of material in SS-8
-14.1	00.0				Interbedded Organic Soil (SP)
		1.5	SS-8	0-0-0 (0)	35.0-35.6' - dusky brown, (5YR 2/2), wet, 60% organic soil and 40% poorly graded sand; organic soil exhibits
1	36.5			(0)	low to medium plasticity, slow dilatancy, no HCl reaction; poorly graded sand is fine grained, possible
					\rightarrow \right
					\raction Poorly Graded Sand Grading To Silty Sand With -
					Organics (SP)
					35.6-36.5' - dusky brown, (5YR 2/2), wet, very loose, no HCl reaction, fine sand, possible orange silica Driller's Remark: Gravelly material at 38.0' (like SS-9)
					grains, trace coarse sand-sized pyrite grains, 10-25% low plastic fines, increasing with depth, appear to be
-					organics
40					



PROJECT NUMBER:	BORING NUMBER:					_
338884.FL	IT-01	SHEET	3	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1705495.9 N, 457735.8 E (NAD83)

ELEVATION: 20.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 75 S/N 252437, mud rotary, auto hammer, NW rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

DRILLIN	G METH	OD AND	EQUIPM	ENT : CME 75 S/N	/N 252437, mud rotary, auto hammer, NW rods, 3-7/8" tri-cone bit ORIENTATION : V	/ertical
WATER	LEVELS	: 42.0 ft b	gs on 6/2	28/07 S	START : 6/27/2007 END : 6/29/2007 LOGGER : J. Schaeffer, D. Thomas	
				STANDARD	SOIL DESCRIPTION O COMMENTS	
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RA DRILLING FLUID LOSS, TESTS, A	
H SE		RECOVE	RY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DEPTH OF CASING, DRILLING RA	
PTF PRF/ EVA			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	"10
				(N)		
-19.1	40.0			3-5-8	Silty Sand (SM) 40.0-41.3' - mixed yellowish gray, medium light gray,	_
-		1.3	SS-9	(13)	light bluish gray, (5Y 8/1, N6, 5B 7/1), wet, medium	_
_	41.5				dense, strong HCl reaction, fine to coarse sand-sized shells and limestone	_
_						_
_]]	_
_]]	
_]]	
_]]	
_					Driller's Remark: 100% loss of circu 44.0-44.5'	lation at
45	45.0					
-24.1				40 44 40	Silty Gravels (GM) 45.0-45.8' - 50/50 split in sample; lenses alternates,	27/07 at
		0.8	SS-10	12-41-40 (81)	☐ 1"-2-1/2" thick limestone fragments are medium gray ☐ ☐ ☐ ☐ Driller set HW casing	
_	46.5			. ,	\[\text{(N5), strong HCl reaction, same as SS-9, angular fine } \] \[\text{Driller's Remark: Caving at 16.0-17'} \] \[\text{to coarse gravel-sized, silt with sand (ML) is pale} \] \[\text{Driller's Remark: Caving at 16.0-17'} \] \[\text{(possible water table); casing is dry} \]	
_					\ \ yellowish brown, wet, very soft, nonplastic, very rapid \ \ 43.5'.	up to
_					dilatancy, 10-20% very fine sand-sized particles, mild to moderate HCl reaction, carbonate materials On 6/28/07 water table is at 42.0'; re	esume -
_					drilling at 07:30 AM	
_					Driller's Remark: Alternating layers of and hard material between 45.0-50.0	ot soft 0': lost
_					_ circulation at 45.0'	_
_]]	
50	50.0					_
-29.1				24 27 47	Silty Gravels (GM) 50.0-51.4' - Same as 45.0-45.8' except limestone in	
_		1.4	SS-11	31-27-17 (44)	gravel-sized particles, one 1" fragment in middle of	
_	51.5				sample, fine to coarse angular gravel-sized limestone from 51.0-51.4'; silt is same as SS-10	
_						_
_]]	_
_]]	_
_]]	_
_]]	
_]]	
55	55.0					_
-34.1	55.6	0.5	SS-12	50-50/1.5 (100/7.5")	Well Graded Limestone Gravel With Silt And Sand (GW)	_
_				(130,110)	│	
_					to moderate yellowish brown, (N5, 10YR 5/4), wet, very dense, gravel is in both colors and fines are in	
					brown color, fine to coarse angular gravel-sized	
_					limestone, 30% fine to coarse angular sand-sized material, 15% nonplastic fines, gray material has	
_					strong HCl reaction, brown material has mild to	
_					moderate HCl reaction, all carbonate materials Driller's Remark: Change to SS-13 r at 58.0'; Install casing to 60.0'	material -
_						
_]]	
60						
					1 1	



PROJECT NUMBER:	BORING NUMBER:				
338884.FL	IT-01	SHEET	4	OF	8

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1705495.9 N, 457735.8 E (NAD83)

ELEVATION: 20.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 75 S/N 252437, mud rotary, auto hammer, NW rods, 3-7/8" tri-cone bit ORIENTATION: Vertical

DRILLIN	G METH	OD AND	<u>EQUIPM</u>	ENT : CME 75 S/I	N 252437, mud rotary, auto hammer, NW rods, 3-7/8" tri-cone bit ORIENTATION : Vertical
WATER	LEVELS	: 42.0 ft l	ogs on 6/2	28/07	START : 6/27/2007 END : 6/29/2007 LOGGER : J. Schaeffer, D. Thomas
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	L (ft)	PENETRATION TEST RESULTS	اِن ا
BEL 10N		SOIL NAME, USCS GROUP SYMBOL, COLOR,			SOIL NAME, USCS GROUP SYMBOL, COLOR, DEPTH OF CASING, DRILLING RATE,
YFA(#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SINSTRUMENTATION INSTRUMENTATION
SUF			#1117	(N)	$\left \begin{array}{c} \delta \\ \delta \end{array}\right $
-39.1	60.0				Silty Sand With Limestone Fragments (SM) Driller's Remark: Circulation lost after spoon
		1.2	SS-13	16-19-25 (44)	60.0-61.2' - moderate yellowish brown, (10YR 5/4), - wet, dense, fine to coarse grained, nonplastic, mild -
-	61.5			(44)	⊢ HCl reaction, 20-25% silt, 15% fine gravel, carbonate
-	01.0				\materials -
-					Driller's Remark: Hard at 62.0'
-					
-					
-					
-					- Driller's Remark: Softer at 64.0', circulation
-					returns, installed 10' more casing (to 65.0')
65	65.0	0.2	00 44	50/2.0	
-44.1	65.3	0.3	SS-14	50/3.0 (50/3.0") /	Sandy Silt (ML) Driller's Remark: 65.0-70.0' drilling hard, a
				(00:010)	\ moderate HCl reaction, 25% sand, predominantly fine /
_					sands, trace medium coarse sand, all carbonate
					material
					11
1 1					
-					
70 -	70.0				
70 -49.1	70:9	0.0	SS-15	50/1.0	No Recovery 70.0-70.1' Driller's Remark: Hard from 70.0-75.0', little
-				(50/1.0")	- chatter -
-					
-					
-					
-					
-					
_					
_					
					」
75	74.9	0.0	00.40	E0/4 5	No Decovery 75 0.75 4!
-54.1		\U.U/	(SS-16)	50/1.5 (50/1.5")	No Recovery 75.0-75.1' Begin Rock Coring at 75.0 ft bgs
				(, , , , , , , , , , , , , , , , , , ,	See the next sheet for the rock core log
					11
					1
					1
-					
-					
-					-
-					-
-					
80					-
		ı	i		l I



FRACTURES PER FOOT

0

2

1

1

1

1

2

>10

3

3

3

>10

5

NR

8

3

0

nearly healed

undulating, tight

healed

fractures

tight

smaller

fracture

tight to open

tiaht

RQD(%)

100 0

WATER LEVELS: 42.0 ft bgs on 6/28/07

CORE RUN, LENGTH, AND RECOVERY (%)

75.0 R1-HQ

76.0

1 ft

100%

R2-HQ

5 ft 97 1

100%

R3-HQ

5 ft 63 1

100%

R4-HQ

5 ft 35

88%

R5-HO

5 ft

68%

28 7

DEPTH BELOW SURFACE AND ELEVATION (ft)

-54.1

80

-59 1

85

-64 1

90

 $-69.\overline{1}$

95

91.0

86.0

81.0

PROJECT NUMBER: BORING NUMBER: 338884.FL IT-01 SHEET 5 OF 8

ROCK CORE LOG

PROJECT: Progress Energy Florida - COLA Investigation, Levy County Site LOCATION: 1705495.9 N, 457735.8 E (NAD83)

START: 6/27/2007

DESCRIPTION

DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND

THICKNESS, SURFACE STAINING, AND TIGHTNESS

76.95, 79.85, 80.55' - Fracture (3), 25 deg and 45 deg, rough, planar to undulating, tight

77.4' - Fracture, 30 deg, rough, undulating,

77.75' - Fracture, horizontal, rough, planar,

78.3' - Fracture, horizontal, rough, planar to

81.9' - Fracture, horizontal, rough, planar

with a 1" fragment wedge between 2

82.35' - Fracture (2), 30 deg, rough, planar,

83.95' - Fracture, 50 deg, rough, stepped,

84.85' - Fracture, 60 deg, rough, undulating,

85.0-85.15' - Fracture zone, small 1/4 and

85.15, 85.4, 85.75' - Fracture (3), 10 deg,

85.5' - Fracture, 80 deg, rough, undulating to stepped, from 85.15 to 85.75

85.85' - Fracture, 70 deg, rough, undulating, from 85.75 to 86.0 continuation of overlying

86.2' - Fracture, 75 deg, rough, undulating,

fragmentation and debris, nearly fracture

87.0, 87.2' - Fracture (2), 10 deg, rough,

87.65' - Fracture, 10 deg and 30 deg, rough,

very open fracture with significant

88.45' - Fracture, horizontal, rough,

very open with fragmentation

89.5-89.8' - Fracture zone

undulating to stepped, tight to healed

88.75' - Fracture, 75 deg, rough, stepped, tight, bounded by fractures at 88.15 and

89.15' - Fracture, 20 deg, rough, stepped,

planar, open, rounded

undulating, open

89 15'

86.55' - Fractures, horizontal, rough, stepped,

84.55' - Fracture, 10 deg, rough, planar

leading to fracture zone at 85.0'

rough, undulating to stepped

DISCONTINUITIES

 ${\tt DRILLING\ CONTRACTOR: Universal\ Engineering\ Sciences, Ft.\ Myers, FL; Driller:\ R.\ Woodard}$ ELEVATION: 20.9 ft (NAVD88)

90

 $\underline{\circ}$

CORING METHOD AND EQUIPMENT: CME 75 S/N 252437, mud rotary, HQ tools, HW casing

END: 6/29/2007 LOGGER: J. Schaeffer, D. Thomas LITHOLOGY COMMENTS ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD MINERALOGY, TEXTURE WEATHERING, HARDNESS, AND ROCK MASS DROPS, TEST RESULTS, ETC. CHARACTERISTICS Switch to coring; finished soil drilling at 15:30 on Limestone 75.0-76.0' - moderate yellowish brown, (10YR 5/4), fine grained, 6/28/07 moderate HCI reaction, weak (R2), R1: 3 minutes voids (up to 1/16") cover 20% of the surface area, one large 3/4" deep and 4" long cavity, 2"X3/16" with up to 1/8" calcite crystals 76.0-77.55' - Same as 75.0-76.0' except moderate yellowish brown to dark yellowish orange, (10YR 5/4, SC-1 collected at 78.5-10YR 6/6), weak to very weak (R2 to 79.5 R1), voids (up to 1/16") cover 5-25% of the surface area, voids coverage Drilled twice as fast from decreases with depth 79.5-81.0' 77.55-79.5' - light olive gray, (5Y R2: 17 minutes 5/2), fine to coarse grained, moderate HCI reaction, medium strong (R3), 25% of the rock grains are sub angular to sub rounded, voids (up to 1/16") cover 10% of the surface, voids (1/8"-3/16") cover 10% of the surface, shallow and elongated cavities up to 2" long 79.5-81.0' - Same as 79.5-81.0 except grayish orange, (10YR 7/4), very fine grained, moderate HCl reaction, weak to medium strong (R2 to R3), voids (up to 1/16") cover 25% of the surface, few voids (1/8"-3/16"), no cavities R3: 8 minutes 81.0-86.0' - moderate yellowish brown, (10YR 5/4), fine grained, moderate HCI reaction, medium strong (R3), voids (<1/16") cover 25-30% of the surface area, few cavities (1/4"-1/2"), somewhat friable; except 81.7-82.1' weak rock (R2), voids cover 5% of the surface 86.0-86.55' - Same as 81.0-86.0' except medium strong (R3), 25-30% void coverage 86.55-87.65' - moderate yellowish Driller's Remark: 50% brown, (10YR 5/4), fine grained, circulation loss moderate HCI reaction, very weak (R1), voids (<1/16") cover 0-5% of the surface, 1/4"-1/2" thick trace R4: 9 minutes planar bedding 87.65-88.6' - Same as 86.0-86.55' Driller's Remark: 100% 88.6-88.7' - light olive gray, (5Y 5/2), circulation loss as soon as very fine grained, moderate HCI reaction, strong (R4), 20% sub drilling starts at 91.0'; 100% loss through to 96.0' angular coarse sand-sized particles (possible shell fragments), voids (up to 1/16") cover 3% of the rock surface, cavities (up to 1/2") 88.7-89.8' - Same as 86.0-86.55' 89.8-90.4' - Same as 86.0-86.55' except light olive gray, (5Y 5/2), strong to very strong (R4 to R5) No Recovery 90.4-91.0'

ORIENTATION: Vertical



BORING NUMBER: PROJECT NUMBER: 338884.FL IT-01 SHEET 6 OF 8

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1705495.9 N, 457735.8 E (NAD83)

ELEVATION: 20.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

CORING	METHOD A	ND E	QUIPN	IENT : CME 75 S/N 252437, mud rotary, HQ tools, HW ca	asing	•	ORIENTATION : Vertical
WATER	LEVELS: 42	.0 ft b	gs on (6/28/07 START: 6/27/2007 END: 6/2	29/20	07 LOGGER: J. Schaeffer, D. Thom	as
≥0€	- %			DISCONTINUITIES	POO	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	R Q D (%)	FRACTURES PER FOOT	DESCRIPTION DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LC	ROCK TYPE, COLOR, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
-74.1			NR	89.8' - Fracture, 30 deg, rough, undulating,	ш	Limestone	R5: 15 minutes
-	96.0			open to fracture zone - 90.05' - Fracture, 20 deg, rough, stepped, _	世	- 91.0-91.65' - light olive gray, (5Y 5/2), fine grained, moderate HCl	1
-			0	very open 90.2' - Fracture, 70 deg, rough, undulating, - fracture to fragmentation	Ħ	reaction, weak (R2), voids cover 25% of the surface, 3% gray voids, same as 88.6-88.7'	Added EZ-Mud, still 100% water loss -
-			0	91.25' - Fracture, 30 deg, smooth, undulating 91.45, 91.5, 91.6, 91.65' - Fracture (4), horizontal, rough, planar, open fragmentation		91.65-93.0' - light olive gray, (5Y – 5/2), fine grained, moderate HCl reaction, strong (R4), transition to	-
-	R6-HQ 5 ft	62	2	(sub angular) from 91.6-91.65' 92.2' - Fracture, 40 deg, rough, planar, -		moderate yellowish brown particularly at the top and bottom,	-
-	100%		3	healed with trace fragmentation (sharp angular) - 92.35' - Fracture, 20 deg, rough, planar, -		voids (up to 1/16") cover 15-20% of the surface, 1/2" cavities and fossil casts]
100_ -79.1	-		>10	fragments, joins with 92.2 fracture 92.55' - Fracture, horizontal, smooth, planar 93.0' - Fracture, 70 deg, rough, undulating,		93.0-94.4' - dusky yellow, (5Y 6/4), fine grained, moderate HCl reaction, weak to medium strong (R2 to R3),	R6: 5 minutes
-	101.0		0	tight 93.2' - Fracture, 20 deg, rough, undulating, tight -		5% rounded coarse fragments, voids (up to 1/16") cover 10% of the surface	_
-				93.65' - Fracture, 70 deg, rough, undulating, tight	Ħ	No Recovery 94.4-96.0' Limestone 96.0-98.1' - dusky yellow, (5Y 6/4),	-
-	R7-HQ		1	93.8-93.95' - Fracture zone 93.95' - Fracture, 10 deg, rough, stepped, open -		fine grained, moderate HCl reaction, weak to medium strong (R2 to R3),]
-	5 ft 96%	77	1	98.3' - Fracture, 25 deg, rough, undulating, tight 98.55' - Fracture, 80 deg, rough, undulating,		voids (up to 1/16") cover 30-40% of the surface, trace elongate cavities up to 3/4"X1/4", trace organics (up to	- 100 % water loss from
105_			1	that starts at 98.3 and ends as unbroken fracture at 98.8, 99.45' - Fracture, 50 deg, rough, planar, tight	H	1/4") 98.1-101.0' - moderate yellowish brown, (10YR 5/4), fine grained,	101.0-106.0' -
-84.1			2	99.6' - Fracture, 70 deg, rough, undulating to		moderate HCl reaction, weak to very	R7: 14 minutes
-	106.0		NR	planar, tight extends from 99.45 to 99.65' 99.65' - Fracture, 30 deg, rough, planar, tight	F	weak (R2 to R1), voids (up to 1/16") cover 5-15% of the rock surface,	_
-	-		>10	100.1' - Fracture, horizontal, rough, stepped, open to fracture zone below		organics (up to 1/8" long) 101.0-103.5' - Same as 96.0-98.1'	-
-			>10	100.1-100.7' - Fracture zone, with several large 3" subangular fragments and several 0		 except very weak to weak (R1 to R2), the rock is gray where it is stronger, 	_
-	R8-HQ	0		to 70 degree fractures 100.7' - Fracture, horizontal, rough, stepped, - very weak (R1) rock and rounded core with		voids (up to 1/16") cover 10-25% of the surface, cavities (up to 1/4") and trace 3/4"-1" cavities with molds and	-
-	5 ft 100%	0	>10	faded color 102.85' - Fracture, 60 deg, rough, undulating, - healed		casts, more voids in 103.2-103.5' 103.5-105.15' - light olive gray, (5Y 5/2), fine to very fine grained.	-
110 -89.1	-		>10	103.45' - Fracture, 25 deg, rough, undulating, open	H	moderate HCl reaction, medium strong to strong (R3 to R4), voids (up	R8: 7 minutes
-	111.0		>10	103.65' - Fracture, horizontal, rough, stepped, very open 104.25' - Fracture, 10 deg, rough, stepped, -		to 1/16") cover 10-15% of the surface, cavities (up to 1/4") cover 5% of the surface and frequency]
-			>10	very open fracture with some fragments 105.15' - Fracture, 50 deg, rough, undulating, healed	Ė	decreases with depth, rare larger cavities also decreasing with depth 105.15-105.8' - Same as	100% circulation loss from 111.0-116.0' –
-	-		>10	105.35-105.45' - Fracture zone, rough, planar		101.0-103.5' except steep increase in voids, more brownish No Recovery 105.8-106.0'	-
	R9-HQ 5 ft 84%	25	2	106.55' - Fracture, 20 deg, rough, undulating to stepped, very open fracture	Ħ	-]
-	- 5-70		0	106.7-106.85' - Fracture zone, 30 deg and 60 deg, subrounded -		-	_
115					H		



PROJECT NUMBER:

33884.FL BORING NUMBER:

IT-01 SHEET 7 OF 8

ROCK CORE LOG

ORIENTATION: Vertical

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1705495.9 N, 457735.8 E (NAD83)

ELEVATION: 20.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT: CME 75 S/N 252437, mud rotary, HQ tools, HW casing

				C/00/07 CTART - C/07/0007 FAIR - C			LOCOED : LOchester D. There	ONLINIATION . Vertical
WATER	LEVELS : 42	U II D	ys on		<u>29/20</u>	107	Z LOGGER: J. Schaeffer, D. Thon LITHOLOGY	COMMENTS
≥□£	CORE RUN, LENGTH, AND RECOVERY (%)			DISCONTINUITIES	- 8	H	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	ZAN ZAN ZIO		FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	L	ROCK TYPE, COLOR,	SIZE AND DEPTH OF CASING,
표병은	8. F. P.	(%)	15.0 15.0 15.0	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	7 ặ	L	MINERALOGY, TEXTURE,	FLUID LOSS, CORING RATE AND
<u></u>	#25 유한		2 F	PLANARITY, INFILLING MATERIAL AND	₩ W	П	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SCIE		S O	F.F.	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYI	L	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
-94.1			>10	106.85' - Fracture, horizontal, rough, planar,	╅	۰	Limestone	R9: 4 minutes
-			NR	with fragmentation transition abruptly to	二	1	106.0-106.7' - moderate to dark	-
l _	116.0			different material	₽	╁	yellowish brown, (10YR 5/4, 10YR	
				106.95' - Fracture, 45 deg, rough, stepped,		1	5/6), fine grained, moderate HCl	100% circulation loss from
-			>10	very fine steps 107.15, 107.5' - Fracture (2), 80 deg, rough,	1	1	reaction, medium strong (R3), voids (up to 1/16") cover 30% of the	116.0-121.0'
-				undulating, stained	╫	╁	surface, 1" long elongated fossil	-
l -			0	107.65' - Fracture, 10 deg and vertical,	一	1	molds and casts, slightly stronger	-
_				break, angular	ᅪ	Ł	where mottled as 105.15-105.8'	
	R10-HQ			107.75' - Fracture, 10 deg, rough, stepped,		1	106.7-107.75' - light olive gray, (5Y	
-	5 ft 100%	63	>10	open, abrupt transition to material below 107.75-108.75' - Fracture zone, horizontal	口	1	5/2), fine to very fine grained, mild to moderate HCl reaction, medium	1
	100 /6			and vertical, present significant 1/4"	╁	╁	strong to strong (R3 to R4), voids (up	-
-			2	fragments	上	1	to 1/16") cover 0-5%	-
120_				108.75-109.85' - Fracture zone, angular	Щ	Ł	107.75-109.85' - Same as	
-99.1				fragments 109.85' - Fracture, vertical, rough, undulating,	\vdash	1	106.0-106.7' except extremely weak (R0), transitioning gradually from	R10: 5 minutes
-	404.0		>10	109.85 - Fracture, Vertical, Tough, undulating,		1	108.5-109.5' as very weak rock (R1)	1
-	121.0			110.6-111.0' - Fracture, horizontal, rough,	╨	╂	with voids (up to 1/16") cover 20% of	100% circulation loss from
-			4	undulating, fracture zone, sub angular, 1-2"	╼	₺	the surface, trace fine organics	121.0-126.0'
_				fragments to end of core	\perp	Ł	109.85-111.0' - Same as	
				111.0-111.95' - Fracture zone, vertical, 1-4" subangular fragments	\vdash	Ŧ	106.7-107.75' except increased voids to 10% and trace 1/4" cavities, trace	
-			0	111.95, 112.35' - Fracture, horizontal, rough,	世	1	organics, almost transition to rock	1 1
-	l R11-HQ			undulating, open to fracture zone at 112.35	╁╌	╁	similar to 105.15-105.8'	SC-2 collected at 122.9-
-	5 ft	63	0	112.9' - Fracture, horizontal, rough, planar	╀	╁	111.0-115.2' - moderate yellowish	124.0'
l _	98%			113.5' - Fracture, 45 deg, rough, planar,	ш	1	brown, (10YR 5/4, 10YR 6/6), fine	
				fragmentation along plane, closely spaced fractures, tight to open	Н	1	grained, moderate HCl reaction, weak to very weak (R2 to R1),	
125			3	113.9' - Fracture, 20 deg, rough, undulating,		1	gradual transition throughout the	1
-104.1				open –	╁	╁	core, voids (up to 1/16") cover	R11: 5 minutes
-			>10	115.0-115.2' - Fracture zone, sand and sub	╁	╁	10-25% of the rock surface, trace	Driller's Remark: Used -
l _	126.0		ND	angular fragments ☐ 116.0-116.4' - Fracture zone, sub angular		l	1/4" molds, molds (up to 1/2") over less than 2% of the surface, fewer	1200 gallons of water at
			NR.	fragments, sand to 1" fragments		П	voids and cavities where the rock	hole; water 25.0' below
-				116.4' - Fracture, horizontal, rough, stepped,	1	H	strength is very weak (R1);	ground surface before grouting at 6/29/07 at 14:00
-				very open	┨	H	111.0-112.5', rock is weak (R2) and	groung at 0/23/07 at 14:00
-				116.85' - Fracture, 60 deg, smooth,	4	F	voids cover 15% of the surface with	-
I -				undulating, tight 118.05' - Fracture, 60 deg, rough, undulating,	1	L	some cavities; 112.5-113.5', rock is very weak (R1)]
I				similar to fracture above in size and	1	1	and voids cover 10% of the surface	
Ι -				orientation but followed at depth by crush	1	Γ	with few cavities;	1
-				118.2-118.45' - Fracture zone, sand to 1"	1	F	113.5-115.2', rock is weak (R2),	-
-				subangular fragments 118.45, 118.65' - Fractures (2), horizontal,	-	F	voids cover 25% of the surface, some cavities, ends with rock] -
_				rough, stepped, tight to open, fracture at	4	L	- fragments that are sub-angular to	_
				118.65 also splits off at 60 degree near one	1	П	sub-rounded	
				side	1	Γ	No Recovery 115.2-116.0'	1
-				119.15' - Fracture, 10 deg, rough, planar, tight to healed	1	F	Limestone 116.0-116.75' - dark yellowish	1 1
-				119.8' - Fracture, 15 deg, rough, undulating,	-	F	orange to moderate yellowish brown,	-
-				tight	1	F	(10YR 6/6, 10YR 5/4), fine grained,]
				120.5, 120.55' - Fracture, horizontal, rough,	⅃		moderate HCl reaction, very weak	
Ι -				planar, tight	1	Γ	(R1), voids (up to 1/16") cover 25%	1
-				120.55-120.8' - Fracture zone, sand to gravel sized fragments, weakly to non competent	1	F	of the surface, trace cavities (1"-1/2" elongate infilled with grayish	-
-				1208' - Fracture, horizontal, rough, undulating	-	F	silt-sized infill)	-
I -				to stepped	1	L	116.75-118.15' - Same as	
				121.5 - Fracture, 50 deg, smooth, undulating,			116.0-116.75' except weak to	
				open, with fragmentation to smaller	1	Γ	extremely weak (R2 to R0), hard to determine voids and cavities	1
				orthogonal fractures at same depth	+	t	Luctermine voids and cavilles	
I						П		1



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	IT-01	SHEET	8	OF	8	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1705495.9 N, 457735.8 E (NAD83)

ELEVATION: 20.9 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, HQ tools, HW casing

ORIENTATION : Vertical

DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	D (%)	ES	DISCONTINUITIES DESCRIPTION	၂ ဗွ	LITHOLOGY COMMENTS
DEPTH BELOV SURFACE ANI ELEVATION (#	CORE RUN, LENGTH, AND RECOVERY (%	(%)	ES	DESCRIPTION		<u> </u>
DEPTH BI SURFACE ELEVATIC	CORE RU LENGTH, RECOVEF	%		DESCRIPTION	O LC	ROCK TYPE, COLOR, SIZE AND DEPTH OF CASING,
SUR	REN		CTUR	DEPTH, TYPE, ORIENTATION, ROUGHNESS,	BOLI	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, MINERALOGY MASS, MINERALOGY, TEXTURE, WEATHERING, HARDNESS, MINERALOGY, TEXTURE, SIZE AND BOX MINERALOGY, SMOOTHNESS, CAVING ROD
_		a Q	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	AND ROCK MASS CHARACTERISTICS DROPS, TEST RESULTS, ETC.
		o l	FRACTURES PER FOOT	PLANARITY, INFILLING MATERIAL AND	SYMBOLIC LOG	AND ROCK MASS CHARGER SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC. 118.65-120.3' - Same as
-				-	1	†
					1	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	IT-02	SHEET	1	OF	7	

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1705642.1 N, 457838.7 E (NAD83)

ELEVATION: 29.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

DRILLING METHOD AND EQUIPMENT: CME 75 S/N 252437, mud rotary, auto hammer, NW rods, 4-7/8" tri-cone bit

ORIENTATION : Vertical

DRILLING METHOD AND EQUIPMENT. OME 75 5/N 252457, Midd Totally, auto Traininer, NW Tods, 4-7/6 Lin-cone bit Orientation . Vertical					
WATER LEVELS : 30.0 ft bgs on 7/2/2007 START : 7/1/2007 END : 7/2/2007 LOGGER : J. Schaeffer, C. Dougherty SOIL DESCRIPTION COMMENTS					
≷Q₽	CANADIS	INTER (A	I (#)	STANDARD PENETRATION	O CONTINUENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE INTERVAL (ft)			TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,
ATI(RECOVE	ERY (ft)		MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
			#TYPE	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
29.6	0.0			(14)	Poorly Graded Sand With Silt To Silty Sand (SP-SM/
-	0.0	1.0	SS-1	0-2-3	SM) - SS-1 appears to be fill
-		1.0	33-1	(5)	0.0-1.0' - pale yellowish brown to moderate brown, (10YR 6/2 to 5YR 4/4), moist, loose, fine to medium
-	1.5				│ ∖ grained, moderate HCl reaction in carbonate
-					materials, mixed carbonate and silica grains, 10-20% / _ nonplastic fines, trace roots
-					[Itoripiastic lines, trace roots]
l _					<u> </u>
l _]
l _					
]
5	5.0				11
24.6					Poorly Graded Sand With Silt (SP-SM)
-		1.0	SS-2	11-12-13	5.0-6.0' - pale brown with grayish brown, (5YR 5/2 with 5YR 3/2), moist to wet, medium dense, fine
-	6.5			(25)	∖ grained, no HCl reaction, silica sand, 5-10%
-	0.5				nonplastic fines
-					
-					
-					-
-					
-					
-]
10	10.0				
19.6				4744	Poorly Graded Sand (SP) 10.0-10.7' - light brownish gray grading to yellowish
l _		0.7	SS-3	4-7-11 (18)	ry gray, (5YR 6/1 to 5Y 8/1), moist, medium dense, fine
	11.5			(- 7	grained, no HCI reaction, silica sand, 5-10% \\nonplastic fines grading to <5%
					Interpression lines grading to 1370
]
-					1
-					1
1 -					1
-					1
45 -	15.0				
15 <u> </u>	15.0	 			Poorly Graded Sand (SP)
-		0.7	SS-4	6-7-6	15.0-15.7' - Same as 10.0-10.7' except trace,
-		0.7	33-4	(13)	nonplastic fines, trace fine organics
-	16.5				1 1
-					1 1
1 -					1 1
1 -]
1 -]]]
1 -]
1 -]
20					



PROJECT NUMBER:

33884.FL

BORING NUMBER:

IT-02

SHEET 2 OF 7

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1705642.1 N, 457838.7 E (NAD83)

ELEVATION: 29.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

DRILLIN	G METH	OD AND	<u>EQUIPM</u>	<u>ENT : CME 75 S/I</u>	N 252437, mud rotary, auto hammer, NW rods, 4-7/8" tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 30.0 ft I	ogs on 7/2	2/2007	START : 7/1/2007 END : 7/2/2007 LOGGER : J. Schaeffer, C. Dougherty
				STANDARD	SOIL DESCRIPTION COMMENTS
<u></u> ≥9€	SAMPLE	INTERVA	d (ff)	PENETRATION	0007
DEPTH BELOW SURFACE AND ELEVATION (ft)				TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY
ATI		RECOVE			MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
EVEN EN			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
9.6	20.0			(N)	Poorly Graded Sand (SP) SS-5 is coarser grained than previous
_ 5.0 _	20.0			4-6-9	20.0-20.9' - brownish gray, (5YR 4/1), moist to wet, - samples -
I _		0.9	SS-5	(15)	medium dense, fine to medium grained, no HCl
	21.5			` ′	\reaction, silica sand, 5% nonplastic fines
					11
-					
-					
-					
-					Cuttings from bit above SS-6 are Fat Clay (CH) -
_					greenish gray (5G 6/1), wet, high plasticity, no
_					dilatancy, no HCl reaction
25	25.9				Driller's Remark: Hard at 24.5'
4.6	۱. پ	0.0	SS-6	50/1"	No Recovery 25.0-25.1'
-				(50/1")	\25.0' - a few coarse grained limestone fragments, \ \ \very mild HCl reaction \ \ -
-					Very mild HCl reaction Driller's Remark: 100% circulation loss at
-					 26.0'; grinding to 26.0-26.5'; then softer
-					_ drilling (still hard)
I _					」
					1
-					
-					
-					
30	30.0				Linear Acad Cities Count (CN)
-0.4				45 04 64	Limestone And Silty Sand (SM) 30.0-31.5' - medium gray, light olive gray and Driller's Remark: 30.0-35.0' medium hard, no circulation
		0.9	SS-7	15-31-61 (92)	yellowish gray, (N5, 5Y 6/1 and 5Y 8/1), wet, dense,
	31.5			(02)	strong HCI reaction, fine to medium sand-sized, 3"
_					lense of limestone, silty sand lenses 1/4" thick, 30% low to medium plastic fines, few carbonate material
-					low to mediani piastic inics, iew carbonate material
-					-
-					
_					_
]
] [
35	35.0				Driller's Remark: Softer at 34.5'
-5.4	35.2	0.0	SS-8	50/2"	No Recovery 35.0-35.2'
-		I	ı	(50/2")	
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PROJECT NUMBER:

338884.FL

BORING NUMBER:

IT-02

SHEET 3 OF 7

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1705642.1 N, 457838.7 E (NAD83)

ELEVATION: 29.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

DRILLIN	G METH	OD AND	EQUIPM	ENT : CME 75 S/I	N 252437, mud rotary, auto hammer, NW rods, 4-7/8" tri-cone bit ORIENTATION : Vertical
WATER	LEVELS	: 30.0 ft l	bgs on 7/2	2/2007	TART : 7/1/2007 END : 7/2/2007 LOGGER : J. Schaeffer, C. Dougherty
	· · ·			STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	SAMPLE	INTERVA	AL (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
BEL GE 4		RECOVI	ERY (ft)	. LOT NEGOLIG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
YFA'			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
SUI				(N)	δ
-10.4 - - -	40.0	1.5	SS-9	30-43-31 (74)	Silty Sand (SM) 40.0-41.5' - light olive gray, (5Y 5/2), wet, very dense, mild HCI reaction, very fine to medium sand-sized, all carbonate materials, 40-45% nonplastic fines, white thread-like lenses from 41.3-41.5', 1" limestone piece at 41.5', fossiliferous, mild HCI reaction
- - - - - 45	45.0				Driller's Remark: Harder at 42.5'; still no circulation. HW casing to 40.0'. Unclear if circulation loss is into formation at depth below casing or along the sides of the casing.
-15.4	45.3	0.0	SS-10	50/3"	No Recovery 45.0-45.3' Driller's Remark: Circulation regained after
- - - - -		0.0		(50/3")	45.0' - a few limestone fragments and cuttings, light olive gray (5Y 5/2), highly fossiliferous, mild to moderate HCl reaction Casing set to 45.0' Driller's Remark: 45.0-50.0' not as hard as above
50	50.0				
-20.4 	51.5	0.9	SS-11	21-14-9 (23)	Silty Sand (SM) 50.0-50.9' - mottled light olive gray, (5Y 5/2), wet, dense, mild to strong HCl reaction, fine to medium sand-sized, predominantly fine, 15-30% nonplastic to low plasticity fines varies throughout sample in lenses, 1" thick lens of coarse sand to fine gravel-sized lenticular limestone at 50.3', fine to coarse gravel-size, rounded limestone fragments with silt matrix surrounding fragments, HCl reaction varies from mild in limestone lense (50.0-50.5') to moderate to strong in fragments (50.5-50.9')
55	55.0				1
-25.4 - -	56.5	1.3	SS-12	12-19-13 (32)	Silty Sand With Limestone Fragments (SM) 55.0-56.3' - yellowish gray to light olive gray, (5Y 7/2 to 5Y 5/2), wet, dense, fine to coarse grained, mild to moderate HCl reaction, similar to SS-11, all carbonate, 30-40% nonplastic fines, 2" limestone
- - - - - 60					fragment at top of sample, highly fossiliferous



PROJECT NUMBER:

33884.FL

BORING NUMBER:

IT-02

SHEET 4 OF 7

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1705642.1 N, 457838.7 E (NAD83)

ELEVATION: 29.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

DRILLIN	G METH	<u>OD AND</u>	EQUIPM	<u>ENT : CME 75 S/I</u>	N 252437, mud rotary, auto hammer, NW rods, 4-7/8" tri-cone bit		ORIENTATION : Vertical
WATER	LEVELS	: 30.0 ft I	ogs on 7/2	2/2007	START : 7/1/2007 END : 7/2/2007 LOGGER	R : J.	Schaeffer, C. Dougherty
				STANDARD	SOIL DESCRIPTION	П	COMMENTS
§8€ (#)	SAMPLE	INTERVA	L (ft)	PENETRATION		SYMBOLIC LOG	
BEL SE A		RECOVE	RY (ft)	TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR,	일	DEPTH OF CASING, DRILLING RATE,
TH VAT			#TYPE	6"-6"-6"	MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	ABC	DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
DEPTH BELOW SURFACE AND ELEVATION (ft)			#ITPE	(N)		SYI	
-30.4	60.0				Limestone	7. 1	Finished drilling at 60.0' on 7/1/2007, HW
_		1.1	SS-13	24-8-7	60.0-60.3' - mild HCl reaction, in 1/4" pieces, same as /-	1	casing to 45.0'
-	61.5			(15)	Silty Sand With Limestone Fragments (SM)		1
-	01.5				60.3-61.1' - mottled light olive gray, (5Y 5/2), wet,	1	-
-					medium dense, fine to coarse grained, mild to moderate HCl reaction, similar to SS-11 and SS-12,	1	-
-					all carbonate materials, 15-35% nonplastic fines	ł	-
-					varied in lenses, 15% fine gravel-sized limestone	ł	-
-					-	ł	-
-					-	ł	-
-					-	1	-
65 <u> </u>	65.0				Silty Sand (SM)	1913	SS-9 through SS-14: Darker gray colors
-55.4				24-55-48	65.0-66.0' - mottled light olive gray to medium gray,		more associated with coarser lenses
-		1.0	SS-14	(103)	(5Y 5/2 to N5), wet, very dense, predominantly fine to medium grained, mild to moderate HCl reaction,	Ш	-
-	66.5				similar to above, all carbonate materials, 5-10%		_
_					coarse sand, 20-40% fines (varies in lenses)	1	_
_					_		
_					_		
					_	1	
					-	1	
70	70.0				-	1	1
-40.4	7 0.0				Silty Sand (SM)	Ш	Driller's Remark: Materials are not coreable
-		1.1	SS-15	18-27-31 (58)	70.0-71.1' - pale to moderate yellowish brown with scattered medium gray lenses, (10Y 6/2 to 10YR 5/4	1111	(wash out of core barrel) SS-9 through SS-15 appear to be
_	71.5			(56)	¬ with N5), wet, very dense, fine to medium grained, ¬ ¬ ¬ ¬ ¬ ¬ ¬ ¬ ¬ ¬ ¬ ¬ ¬		interbedded carbonate silts, sands with some
-	7 1.0				mild to moderate HCl reaction, similar to above, 35% /-	1	gravels and limestone lenses are irregularly – shaped and sized.
-					(nonplastic lines	1	Shaped and sized.
-					-	ł	-
-					-	1	-
-					-	ł	-
-					-	ł	-
-					-	ł	-
75 -45.4	75.9	0.0	SS-16	50/1.5"	No Recovery 75.0-75.1'		Driller's Remark: Still in and out of harder
-45.4		0.0	(33-10)	(50/1.5")	No Necovery 13.0-13.1	ł	and softer lenses
-					-	-	-
_					-	-	_
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PROJECT NUMBER:	BORING NUMBER:				
338884.FL	IT-02	SHEET	5	OF	7

SOIL BORING LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1705642.1 N, 457838.7 E (NAD83)

ELEVATION: 29.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

DRILLIN	G METH	<u>OD AND</u>	EQUIPM	<u>ENT : CME 75 S/I</u>	N 252437, mud rotary, auto hammer, NW rods, 4-7/8" tri-cone bit ORIENTATION: Vertical
WATER	LEVELS	: 30.0 ft l	bgs on 7/	2/2007 S	START : 7/1/2007 END : 7/2/2007 LOGGER : J. Schaeffer, C. Dougherty
				STANDARD	SOIL DESCRIPTION COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (ft)	SAMPLE	INTERVA	AL (ft)	PENETRATION TEST RESULTS	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, AND INSTRUMENTATION
HH		RECOVE	ERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR DRILLING FLUID LOSS, TESTS, AND
PTH N			#TYPE	6"-6"-6"	CONSISTENCY, SOIL STRUCTURE, MINERALOGY
				(N)	
-50.4 - -	80.0 80.9	0.8	SS-17	41-50/5" (91/11")	Silty Sand With Limestone Fragments (SM) 80.0-80.7' - moderate yellowish brown, (10YR 5/4), wet, very dense, fine to coarse grained, mild to moderate HCl reaction, similar to SS-15, 25-30% SS-17: Lenses of limestone pieces throughout sample, much more than previous samples. Driller's Remark: 80-85 still drilling hard and
- - -					nonplastic fines, 15-20% fine gravel-sized limestone Soft, material is likely to wash out of core barrel
- 85 -55.4	85.0				Sandy Clay With Silt (CL-ML)
-55.4	86.5	1.1	SS-18	5-8-9 (17)	85.0-86.1' - moderate yellowish brown, (10YR 5/4), wet, stiff, nonplastic, rapid dilatancy, mild to moderate HCI reaction, 5-10% very fine to fine sand, all carbonate
 90 -60.4	90.5				Driller's Remark: 100% water loss at 88.0' Driller's Remark: Extremely soft at 88.5', possibly cavity Driller's Remark: For SS-19 rods dropped to 90.5', SPT taken at 90.5', potential cavity
- - - - -	90.9	0.4	SS-19	50/5" (50/5")	Sity Gravels (GM) 90.5-90.9' - mild to moderate HCl reaction, similar to SS-17 and SS-18, all carbonate materials, 1" rounded gravel-sized limestone piece, several 1/2" angular pieces Begin Rock Coring at 91.0 ft bgs See the next sheet for the rock core log
9565.4 -65.4 - - - - -					
100					



PROJECT NUMBER:

338884.FL

BORING NUMBER:

IT-02

SHEET 6 OF 7

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1705642.1 N, 457838.7 E (NAD83)

ELEVATION: 29.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, HQ tools, HW casing

ORIENTATION: Vertical

WATER							
	LEVELS : 30.	.0 ft b	gs on T		/2/2007	***	
≥D€				DISCONTINUITIES	ဗ္ဂ	LITHOLOGY	COMMENTS
DEPTH BELOW SURFACE AND ELEVATION (#)	CORE RUN, LENGTH, AND RECOVERY (%)	(%	FRACTURES PER FOOT	DESCRIPTION	SYMBOLIC LOG	ROCK TYPE, COLOR, MINERALOGY, TEXTURE,	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND
F A Y	H H S S S S S S S S S S S S S S S S S S	(%) O	SCT PCT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND	/BO	WEATHERING, HARDNESS, AND ROCK MASS	SMOOTHNESS, CAVING ROD
SUS	REC	a Q	FRA	THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYN	CHARACTERISTICS	DROPS, TEST RESULTS, ETC.
	91.0		>10	91.0-91.6' - Fracture zone, rough, undulating,	Ш	Limestone	
-			> 10	numerous small fragments 3/16"-1-1/2" in size	Ш	 91.0-92.6' - moderate olive brown, (5Y 4/4), fine grained, mild to 	1
-	1		>10	91.9' - Mechanical break	Н	moderate HCl reaction, medium	Driller's Remark: Water at
-	1			92.1-92.6' - Fracture zone, rough, undulating, numerous small fragments 3/16"-1" in size	Н	 strong (R3), voids (<1/16") over 25% of surface, larger voids (up to 3/16") 	30.0' below ground surface - before extending casing
-	R1-HQ		NR	Ŭ	\Box	over 5% of surface, moderately	from 45.0-90.0'
-	5 ft 72%	33				 fossiliferous, trace organics No Recovery 92.6-94.0' 	Driller's Remark: Only – about 25% return on
-			4.0	94.0-94.5' - Fracture zone, 0-45 deg, rough,	Ш	Limestone	circulation
95	1		>10	undulating, several fragments up to 9/16", film of organic material on some faces	Ш	- 94.0-96.0' - Same as 91.0-92.6'	Driller's Remark: Core – barrel hung up, barrel was
-65.4	1			94.8-95.1 - Fracture zone, 0-90 deg, rough,	ш		pulled out, cleaned and put back in to finish run
-	96.0		0	undulating, fragments up to 2" 95.4, 95.5, 96.5' - Mechanical break (3)	Ш	-	R1: 14 minutes
-				, ,	\mathbb{H}	96.0-98.5' - Same as 91.0-92.6'	
-			0		Ħ	 except light olive gray, (5Y 5/2), strong (R4) rock at 97.7-97.8' 	_
-	1			97.0-98.6' - Fracture zone, 0-90 deg, rough,	世	_ = 0.0.19 (. v.) . 00.1 at 0 . 1.	Driller's Remark: Loss of
-			>10	undulating, fragments from <3/8" - 3"	Ш	-	circulation at about 97.0' -
-	R2-HQ		. 40		Ж	_	1
	5 ft 100%	50	>10	98.8' - Mechanical break, brown and gray	\mathbb{H}	Limestone]
]		2	staining on surfaces	Ш	98.5-101.0' - moderate yellowish brown, (10YR 5/4), fine grained,	
100]			99.6-99.8' - Fracture, horizontal on lower	Ш	moderate HCI reaction, medium	
-70.4]		0	face, 30 deg on upper face, crushed rock material and fragments up to 1/2"	ЪН	strong (R3), small voids (<1/16") over about 30% of surface, larger	R2: 6 minutes
Ι.	101.0		U	99.8-100.2' - Fracture, <5 deg	Н	voids (3/16"x3/8") over about 5% of	
			>10	100.8' - Mechanical break 101.0-102.1' - Fracture zone, numerous	H	surface, fossil molds and casts common, very fossiliferous, small	_
_]		- 10	fragments, film of carbonate derived silt in fractures	耳	fragments of gray limestone make up <5% of surface. Thin (1/2") layer of	_
_]		0	iractures	片	gray limestone at 93.8'	_
_			U		Н	Limestone 101.0-105.2' - moderate yellowish	_
	R3-HQ 5 ft	57	1	103.1' - Mechanical break	$oxed{\square}$	brown, (10YR 5/4), fine grained,	SC-1 collected at 103.1-
	84%	0.	·	103.9' - Fracture, horizontal, film of carbonate	┸	moderate HCl reaction, medium strong (R3), voids (<1/16") cover	103.9'
			0	derived silt infill	坦	_ 25% of surface to about 102', then]
105				104.8' - Mechanical break –	-Ш	only 15%, trace voids larger than — 1/16", trace organics	
-75. 4			0 NR		+H	No Recovery 105.2-106.0'	R3: 8 minutes
-	106.0		1417		뮈	Limestone	-
-			2	106.5. 106.6! Erooturoo boritaltal	井	Limestone 106.0-109.4' - pale yellowish brown	-
-				106.5, 106.6' - Fractures, horizontal, rough, undulating, tight to open up to 1/16"	丗	transitions to dusky yellow, (10YR 6/2 to 5Y 6/4), fine grained, moderate	-
-			>10	107.0-107.2' - Fracture zone, rough, undulating, numerous small fragments (3/16"	出	 HCl reaction, medium strong (R3), 	-
-	R4-HQ			to 9/16")	₩	<1/16" voids cover about 15% of surface, trace larger voids (up to	-
-	5 ft	47	1	107.7-107.8' - Fracture zone, same as for 107.0-107.2'	円	- 3/16"), trace organics	-
-	68%		>10	107.8-108.1' - Fracture, vertical, rough,	口	106.8-107.9' - voids more abundant (35% for <1/16" voids and 5% for up	-
			>10	undulating, tight 108.3-108.7' - Fracture, 70 deg, closed	丗	to 3/16" voids). Larger voids and	-
110_ -80.4			NR	109.0-109.4' - Fracture zone –	丗	fossil molds are up to 3/16"x1-3/16" 108.1' - a large cavity measuring	-
-			````		+	 about 1-3/16"x2-3/8" No Recovery 109.4-111.0' 	-
-	111.0				Ħ	110 11000V61y 100.4-111.0	



PROJECT NUMBER:	BORING NUMBER:					
338884.FL	IT-02	SHEET	7	OF	7	

ROCK CORE LOG

PROJECT : Progress Energy Florida - COLA Investigation, Levy County Site LOCATION : 1705642.1 N, 457838.7 E (NAD83)

ELEVATION: 29.6 ft (NAVD88) DRILLING CONTRACTOR: Universal Engineering Sciences, Ft. Myers, FL; Driller: R. Woodard

CORING METHOD AND EQUIPMENT : CME 75 S/N 252437, mud rotary, HQ tools, HW casing ORIENTATION : Vertical

CORING	NETHOD A	ND E	JUIPIV	IENT: CME 75 S/N 252437, mud rotary, HQ tools, HW c	asıng		ORIENTATION : Vertical
WATER	LEVELS: 30	.0 ft b	gs on	7/2/2007 START : 7/1/2007 END : 7/	2/200	LOGGER: J. Schaeffer, C. Doug	herty
> 0 =	-			DISCONTINUITIES	ניו	LITHOLOGY	COMMENTS
LOW (#)	7. N 0%)		S.I.	DESCRIPTION	Ĭ	ROCK TYPE, COLOR,	OUTS AND DEPTH OF CACING
DEPTH BELOW SURFACE AND ELEVATION (ft)	CORE RUN, LENGTH, AND RECOVERY (%)	RQD(%)	FRACTURES PER FOOT	DEPTH, TYPE, ORIENTATION, ROUGHNESS, PLANARITY, INFILLING MATERIAL AND THICKNESS, SURFACE STAINING, AND TIGHTNESS	SYMBOLIC LOG	MINERALOGY, TEXTURE, WEATHERING, HARDNESS, AND ROCK MASS CHARACTERISTICS	SIZE AND DEPTH OF CASING, FLUID LOSS, CORING RATE AND SMOOTHNESS, CAVING ROD DROPS, TEST RESULTS, ETC.
- - - - 115 -85.4	R5-HQ 5 ft 8%	0	>10 NR	111.0-111.4' - Fracture zone, rough, undulating, numerous fragments 3/8" to 1-3/16" in size		Limestone 111.0-111.4' - moderate olive brown, (5YR 4/4), fine to coarse grained gravel-sized grained, moderate HCI reaction, weak to medium strong (R2 to R3), very fossiliferous, voids (<1/16") over 30% of surface, larger voids (up to 3/16"-3/8") and fossil molds over 5% of surface No Recovery 111.4-116.0'	R4-HQ: 6 minutes Driller's Remark: Apparent cavity beginning at about 110.0', little resistance to drilling
	116.0				ш		
-	-			116.0-116.2' - Fracture zone, rough,	Н	Limestone	_
-			2	undulating, several small fragments (0.5-1.5") 116.6' - Fracture, horizontal for lower face, 50	F	 116.0-117.0' - yellowish gray transitions to light olive gray by 	-
-				deg for upper face, open, film of silty fine	Ħ	116.3', (5Y 7/2 to 5Y 6/1), fine	· -
-				sand on lower face	世	 grained, mild to moderate HCl reaction, strong (R4), voids (<1/16") 	· -
-	R6-HQ	40		-	₽	over 5% of surface, trace larger	-
-	5 ft 20%	13		-	匚	 voids (up to 3/16") No Recovery 117.0-121.0' 	-
-			NR	-	ၽ	-	-
120				-	\vdash	=	<u> </u>
-90.4				_	\vdash		R6: 2 minutes
-	121.0				Ħ	-	<u> </u>
-				121' - Unconsolidated material. No fractures.		Poorly Graded Sand With Silt (SP)	· -
-			0			 121.0-125.6' - light gray to light olive gray, (N7 to 5Y 6/1), wet/saturated, 	-
-				-		medium dense, fine grained, silica	· -
-			0	-		 sand, about 10% fines (carbonate derived), well rounded grains, 124.4' 	-
-	R7-HQ			-		- a 1" limestone fragment, 124.8' -	-
-	5 ft 92%	0	0	-		 fines increasing to about 50%, color change to olive gray (5Y 3/2) 	-
-							-
125			0			-	-
-95.4			0	_			R7: 1 minute
-	126.0					No Recovery 125.6-126.0'	·
-						Bottom of Boring at 126.0 ft bgs on	
-					1	- 7/2/2007	·
-			NR		1	_	<u> </u>
-					1		-
1 -					1	-	_
1 -					1	-	_
1 -					1	-	· -
1 -					1	-	· -
1 -				_	1		_
1 -					1	-	· -
					\Box		
					1		



LNP- (OFFSET B	ORING F	PROGRA	м				PROJECT NO. 07-3935
						LOG OF BORING NO. O-1		1 NOSES 1 NO. 07 0000
ELEVATION (FEET MSL)	ТН .Τ.)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1723173.4 E 458057.4	SYMBOL	
EVA'	DEPTH (FEET)	MPLE	7W/6' R % F R (RC	OVE	PROFILE	SURFACE EL: 42.7	S SY	REMARKS
山 r		SA	BLC	REC	"	DESCRIPTION	NSCS	
DATE	0	r: 9/2	2/09		GWL: C	O.0-20.0' Sand-fine grained. As above except with Dolomite layers, little clay. EPTH: 3.4' DATE/TIME: 9/3/09 @ 0730	sp	Destructive drilling from 0-20'. Log based on drill cuttings. S: Logging of coring per the Work
DATE	COMPLET	ΓED: 9/8			GWL: D	EPTH: 4.5' DATE/TIME: 9/8/09 @ 0900		Plan started at 62'. General rock description logged from
CHEC APPR	GEOLOG KED BY: OVED BY:	WI	O DS			R: Eddie Palmer HELPER: Chad/Cody	RIG:	20-62'. Failing 1500
DKILL	ING CO.:	посс						



LNP- (OFFSET B	ORING F	PROGRAI	М		LOG OF BORING NO. 0-1		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	ОЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1723173.4 E 458057.4	SYMBOL	REMARKS
EEV.	DE FF	AMF OR R	OW %	:co/	PRC	SURFACE EL: 42.7	nscs :	
		<i>w</i> 0	IB)	RE		DESCRIPTION	5	
22.7	16 — 18 — 20 — 22 — 24 — 26 — —					As above except with organics. TOP OF AVON PARK FORMATION 20.0-35.0' DOLOMITE, fossiliferous, highly weathered, porous, soft.	sp	At 20' switched to core barrel for advancement-no casing set.
	28 							Chatter at 28'. Soft area 25-30'. Kelly Bar RPM: 203 Engine PRM: 1300
	STARTED		2/09		GWL: D		NOTE	ES: Logging of coring per the Work
	COMPLET				GWL: D	<u>o</u>		Plan started at 62'. General rock description logged from
	GEOLOGI KED BY:		O DS		DKILLIN	NG METHOD: Mud Rotary/PQ3 Coring		20-62'.
APPR	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILL	ING CO.:	HUSS						



LNP- OFFSET B	ORING F	PROGRAI	M		LOG OF BORING NO. O-1		PROJECT NO. 07-3935
(FEET MSL) DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1723173.4 E 458057.4	SYMBOL	DEMARKO
LEVATIO EET MSI DEPTH (FEET)	MMPI R RU	0W/% 8 /R	NO.	PRO	SURFACE EL: 42.7	s	REMARKS
日日	S, OF	BLO	REC		DESCRIPTION	nscs	
30 — 32 — 34 — 36 —					35.0-45.0' DOLOMITE (tan), replacing limestone (gray), highly weathered.		Driller notes hard area starting at 33'.
38 — 38 — 40 — 42 — DATE STARTED DATE COMPLET		2/09 8/09		GWL: D		NOTE	40-45' No Recovery. ES: Logging of coring per the Wo Plan started at 62'. General rock description logged from
FIELD GEOLOG CHECKED BY: APPROVED BY:	WI	o os			IG METHOD: Mud Rotary/PQ3 Coring R: Eddie Palmer HELPER: Chad/Cody	BIG	20-62'. Failing 1500



LNP- (OFFSET B	ORING F	PROGRAI	М		LOG OF BORING NO. 0-1		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	F.C	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	当	COORDINATES N 1723173.4 E 458057.4	SYMBOL	
EVA TEET I	DEPTH (FEET)	MPLE RUN	3 % F RC RC	OVE	PROFILE	SURFACE EL: 42.7	\S S.	REMARKS
급띤		SA	BLO	REC	"	DESCRIPTION	NSCS	
-11.3	44 —					45.0-54.0' DOLOMITE with interbedded degraded dolomite layers (sandy texture).	4'- cl	55.0-60.0' Drill time: 13min 18sec.
-14.3	- 58					57.0-61.15' DOLOMITE.	1 -	Driller Notes: harder at 57'. Water level on 9/3/09 @ 0730 is 3.4'.
DATE FIELD	STARTED COMPLET GEOLOGI	ED: 9/8	0		GWL: D GWL: D DRILLIN	_	NOT	ES: Logging of coring per the Wor Plan started at 62'. General rock description logged from 20-62'.
APPR	KED BY: OVED BY: ING CO.:		DS ———		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- OFFSET BOR	RING PF	ROGRAI	VI		LOG OF BORING NO. O-1		PROJECT NO. 07-3935
(FEET MSL) DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RY (ft.)	ILE	COORDINATES N 1723173.4 E 458057.4	SYMBOL	
EET MSI DEPTH (FEET)	RUN	2 % R R R R R	RECOVERY	PROFILE	SURFACE EL: 42.7		REMARKS
	S O I		REC		DESCRIPTION	nscs	
60 —							60-62' Drill Time: 11min 20sec. Set casing at 62'.
62 —		100%			61.15-63.1' DOLOMITE, pale yellowish brown (10YR 6/2), moderatel hard to hard, thick bedded, with organic layers, porous, unfractured, weak reaction to 1N HCl when powdered.		Run-1: Drilling Pressure: 250-300 psi Kelly Bar RPM: 199 Engine RPM: 1200-1300 Drill Time: 10min 8sec Circulation loss: none
-20.4	R-1	(55%)	3.85		63.1-63.8' CLAY, calcareous, sandy, no plasticity, some dolomite fragments throughout. 63.8-65.5' DOLOMITE, same as above.	Ci	
66 — — — — — —	R-2	96% (44%)	4.8		65.5-66.0' Wash out zone (evidence of bit spinning on core above). 66-69.4' DOLOMITE, pale yellowish brown (10YR 6/2), alternating zones of porous and fine grained layers, trace organics, moderately hard, fresh to slightly weathered, moderate reaction to 1N HCl when powdered.		Run-2: Drilling Pressure: 300-350 psi Kelly Bar RPM: 197 Engine RPM: 1200 Drill Time: 26min 9sec Circulation loss: none 67', 67.5', 67.7', 67.8', 69.2' fines washed out.
-26.7					69.4-70.0' Sandy CLAY (cl), pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 5/4), interbedded with highly weathered dolomite. 70 70-75' DOLOMITE, pale yellowish brown (10YR 6/2) with limestone clasts (light gray (N7) to medium light gray (N6)), moderately hard, slightly to moderately weathered, porous, vuggy, becomes very sand below 73', weak reaction to 1N HCl when powdered, some fossils. 71.2-72.1' Vertical fracture.	<u>.</u>	Run-3: Drilling Pressure: 350-250 psi Kelly Bar RPM: 207 Engine RPM: 1300 Drill Time: 12min 34sec Circulation loss: none
DATE STARTED:	9/2/0		4.0	GWL: D			ES: Logging of coring per the Wor Plan started at 62'. General
DATE COMPLETED FIELD GEOLOGIST CHECKED BY:		1		GWL: D	IEPTH: 4.5' DATE/TIME: 9/8/09 @ 0900 NG METHOD: Mud Rotary/PQ3 Coring		rock description logged from 20-62'.
APPROVED BY:	JSS	-		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- (OFFSET B	ORING P	ROGRAI	M		LOG OF BORING NO. 0-1		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	Ŧ£.	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	:RY (ft.)	ILE ILE	COORDINATES N 1723173.4 E 458057.4	SYMBOL	
EVA EET	DEPTH (FEET)	MPL	2W/6 R % R (R(RECOVERY	PROFILE	SURFACE EL: 42.7		REMARKS
日币		SA OF	BLO	REC		DESCRIPTION	nscs	
	74 — -							
	76 — - - - 78 —	R-4	92% (10%)	4.6		75-78.5' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, porous, sandy texture, fined grained, fossiliferous, moderately weathered, thick bedded but moderately to intensely fractured, weak reaction to 1N HCl when powdered. Vertical fractures at 75.3-76.2', and 76.2-76.5'. 76.5-76.7' Rubble.		Run-4: Drilling Pressure: 300-250 psi Kelly Bar RPM: 196 Engine RPM: 1200 Drill Time: 20min 53sec Circulation loss: none Driller Notes: 77.5-78.5' softer, dark color cuttings return. Vertical fractures at 75.3-76.2', 76.
-35.8 -35.9	80 —					78.5-78.6' Silty CLAY, grayish brown (5YR 3/2), as above. 78.6' Dolomite becomes very sandy, poorly indurated. 80.0-85.0' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, porous, slightly to moderately weathred, fossiliferous, moderate reaction to 1N HCl when powdered, thick bedded.	CI	Run-5: Drilling Pressure: 350-500-300 psi Kelly Bar RPM: 198 Engine RPM: 1200
	82 — -	R-5	90% (38%)	4.5		81.7-82.0' Vertical fracture. 82.0-82.8' Dolomite becomes very sandy, severely weathered. Vuggy below 82.8'.		Drill Time: 29min 23sec Circulation loss: none
	84 — - - -					85-85.6' DOLOMITE, pale yellowish brown (10YR 6/2), fresh, vuggy, weak reaction to 1N HCl when powdered, medium bedded, moderately hard.		Run-6: Drilling Pressure: 200 psi Kelly Bar RPM: 199
	86 — –	R-6	100%	2.5		85.6-88.3 DOLOMITE, pale yellowish brown (10YR 6/2), moderately to severely weathered, fossiliferous, porous, moderate reaction to 1N HCl when powdered, vuggy, intensely fractured.		Engine RPM: 1200 Drill Time: 13min 41sec (85-85.8') 13min 54sec (85.8-87.5') Circulation loss: none
	_							Run-7:
DATE FIELD	STARTED COMPLET GEOLOG KED BY:	ΓED: 9/8)		GWL: D GWL: D DRILLIN	9	NOTE	ES: Logging of coring per the Work Plan started at 62'. General rock description logged from 20-62'.
APPR	OVED BY:			\dashv	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- C	FFSET B	ORING F	ROGRA	M		LOG OF BORING NO. O-1		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	H (:	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RY (ft.)	ILE	COORDINATES N 1723173.4 E 458057.4	SYMBOL	
EVA EET	DEPTH (FEET)	MPL RUI	DW/6 R % I & (RC	RECOVERY	PROFILE	SURFACE EL: 42.7		REMARKS
∃ F)		S O O E	BLO	REC		DESCRIPTION	nscs	
	88 —	R-7	92% (12%)	2.3		88.3' Olive gray (5Y 3/2), no plasticity sandy CLAY around dolomite pieces. 88.3-90' DOLOMITE becomes sandy, highly fractured, no fossils, hard, moderate reaction to 1N HCl when powdered, moderately weathered.		Drilling Pressure: 450-500 psi Kelly Bar RPM: 177 Engine RPM: 1100 Drill Time: 19min 24sec Circulation loss: 90% Water level on 9/4/09 @ 0730 is 4.8'.
-48.8	90 —					90-90.8' DOLOMITE gravel (matrix possibly washed away). 90.8-91.5' DOLOMITE, sandy, porous, vuggy, grayish orange (10YR 7/4) with very pale orange (10YR 8/2) dolomite clasts, fossiliferous, moderately soft, slightly to moderately weathered, breaks easily. ROD DROP 91.5-92'.		Run-8: Drilling Pressure: 500 psi Kelly Bar RPM: 209 Engine RPM: 1300 Drill Time: 23min 12sec Circulation loss: 20%
-49.3	92 — - - - 94 —	R-8	90% (28%)	4.5		92-95.2' DOLOMITE, same as above. 92.3' Color change (gradual transition) to pale yellowish brown (10Yf 6/2) with increase in amount and size of very pale orange (10 YR 8/2 dolomite clasts, fresh, thick bedded, moderately hard, weak to no reaction to 1N HCl when powdered. 93.5' Becomes highly fractured with clasts of crystalline dolomite.	₹	
	96 —					95-95.2' Residual dolomite gravel from previous run. 95.2-97' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, slightly weathered, fossiliferous, porous, moderate reaction to 1N HCl when powdered, with thin layers of microcrystalline dolomite, sandy texture, medium bedded.		Run-9: Drilling Pressure: 400 psi Kelly Bar RPM: 197 Engine RPM: 1200 Drill Time: 24min 51sec Circulation loss: 100% below 97'
-54.3 -55.1	98 — -	R-9	80% (22%)	4.0		97-97.8' ROD DROP. 97.8-100' DOLOMITE, as above except highly fractured.		
	100 —					100-100.7' DOLOMITE rubble. 100.7-101.6' DOLOMITE, grayish orange (10YR 7/4), moderately hard, moderate reaction to 1N HCl, medium bedded, vuggy, fossiliferous, fresh (except for 101-101.2' moderately weathered and fractured). 101.6-105.0' Color change to pale yellowish brown (10YR 6/2), vuggy.		Run-10: Drilling Pressure: 450 psi Kelly Bar RPM: 183 Engine RPM: 1100-1200 Drill Time: 18min 36sec Circulation loss: 100%
DATE (STARTED COMPLET GEOLOG KED BY:	ED: 9/8	0		GWL: D GWL: D DRILLII	102-102.2' Severely weathered/broken zone. DEPTH: 3.4' DATE/TIME: 9/3/09 @ 0730	NOTE	ES: Logging of coring per the Worl Plan started at 62'. General rock description logged from 20-62'.
APPRO	OVED BY:			\dashv	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



SURFACE EL: 4.2.7 DESCRIPTION 102.9' Broken zone, then becomes sandy DOLOMITE, moderately soft, highly fractured, vertical fracture from 103-104.5', moderate reaction to 1N HCl when powdered. 104— 106— R-11 108— R-11 108— 108	USCS SYMBOL	DEMARKS
R-10 100% 5.0 102.9' Broken zone, then becomes sandy DOLOMITE, moderately soft, highly fractured, vertical fracture from 103-104.5', moderate reaction to 1N HCl when powdered. 104 — 105-110' DOLOMITE, sandy, grayish orange (10YR 7/4), moderately soft, porous, few fossils, thick bedded, fresh to slightly weathered, some fractures (106.8' 45°- possibly mechanical), moderate reaction to 1N HCl when powdered.	USCS S	
R-10 100% 5.0 102.9' Broken zone, then becomes sandy DOLOMITE, moderately soft, highly fractured, vertical fracture from 103-104.5', moderate reaction to 1N HCl when powdered. 104— 105-110' DOLOMITE, sandy, grayish orange (10YR 7/4), moderately soft, porous, few fossils, thick bedded, fresh to slightly weathered, some fractures (106.8' 45°- possibly mechanical), moderate reaction to 1N HCl when powdered.	NSO	REMARKS
102.9' Broken zone, then becomes sandy DOLOMITE, moderately soft, highly fractured, vertical fracture from 103-104.5', moderate reaction to 1N HCl when powdered. 105-110' DOLOMITE, sandy, grayish orange (10YR 7/4), moderately soft, porous, few fossils, thick bedded, fresh to slightly weathered, some fractures (106.8' 45°- possibly mechanical), moderate reaction to 1N HCl when powdered. 5.0 108-109.1' Vertical fracture.		
soft, porous, few fossils, thick bedded, fresh to slightly weathered, some fractures (106.8' 45°- possibly mechanical), moderate reaction to 1N HCl when powdered. 5.0 108-109.1' Vertical fracture.		
108— 5.0 5.0 108-109.1' Vertical fracture.		Run-11: Drilling Pressure: 400 psi Kelly Bar RPM: 228 Engine RPM: 1400-1500 Drill Time: 10min 15sec Circulation loss: 100%
110 — 110-115.0' DOLOMITE, interlayered sandy and microcrystalline, vuggy, moderately fractured, moderate reaction to 1N HCl, few to no fossils, medium bedded, moderately to severely weathered.		Run-12: Drilling Pressure: 300 psi Kelly Bar RPM: 199 Engine RPM: 1200-1300 Drill Time: 13min 6sec
-68.5 R-12 R-12 4.3 111.0-111.2' ROD DROP.		Circulation loss: 100% Driller notes slight rod drop around 111' (2 to 3") softer material, faster drilling.
115-119.5' DOLOMITE, severely weathered, medium to coarse grained, poorly indurated, soft, fossiliferous, friable, pale yellowish brown (10YR 6/2), thick bedded, moderate reaction to 1N HCl when powdered.		Run-13: Drilling Pressure: 200-250 psi Kelly Bar RPM: 212 Engine RPM: 1300-1400 Drill Time: 6min 23sec Circulation loss: 100% Driller notes extremely soft first 4 feet.
DATE STARTED: 9/2/09 GWL: DEPTH: 3.4' DATE/TIME: 9/3/09 @ 0730 NC DATE COMPLETED: 9/8/09 GWL: DEPTH: 4.5' DATE/TIME: 9/8/09 @ 0900 FIELD GEOLOGIST: JLO CHECKED BY: WDS	OTE	ES: Logging of coring per the Wor Plan started at 62'. General rock description logged from 20-62'.
APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RI DRILLING CO.: HUSS		



LNP- (OFFSET B	ORING P	ROGRA	М		LOG OF BORING NO. 0-1		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	ΕC	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RY (ft.)	ILE	COORDINATES N 1723173.4 E 458057.4	SYMBOL	
EVA'	DEPTH (FEET)	MPLE RUN	3.W/6' 7 % F 8 (RG	RECOVERY	PROFILE	SURFACE EL: 42.7		REMARKS
EL (FI		SA	BLC OF	REC		DESCRIPTION	nscs	
	118 —	R-13	60% (32%)	3.0				
	120 — -					119.5-120.0' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, fresh, moderate reaction to 1N HCl when powdered fossiliferous, porous, sandy texture. 120-121.6' DOLOMITE, grayish orange (10YR 7/4), moderately hard porous, fossiliferous, vuggy (in horizontal bands), medium bedded, fresh to slightly weathered, with interbedded layers of hard, fine grained dolomite, medium light gray (N6).	1	Run-14: Drilling Pressure: 200-300 psi Kelly Bar RPM: 193 Engine RPM: 1200 Drill Time: 17min 30sec
	122 — - - -	R-14	98% (56%)	4.9		121.6-122.5' As above except no dolomite layers, intensely fractured moderately weathered. 122.5-124.8' DOLOMITE, grayish orange (10YR 7/4), moderately soft, moderate to strong reaction to 1N HCl when powdered, thick bedded, vuggy, fossiliferous, porous, fresh.	,	Circulation loss: 100%
-83.8	124 — — — — — ———————————————————————————					124.8-125' Same as 120-121.6'. 125-126.5' DOLOMITE, light olive gray (5Y 5/2), moderately hard, weak reaction to 1N HCl, vuggy, fossiliferous, porous/sandy texture, thick bedded, fresh to slightly weathered.	'-	Run-15: Drilling Pressure: 200 psi Kelly Bar RPM: 200 Engine RPM: 1200-1300 Drill Time: 18min 10sec Circulation loss: 100% Driller Notes: soft at 128'.
-84.3 -84.8 -85.3	128 — —	R-15	62% (26%)	3.1		ROD DROP 126.5-127.0'. 127.0-127.5' LIMESTONE, medium light gray (N6), strong reaction to 1N HCl, thin bedded, few fossils. ROD DROP 127.5-128.0'. 128-130' DOLOMITE, as above except moderately to severely weathered, fossiliferous, vuggy, porous.	\ <u>'</u>	
	130 — — — —					130-130.8' DOLOMITE, fine grained but porous, moderate reaction to 1N HCl, medium bedded, fresh, few vugs and fossils, yellowish gray (5Y 7/2). 130.8-131.6' As above except more porous/sandy texture, friable, moderately weathered.		Run-16: Drilling Pressure: 350-200 psi Kelly Bar RPM: 198 and 188 Engine RPM: 1200-1300 and 1100- 1200 Drill Time: 9min 30sec (130-131.5')
DATE FIELD	STARTED COMPLET GEOLOG KED BY:	ΓED: 9/8	0		GWL: C GWL: C DRILLI		NOTE	ES: Logging of coring per the Work Plan started at 62'. General rock description logged from 20-62'.
APPRO	OVED BY:		-	\dashv	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- C	OFFSET B	ORING P	ROGRA	M		LOG OF BORING NO. 0-1		PROJECT NO. 07-3935
7 🗇		0.0	Î	(ff.)		COORDINATES	0	
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (PROFILE	N 1723173.4 E 458057.4	SYMBOL	REMARKS
:LEV. FEET	DEI (FE	AMP R RU	0.0V/ 3.8 8.(R)	COV	PRO	SURFACE EL: 42.7	SCS 8	KLIVIAKKS
) 		80	B O	8		DESCRIPTION	<u> </u>	
	132 — — —	R-16	80% (64%)	4.0		131.6-135' DOLOMITE, with interbedded LIMESTONE clasts, colors are as above, strong reaction to 1N HCl when powdered, thick bedded, fresh to slightly weathered, becomes moderately weathered with depth.		10min 58sec (131.5-135) Circulation loss: 100% Chatter at 132'. 130.5' horizontal fracture, edges slightly rounded. Driller Notes: 131.5-132.0' possible wash-out zone, soft.
	134 — — —					135-135.4' DOLOMITE, light olive gray (5Y 5/2), moderately hard,		Run-17:
-93.3 -94.0	- 136 -					porous, vuggy, fossiliferous, moderate reaction to 1N HCl when powdered. 135.4-138.7' DOLOMITE, severely weathered zone, light gray (N7), moderately hard to hard, fossiliferous, vuggy (most are continuous throughout core). ROD DROP 136-136.7'.	<u> </u> -	Drilling Pressure: 200-300-500 psi Kelly Bar RPM: 196 Engine RPM: 1200 Drill Time: 25min 41sec (135-139') 12min 16sec (139-140') Circulation loss: 100% Driller notes Rod drop 136-136.7'
	- 138 	R-17	78% (20%)	3.9			<u>'</u>	
	_ _ 140 					138.7-140' DOLOMITE, yellowish gray (5Y 7/2) and grayish orange (10YR 7/4), moderately hard, intensely fractured, porous/sandy texture, vuggy, fossiliferous, moderate reaction to 1N HCl when powdered.		Water level on 9/5/09 @ 0730 is 4.4'.
		R-18	90% (76%)	4.5		140-141' DOLOMITE, grayish orange (10YR 7/4) to dark yellowish orange (10YR 6/6), moderately hard to hard, fine grained to crystalline, fresh, trace to no fossils, weak reaction to 1N HCl when powdered. 141-141.3' DOLOMITE becomes highly fossiliferous, porous, moderately weathered with thin coating of degraded dolomite, possible small wash out zone. 141.3-141.7' DOLOMITE, crystalline, pale yellowish brown (10YR 6/2), hard, fine grained, no fossils, fresh, few healed fractures (very thin-closed), abrupt upper contact. 141.7-142' Gradual basal contact-transition to coarse gained dolomite, pale yellowish brown (10YR 6/2), fossiliferous, fresh to		Run-18: Drilling Pressure: 500 psi Kelly Bar RPM: 218 Engine RPM: 1400 Drill Time: 13min 35sec (140-141') 13min 50sec (141-145') Circulation loss: 100% Driller Notes: softer from 143-145' Vertical fracture from 143.3-144.0'.
	144 					slightly weathered, moderately hard. 142-145' DOLOMITE, sandy texture, poorly to moderately indurated, moderately weathered, soft, strong reaction to 1N HCl when powdered, fine to medium grained, rounded to subangular grains, some fossils.		D
	146 —					145-146.5' Same as above except moderately to intensely weathered	1.	Run-19: Drilling Pressure: 300 psi Kelly Bar RPM: 205 Engine RPM: 1200-1300 Drill Time: 13min 49sec (145-149')
DATE FIELD	STARTED COMPLET GEOLOG KED BY:	TED: 9/8	Э		GWL: D GWL: D DRILLIN	9	NOTE	ES: Logging of coring per the Wor Plan started at 62'. General rock description logged from 20-62'.
APPRO	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- (OFFSET B	ORING P	ROGRA	M		LOC OF POPING NO. O.4		PROJECT NO. 07-3935
						LOG OF BORING NO. 0-1	Τ.	I
ELEVATION (FEET MSL)	E.E.	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1723173.4 E 458057.4	SYMBOL	
LEVA :EET	DEPTH (FEET)	AMPL R RUI	OW/6 R % I & (RC	SOVE	PROFILE	SURFACE EL: 42.7		REMARKS
<u>п</u> п		<i>\</i> \$ 10	B.O.	REC		DESCRIPTION	nscs	
	- - 148 -	R-19	68% (30%)	3.4		146.5-150' DOLOMITE, yellowish gray (5Y 7/2) to light olive gray (5Y 5/2), moderately hard to hard, alternating zones/bands of fresh and slightly to moderately weathered, fossiliferous, vuggy, sandy texture in weathered zones, moderate to strong reaction to 1N HCl when powdered, few clasts of limestone, thick bedded (horizontal breaks are mechanical).		2min 57sec (149-150') Circulation loss: 100%
	 150 					150-154' DOLOMITE, light olive gray (5Y 5/2), yellowish gray (5Y 7/2), pale yellowish brown (10YR 6/2), and pale yellowish orange (10YR 8/6) in thin layers, moderately hard, some vugs, few fossils, moderate reaction to 1N HCl when powdered, thick bedded, fresh.		Run-20: Drilling Pressure: 450-350 psi Kelly Bar RPM: 201 Engine RPM: 1200-1300 Drill Time: 16min 50sec (150-153') 9min 21sec (153-155')
	152 — - -	R-20	100%	5.0		151.4-151.8' As above except moderately weathered (porous texture). 151.8-153' Same as at 150'. 153-154' Intensely weathered to degraded, thinly laminated.		Circulation loss: 100%
	154 — — — — — — — — — — — — — — — — — — —					154-155' DOLOMITE, pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 5/4), moderately hard, thick bedded, crystalline, strong reaction to 1N HCl when powdered, moderately fractured (vertical). 155-156.2' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, moderate reaction to 1N HCl when powdered, fossiliferous, vuggy, fresh, thick bedded.	,	Run-21: Drilling Pressure: 250-300 Kelly Bar RPM: 210 Engine RPM: 1300 Drill Time: 7min 39sec (155-157')
-114.8	- - 158 —	R-21	92% (42%)	4.6		156.2-157.5' As above except moderately to severely weathered, porous texture, sandy. ———————————————————————————————————		21min 10sec (157-159') 2min 54sec (159-160') Circulation loss: 100% 155-155.6' Healed vertical fracture.
-116.3 -116.5 -117.0	160 —					T159-160' DOLOMITE as at 156.2'. ROD DROP 159.2-159.7'. 160-161' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, porous texture, moderate reaction to 1N HCI, fossiliferous, moderated weathered, thick bedded.		Run-22: Drilling Pressure: 300 psi Kelly Bar RPM: 199 Engine RPM: 1200-1300
DATE FIELD	STARTED COMPLET GEOLOG KED BY:	ΓED: 9/8	0		GWL: C GWL: C DRILLII	S	NOTE	ES: Logging of coring per the Worl Plan started at 62'. General rock description logged from 20-62'.
APPRO	OVED BY:			\dashv	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- C	OFFSET B	ORING F	ROGRA	M		LOG OF BORING NO. 0-1		PROJECT NO. 07-3935
Z ()		0 0	2 _{ci}	(ft.)		COORDINATES	30L	
ELEVATION (FEET MSL)	ОЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	N 1723173.4 E 458057.4 SURFACE EL: 42.7	SYMBOL	REMARKS
ELE (FEE	D A	SAM OR F	3LOV OR	ECO	PR	DESCRIPTION	NSCS	
				12		161-161.9' Vertical fracture.	+-	Drill Time: 10min 13sec (160-163')
	162 — - - - 164 —	R-22	94% (40%)	4.7		161.9-162.7' DOLOMITE, as above except slightly weathered, vuggy some pale brown (5YR 5/2) layers/bands and trace limestone. 162.7-163' As above except intensely broken (possibly mechanical). 163-165' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, strong reaction to 1N HCl when powdered, medium to thick bedded, moderately weathered, porous texture, fossiliferous, few horizontal breaks (possibly mechanical).	,	6min 27sec (163-165') Circulation loss: 100%
	166 —					165-167' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, moderate reaction to 1N HCI when powdered, moderately weathered, porous texture, sandy, vuggy, with limestone zones and layers, moderately fractured, limestone is medium light gray (N6), strong reaction to 1N HCI, hard.		Run-23: Drilling Pressure: 300-250-300 psi Kelly Bar RPM: 210 Engine RPM: 1300 Drill Time: 8min 39sec (165-167.5") 21min 56sec (167.5-170) Circulation loss: 100%
	- 168 	R-23	90% (16%)	4.5		167-170' DOLOMITE, crystalline, pale yellowish brown (10YR 6/2), moderately hard, fresh, thick bedded, few fossils, few vugs, strong reaction to 1N HCI. 168.2-168.5' Vertical fracture. 168.3-170' As above except intensely fractured (possibly mechanical).		165.5-166' Vertical fracture-faces stained black with white rounded calcite grains.
	170 — — — — — — — — — — — — — — — — — — —	R-24	100%	5.0		170-174.5' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, fresh to slightly weathered, thick bedded, moderate reaction to 1N HCl when powdered, with some light olive gray (5Y 5/2) dolomite clasts from 107.3-170.7'. 170.8-171.5' As above except moderately weathered, vuggy, porous texture, sandy.	,	Run-24: Drilling Pressure: 350-200-250 psi Kelly Bar RPM: 209 Engine RPM: 1300 Drill Time: 17min 11sec (170- 172.5') 10min 34sec (172.5-174') 10min 1sec (174-175') Circulation loss: 100% Water level on 9/8/09 @ 0900 is
	- 174 —	11 24	(30%)	0.0		172.5-173' Unfractured, no dolomite clasts. 173-174.5' Moderately fractured, moderately weathered. 174.5-175' DOLOMITE, hard, light olive gray (5Y 6/1), strong reaction		4.5'. NOTE: Zones at 172.5' and 174' mechanically broken during removal from shoe.
DATE	STARTED COMPLET	TED: 9/8			GWL: D GWL: D	to 1N HCI, crystalline, no fossils, thick bedded, moderately to intensely fractured (possibly mechanical), fresh to slightly weathered, few vugs. DEPTH: 3.4' DATE/TIME: 9/3/09 @ 0730		Run-25: Drilling Pressure: 300-250 psi ES: Logging of coring per the Wor Plan started at 62'. General rock description logged from 20-62'.
APPRO	KED BY: OVED BY: ING CO.:		OS	\dashv	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- C	FFSET B	ORING F	ROGRA	М		LOG OF BORING NO. 0-1		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	HT.	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1723173.4 E 458057.4	SYMBOL	
EVA.	DEPTH (FEET)	MPLI	2W/6' R % F R (RC	OVE	PROFILE	SURFACE EL: 42.7	S S	REMARKS
급는		SA	BLC	REC		DESCRIPTION	nscs	
	176 — –					175-180' DOLOMITE, moderately soft to moderately hard, pale yellowish brown (10YR 6/2) to dark yellowish orange (10YR 6/6), thicl bedded, moderately weathered, porous texture, sandy (with nodules of dolomite-medium light gray (N6)), hard, strong reaction to 1N HCl, weak to moderate reaction to 1N HCl when powdered.	k	Kelly Bar RPM: 216 Engine RPM: 1300-1400 Drill Time: 30min 5sec Circulation loss: 100% Driller Notes: 175-176' very soft.
	- 178 — -	R-25	90% (38%)	4.5		177.6' Dolomite becomes moderately fractured, vuggy.		
	180 — —					180-185' DOLOMITE, moderately hard to hard, pale yellowish brown (10YR 6/2), moderately to intensely fractured, thick bedded, fresh to slightly weathered, moderate to strong reaction to 1N HCl when powdered, some vugs and medium light gray (N6) dolomite clasts.		Run-26: Drilling Pressure: 250-200 psi Kelly Bar RPM: 223 Engine RPM: 1400-1500 Drill Time: 12min 7sec (180-182') 21min 42sec (182-185')
	182 —	R-26	100%	5.0		181.6' Very thin sandy CLAY layer, no plasticity, moderate yellowish brown (10YR 5/4)-in between a horizontal fracture.		Circulation loss: 100%
	184 — — — — — — — — — — — — — — — — — — —	R-27	90% (0%)	4.5		185-187' DOLOMITE, pale yellowish brown (10YR 6/2) to grayish orange (10YR 7/4), moderately hard, moderate to strong reaction to 1N HCl when powdered, thick bedded, moderately to intensely fractured, few vugs and fossils, slightly to moderately weathered, MnO grains throughout, few thin layers of crystalline dolomite. 187' Becomes moderately to severly weathered, sandy texture. 187-190.0' DOLOMITE, soft, severely weathered to degraded, sandy texture, intensely fractured, few nodules of unweathered limestone, moderate reaction to 1N HCl, few darker (possibly organic) layers, very thin.		Run-27: Drilling Pressure: 200-250-250 Kelly Bar RPM: 225 Engine RPM: 1400-1500 Drill Time: 16min 9sec (185-187') 3min 25sec (187-190') Circulation loss: 100% 187-190' very soft-fast drilling.
DATE	190 — STARTED COMPLET	ΓED: 9/8			GWL: C		NOTE	Run-28: ES: Logging of coring per the Wo Plan started at 62'. General rock description logged from 20-62'.
APPRO	KED BY: OVED BY: NG CO.:		DS		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- C	FFSET B	ORING F	ROGRAI	М		LOG OF BORING NO. 0-1		PROJECT NO. 07-3935
			9	ft.)		COORDINATES	٦	
ELEVATION (FEET MSL)	ĒΕ	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	빌	N 1723173.4 E 458057.4	SYMBOL	
EET	DEPTH (FEET)	MPL RU	OW/6 R % 8 (R(SOVE	PROFILE	SURFACE EL: 42.7		REMARKS
		S O	BLO	REC		DESCRIPTION	nscs	
	- - 192 — -	R-28	100%	5.0		brown (10YR 6/2), moderately weathered, porous texture-sandy, vuggy, thick bedded, few small thin fractures, moderate reaction to 1N HCl when powdered. 190.8-192.4' DOLOMITE, pale yellowish brown (10YR 6/2) to dark yellowish brown (10YR 5/4), moderately soft, moderately weathered, thick bedded but with banded apperance, few vugs, moderately fractured, wavy basal contact. 192.4-195' DOLOMITE, crystalline, fresh, moderately fractured, pitted, pale yellowish brown (10YR 6/2) and grayish orange (10YR 7/4), moderately hard, few fossils, and few dolomite clasts.		Drilling Pressure: 200-150-200 psi Kelly Bar RPM: 215 Engine RPM: 1300-1400 Drill Time: 4min 38sec (190-192') 10min 26sec (192-193.5') 25min 44sec (193.5-195) Circulation loss: 100%
	194 — 					193.3-195' As above except fossiliferous, intensely fractured.		
	196 — 					195-196.5' DOLOMITE, moderately hard, pale yellowish brown (10Yf 6/2) to yellowish gray (5Y 7/2), intensely fractured, crystalline, slightly to moderately weathered, pitted, fossiliferous in bands, moderate to strong reaction to 1N HCl when powdered, thick bedded. 196.5-197.4' As above except very intensely fractured.		Run-29: Drilling Pressure: 150-200 psi Kelly Bar RPM: 204 Engine RPM: 1200-1300 Drill Time: 56min 43sec Circulation loss: 100%
	- 198 — - -	R-29	100%	5.0		197.4-200' DOLOMITE, moderately hard, moderate to strong reaction to 1N HCl when powdered, banded apperance in color-grayish orange (10YR 7/4), pale yellowish brown (10Y 6/2), and moderate yellowish brown (10YR 5/4), fossiliferous, pitted/fossiliferous in zones bands, thin bedded, moderately to intensely fractured.		
	200 —	R-30	100%	5.0		200-202.7' DOLOMITE, yellowish gray (5Y 7/2) to pale yellowish brown (10YR 6/2), thick bedded, moderately to intensely fractured, fossiliferous, pitted, moderately weathered, moderate reaction to 1N HCl when powdered.		Run-30: Drilling Pressure: 100-150-100 psi Kelly Bar RPM: 211 Engine RPM: 1300-1400 Drill Time: 35min 41sec Circulation loss: 100%
-160.8 -161.4	204 —		(54%)			202.7-203.5' DOLOMITE, as above except very slightly fractured, slightly weathered, pitted, vuggy, few thin laminae (dark gray (N3)). -203.5-204.1' LIMESTONE, moderately hard to hard, light olive gray (5Y 6/1), moderately fractured, slightly to moderately weathered, fine grained, pitted and fossiliferous in bands. -204.1-205' DOLOMITE, pale yellowish brown (10YR 6/2), slightly to		
DATE (STARTED COMPLET GEOLOG KED BY:	ΓED: 9/8)		GWL: D GWL: D DRILLII	EPTH: 3.4' DATE/TIME: 9/3/09 @ 0730	NOTE	ES: Logging of coring per the Wor Plan started at 62'. General rock description logged from 20-62'.
APPRO	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LND)FF0FT 7	ODINO:	200004	\ #				DDO 1507 NO. 07 0005
LNP-	OFFSET B	ORING F	ROGRAI	VI		LOG OF BORING NO. O-1		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	ОЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1723173.4 E 458057.4 SURFACE EL: 42.7 DESCRIPTION	USCS SYMBOL	REMARKS
-162.3	206 — 208 — 210 — 212 — 214 — 216 — 218 —			<u>x</u>	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	moderately weathered, pitted/vuggy, fossiliferous, moderately hard, moderate reaction to 1N HCl when powdered, thick bedded, unfractured. BOTTOM OF BORING 205'	Ü	
DATE FIELD CHEC APPRO	STARTED COMPLET GEOLOG KED BY: OVED BY:	TED: 9/8 IST: JL WI			GWL: [DEPTH: 4.5' DATE/TIME: 9/8/09 @ 0900 NG METHOD: Mud Rotary/PQ3 Coring		S: Logging of coring per the Work Plan started at 62'. General rock description logged from 20-62'. Failing 1500



LNP- (OFFSET E	ORING P	ROGRAI	M				PROJECT NO. 07-3935
						LOG OF BORING NO. 0-2		
ELEVATION (FEET MSL)	TH T)	SAMPLE NO. OR RUN NO.	' & (N) REC. ND)	RECOVERY (ft.)	ILE	COORDINATES N 1722994.8 E 457937.7	SYMBOL	
EVA'	DEPTH (FEET)	MPLE	BLOW/6" & (N OR % REC. & (RQD)	COVE	PROFILE	SURFACE EL: 42.7		REMARKS
		S O O	BL(REC		DESCRIPTION	nscs	
	0 -	S-1	4-7 5 (12)	0.8		0.0-1.5' POORLY GRADED SAND (sp), fine to medium grained, subrounded to rounded, no plasticity, no dry strength, rapid dilatancy, low toughness, grayish brown (5YR 3/2), moist to wet, no reaction to 1N HCl, medium dense.	sp	
	2 	S-2	8-6 5 (11)	1.0		1.5-5.0' POORLY GRADED SAND (sp), fine to medium grained, well sorted, subangular to subrounded, no plasticity, no dry strength, rapid dilatancy, low toughness, dark yellowish orange (10YR 6/6), moist, no reaction to 1N HCl, medium dense.		
	- -		5-3	1.0			sp	
	4 —	S-3	3 (6)	1.0			sp	
36.7	- - 6 	S-4	5-4 4 (8)	1.0		5.0-6.0' POORLY GRADED SAND (sp), fine grained, subangular to rounded, well sorted, no plasticity, no dry strength, rapid dilatancy, low toughness, very pale orange (10YR 8/2), no reaction to 1N HCl, loose.	sp	
50.7	- -	S-5	3-3 4 (7)	1.0		6.0-9.0' POORLY GRADED SAND with CLAY (sp-sc), fine grained, well sorted, subangular to subrounded, medium plasticity, medium dry strength, slow dilatancy, medium toughness, light gray (N7) to medium light gray (N6), medium stiff, no reaction to 1N HCl.	sp-sc	
	8 	S-6	1-1 1 (2)	0.9		7.5' As above except with less clay, very light gray (N8) to light gray (N7).	sp-sc	
	- - 10 —	S-7	W-1 1 (2)	0.8		9.0-12.0' POORLY GRADED SAND with CLAY (sp-sc), 5% dolomite (large pebble size, soft), fine grained, subrounded to rounded, maximum size large pebble, well sorted, medium plasticity, medium dry strength, slow dilatancy, low toughness, medium dry strength, very light gray (N8) to light gray (N7), moist, very soft, strong reaction to 1N HCI.	ľ	
	- -	S-8	W-W 1 (1)	0.4	/	10.5' As above except more dolomite.	sp-sc	
29.9	12 	S-9	1-3 5 (8)	1.1	13	12.0-12.8' POORLY GRADED SAND (sp), trace silt, fine to medium grained, low plasticity, low dry strength, rapid dilatancy, low toughness, light bluish gray (5B 7/1), moist, no reaction to 1N HCl, loose.	sp	
	14 	S-10	5-12 42 (54)	1.5		12.8-15.5' POORLY GRADED SAND with SILT (sp-sm), fine grained, no plasticity, low dry strength, rapid dilatancy, low toughness, grayish orange (10YR 7/4), moist, no reaction to 1N HCI, loose.	sp- sm	
DATE	STARTE	D: 9/1	0/09		GWL: D	EPTH: 5.2' DATE/TIME: 9/12/09 @ 0715	NOTE	S: Used AWJ rods for SPT
1	DATE STARTED: 9/10/09 DATE COMPLETED: 9/18/09					EPTH: 4.3' DATE/TIME: 9/19/09 @ 0725		sampling from 0-20'.
1		IST: JL				NG METHOD: Continuous SPT/Mud Rotary/PQ3 Coring		Used NWJ rods for SPT sampling below 20'
CHEC	KED BY:	WE	os			, ,		54.11p.111g 5010 # 20
APPRO	OVED BY	:			DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILLI	ING CO.:	HUSS						



LNP- OFFSET BORING PROGRAM PROJECT NO. 07-3935										
							LOG OF BORING NO. O-2			
ELEVATION (FEET MSL)	Εſ	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	l E		COORDINATES N 1722994.8 E 457937.7	SYMBOL		
EVA ⁻	DEPTH (FEET)	MPLE	DW/6" R % F & (RC	OVE	PROFILE		SURFACE EL: 42.7		REMARKS	
<u>п</u> .		S O	BLC	REC			DESCRIPTION	nscs		
27.2	-	S-11	48-50/0 (50)	0.2		;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;;	15.0' As above except with granule to small pebble size limestone pieces.	sp- sm	15.5-20.0' Started coring to advance boring-no casing set.	
	16 — - -						TOP OF AVON PARK FORMATION 15.5-20.0' DOLOMITE, moderately soft, very pale orange (10YR 8/2) to grayish orange (10YR 7/4), slightly weathered, fossiliferous, thick bedded, unfractured.			
	 18 	OB-1	51% (51%)	2.3						
22.7	20 —						20° 24 51 CU T with ODAV(51 (vs)) 200(/ lives store versus at 400/ store	ml	Sample could also be classified as	
	_	S-12	2-5 6 (11)	1.2			20-21.5' SILT with GRAVEL (ml), 20% limestone granules, 10% sand 70% silt, angular, maximum size-granule, no to slow dilatancy, low dry strength, low toughness, grayish orange (10YR 7/2), strong reaction to 1N HCl, medium dense, moist.	,	degraded dolomite. Driller notes: soft from 19.5-20'. Stopped coring at 20' and switched back to mud rotary and SPT sampling.	
	22 —	S-13	9-24 37 (61)	1.4			21.5-24.5' SILT with GRAVEL (ml), 40% silt, 60% dolomite granules, angular, moderately soft granules, no plasticity, low dry strength, slow dilatancy, low toughness, grayish orange (10YR 7/4), moist, strong reaction to 1N HCl, dense.	ml	NOTE: switched to NWJ rods for the remainder of drilling-Energy Testing attempted from 21.5-35.2'.	
	_		46-34					ml		
	24 —	S-14	50/6 (84)	1.2						
	- -	S-15	28-45 50 (95)	1.0			24.5-26.75' SANDY SILT with GRAVEL (ml), 20% fine grained sand, 20% dolomite granules, 60% silt, maximum particle size-granules, moderately soft, no plasticity, slow dilatancy, low toughness, low dry strength, grayish orange (10YR 7/4) to dark yellowish orange (10YR 6/6), moist, moderate reaction to 1N HCI, very dense.	ml		
	26 —	S-16	28-50/3	0.5				ml		
16.0		OB-2	37% (22%)	1.2			26.75-31.5' DOLOMITE, moderately hard, thick bedded, grayish orange (10YR 7/4) to dark yellowish orange (10YR 6/6), slightly weathered, fossiliferous, vuggy, porous.	-	Switched to PQ3 coring starting at 26.75'. Possible wash out zone at top of core run, material was too hard to split spoon but not hard enough to core.	
DATE FIELD	DATE STARTED: 9/10/09 DATE COMPLETED: 9/18/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS					GWL: DEPTH: 5.2' DATE/TIME: 9/12/09 @ 0715 GWL: DEPTH: 4.3' DATE/TIME: 9/19/09 @ 0725 DRILLING METHOD: Continuous SPT/Mud Rotary/PQ3 Coring			ES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'	
APPROVED BY: DRILLING CO.: HUSS						LE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500	
DRILLING CO.: HUSS										



LNP- OF	FSET BO	ORING P	ROGRA	М		LOG OF BORING NO. O-2		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	돈은	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1722994.8 E 457937.7	SYMBOL	
EVA]	DEPTH (FEET)	MPLE RUN	7 % F R (RC	OVE	PROFILE	SURFACE EL: 42.7	SSY	REMARKS
교底		SA	BLC	REC	"	DESCRIPTION	nscs	
11.2	30 —	OB-3	0% (0%)	0		No recovery 30-31.5'.	'- ml	
9.7	32 —	S-17	16-31 50/5 (81)	1.1		31.5-33.0' SANDY SILT with GRAVEL (ml), similar to 24.5'.		
8.2	34 —	OB-4	60% (0%)	0.9		33.0-34.5' DOLOMITE, as above, except moderately weathered.		NOTE: 32.9-33.0' no sample.
7.5	-	S-18	42-50/2 (50)	0.4		34.5-35.2' SILT with GRAVEL (ml), 60% dolomite granules, 40% silt, angular grained-moderately soft, no plasticity, low dry strength, slow dilatancy, low toughness, dark yellowish orange (10YR 6/6) to moderate yellowish brown (10YR 5/4), wet, moderate reaction to 1N HCI, very dense.	ml	NOTE: Sample re-labeled to S-18- 1.
	36 —	OB-5	(20%)	1.4		35.2 35.2-40.0' DOLOMITE, very light gray (N8) to medium light gray (N6) moderately soft to moderately hard, thick bedded, moderately weathered, pitted/porous in zones (filled with weathered dolomite), moderately fractured.		
	38 —	OB-6	100% (0%)	1.5				
	-	OB-7	100% (0%)	1.8		38.2-41.2' Vertical fracture.		
	40 —	OB-8	64%	3.2		40-45' DOLOMITE, moderately soft to moderately hard, yellowish gray (5Y 7/2) to light olive gray (5Y 5/2), fresh to slightly weathered, thick bedded, moderately fractured, fossiliferous, pitted, few vugs, strong reaction to 1N HCI.		OB-8: Drilling Pressure: 250-200 psi Kelly Bar RPM: 220 Engine RPM: 1400 Drill Time: 22min 49sec (40-42.8') 4min 49sec (42.8-45') Circulation Loss: none Core loss area-wash out last 2.2 feet of run.
DATE ST		9/1	(22%) 0/09 8/09	3.2	GWL: D		NOTE	ES: Used AWJ rods for SPT sampling from 0-20'.
CHECKE APPROV	FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY: DRILLING CO.: HUSS					NG METHOD: Continuous SPT/Mud Rotary/PQ3 Coring	RIG:	Used NWJ rods for SPT sampling below 20' Failing 1500



COORDINATES N 1722994.8 E 457937.7 SURFACE EL: 42.7 DESCRIPTION COSCRIPTION COSCRIPTIO	LNP- 0	LNP- OFFSET BORING PROGRAM PROJECT NO. 07-3935											
44 — S-18 30-586 (69) 0.8 45.0-45.9' SILT with GRAVEL (mi), 40% gravel, 60% sit, calcarready soft, no plasticity, low dy strength, slow dilatancy, tow toughness, dark (10YR 54) to gene search to 1N HCI, very dense. 45.9 (10YR 54) to dark yellowish brown (10YR 42). 45.9 (10YR 54) to dark yellowish brown (10YR 42). 45.9 (10YR 54) to dark yellowish brown (10YR 42). 45.9 (10YR 54) to dark yellowish brown (10YR 42). 45.9 (10YR 54) to dark yellowish brown (10YR 42). 45.9 (10YR 54) to dark yellowish brown (10YR 42). 45.9 (10YR 54) to dark yellowish brown (10YR 42). 45.9 (10YR 54) to dark yellowish brown (10YR 42). 45.9 (10YR 54) to dark yellowish brown (10YR 42). 45.9 (10YR 54) to dark yellowish brown (10YR 54) to dar							LOG OF BORING NO. O-2						
44 — S-18 30-586 (69) 0.8 45.0-45.9' SILT with GRAVEL (mi), 40% gravel, 60% sit, calcarready soft, no plasticity, low dy strength, slow dilatancy, tow toughness, dark (10YR 54) to gene search to 1N HCI, very dense. 45.9 (10YR 54) to dark yellowish brown (10YR 42). 45.9 (10YR 54) to dark yellowish brown (10YR 42). 45.9 (10YR 54) to dark yellowish brown (10YR 42). 45.9 (10YR 54) to dark yellowish brown (10YR 42). 45.9 (10YR 54) to dark yellowish brown (10YR 42). 45.9 (10YR 54) to dark yellowish brown (10YR 42). 45.9 (10YR 54) to dark yellowish brown (10YR 42). 45.9 (10YR 54) to dark yellowish brown (10YR 42). 45.9 (10YR 54) to dark yellowish brown (10YR 42). 45.9 (10YR 54) to dark yellowish brown (10YR 54) to dar	TION MSL)	Ŧ£	N N O.	' & (N) REC. 2D)	RY (ft.)	ILE		MBOL					
-2.3	LEVA'	DEP'	AMPLI R RUN	OW/6' R % F & (RC	SOVE	PROF	SURFACE EL: 42.7		REMARKS				
-7.3			<i>\$</i> 0	BLO	REC		DESCRIPTION)SN					
-7.3 50 — S-20 508 0.3 50.50.50 SILT with GRAVEL (m), 40% dolomite gravel (coarse sand size), no plasticity, low dry strength, no dilatancy, low toughness, size), no plasticity, low dry strength, no dilatancy, low toughness, size), no plasticity, low dry strength, no dilatancy, low toughness, size), no plasticity, low dry strength, no dilatancy, low toughness, size), no plasticity, low dry strength, no dilatancy, low toughness, size), no plasticity, low dry strength, no dilatancy, low toughness, size), no plasticity, low dry strength, no dilatancy, low toughness, size), no plasticity, low dry strength, no dilatancy, low toughness, size), no plasticity, low dry strength, no dilatancy, low toughness, size), no plasticity, low dry strength, no dilatancy, low toughness, size), no plasticity, low dry strength, no dilatancy, low toughness, size), no plasticity, low dry strength, no dilatancy, low toughness, size), no plasticity, low dry strength, no dilatancy, low toughness, size), no plasticity, low dry strength, no dilatancy, low toughness, size), no plasticity, low dry strength, no dilatancy, low toughness, size), no plasticity, low dry strength, no dilatancy, low toughness, size), no plasticity, low dry strength, no dilatancy, low toughness, size), no plasticity, low dry strength, no dilatancy, low toughness, size), no plasticity, low dry strength, no dilatancy, low toughness, size), no plasticity, low dry strength, no dilatancy, low toughness, size), no plasticity, low dry strength, no dilatancy, low toughness, size), no plasticity, low dry dry strength, no dilatancy, low toughness, size), low toughness, size), no plasticity, low dry strength, no dilatancy, low toughness, size), no plasticity, low dry strength, no dilatancy, low toughness, size), low to		46 — - - -		20%			45.0-45.9' SILT with GRAVEL (ml), 40% gravel, 60% silt, calcareous, coarse sand to very coarse sand size, subangular, moderately soft, no plasticity, low dry strength, slow dilatancy, low toughness, dark yellowish orange (10YR 6/6) to moderate yellowish brown (10YR 5/4) moist, strong reaction to 1N HCl, very dense. 45.9-50.0' DOLOMITE above except moderate yellowish brown	,	5.2'. OB-9: Drilling Pressure: 250 psi Kelly Bar RPM: 212 Engine RPM: 1300-1400 Drill Time: 5min 38sec Criculation loss: none				
DATE STARTED: 9/10/09 DATE STARTED: 9/10/09 DATE COMPLETED: 9/18/09 DATE STARTED: 9/18/09 DATE STARTED: 9/18/09 DATE COMPLETED: 9/18/09		- -		50/6			50.0-50.5' SILT with GRAVEL (ml), 40% dolomite gravel (coarse sand size), no plasticity, low dry strength, no dilatancy, low toughness, moderate yellowish brown (10YR 5/4) to dark yellowish brown (10YR 4/2), strong reaction to 1N HCl, very dense.	1 ''''	OB-10: Drilling Pressure: 150 psi Kelly Bar RPM: 214				
DATE STARTED: 9/10/09 DATE COMPLETED: 9/18/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500 OB-11: Drilling Pressure: 200 psi Kelly Bar RPM: 210 Engine RPM: 1300 Drill Time: 12min 15sec Criculation loss: none OB-11 OB-11: Drilling Pressure: 200 psi Kelly Bar RPM: 210 Engine RPM: 1300 Drill Time: 12min 15sec Criculation loss: none OR-11 OB-11: Drilling Pressure: 200 psi Kelly Bar RPM: 210 Engine RPM: 210 Engine RPM: 1300 Drill Time: 12min 15sec Criculation loss: none OR-11 OB-11: Drilling Pressure: 200 psi Kelly Bar RPM: 210 Engine RPM: 210		- -	OB-10		2.9		moderate yellowish brown (10YR 5/4), very soft, poorly indurated, but mainly silt with gravel (as described above), strong reaction to 1N		Drill Time: 10min 28sec Criculation loss: none				
DATE COMPLETED: 9/18/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY: GWL: DEPTH: 4.3' DATE/TIME: 9/19/09 @ 0725 DRILLING METHOD: Continuous SPT/Mud Rotary/PQ3 Coring Sampling from 0-20'. Used NWJ rods for SPT sampling below 20' Sampling below 20' DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500		- - -		52%					Drilling Pressure: 200 psi Kelly Bar RPM: 210 Engine RPM: 1300 Drill Time: 12min 15sec				
APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500	DATE FIELD	DATE COMPLETED: 9/18/09 FIELD GEOLOGIST: JLO					EPTH: 4.3' DATE/TIME: 9/19/09 @ 0725	NOTE	sampling from 0-20'. Used NWJ rods for SPT				
, = <u> </u>	APPR	OVED BY:		os ———	_	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500				



LNP- C	OFFSET B	ORING P	ROGRAI	M		LOG OF BORING NO. O-2		PROJECT NO. 07-393
ELEVATION (FEET MSL)	Т.)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	LE LE	COORDINATES N 1722994.8 E 457937.7	SYMBOL	
EVATEET I	DEPTH (FEET)	MPLE RUN	3W/6' R % F & (RC	OVE	PROFILE	SURFACE EL: 42.7	SSY	REMARKS
EL (FI		SA	BLC	REC		DESCRIPTION	nscs	
	60 — 62 — 64 —	S-22 OB-12	50/5 (50) 34% (0%)	1.7				OB-12: Drilling Pressure: 150 psi Kelly Bar RPM: 213 Engine RPM: 1300-1400 Drill Time: 8min 14sec Criculation loss: none
	66 —	OB-13	68%	1.7		65.0-67.5' DOLOMITE, severly weathered to degraded, 65-65.6' moderately to poorly indurated, 65.6-67.5', very soft, very dense, calcareous silt (degraded dolomite), moderately soft to soft, some very thin black (possibly organic layers) throughout, strong reaction to 1N HCI.	D	OB-13: Drilling Pressure: 200 psi Kelly Bar RPM: 216 Engine RPM: 1300-1400 Drill Time: 10min 0sec Criculation loss: none
	68 — - -	OB-14	100%	2.5		67.5-75.0' DOLOMITE, moderately hard, pitted/porous, vuggy, fossiliferous, moderately fractured, modetately weathered, pale yellowish brown (10YR 6/2), strong reaction to 1N HCl when powdered.		OB-14: Drilling Pressure: 150-200 psi Kelly Bar RPM: 209 Engine RPM: 1300 Drill Time: 10min 46sec Criculation loss: none
	70 — - - 72 — -	R-1	80%	4.0		As above except slightly to moderately fractured.		Run-1: Drilling Pressure: 150-150 psi Kelly Bar RPM: 207 Engine RPM: 1200-1300 Drill Time: 9min 16sec (70-73') 6min 34sec (73-75') Circulation Loss: none Driller Notes 70-72' very soft.
DATE FIELD	STARTED COMPLET GEOLOG KED BY:	TED: 9/1)	- 1	GWL: D GWL: D DRILLIN	-	NOTE	ES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'
	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP-	OFFSET B	ORING P	ROGRA	М		LOG OF BORING NO. O-2		PROJECT NO. 07-393
ELEVATION (FEET MSL)	F.C	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1722994.8 E 457937.7	SYMBOL	
EVAT	DEPTH (FEET)	MPLE RUN	NW/6" R % F R (RG	OVE	PROFILE	SURFACE EL: 42.7	S SY	REMARKS
밐띤		SA	BLC	REC		DESCRIPTION	nscs	
	74 — 76 —	R-2	90%	4.5		75-76' DOLOMITE, soft to very soft, moderately to intensely weathered, sandy texture, intensely fractured, dark yellowish orange (10YR 6/6) to moderate yellowish brown (10YR 5/4), weak to moderate reaction to 1N HCl when powdered, thick bedded, pitted/porous, no fossils. 76-77.7' As above except moderately hard, moderately to intensely fractured, fossiliferous.		Run-2: Drilling Pressure: 200 psi Kelly Bar RPM: 206 Engine RPM: 1200-1300 Drill Time: 4min 20sec (75-78') 15min 12sec (78-80') Circulation Loss: none Driller Notes 75-77.5' soft, 77.5-7 harder, then soft.
	78 — — — —	I\-Z	(16%)	4.5		77.7-78.7' DOLOMITE, moderately hard to hard, very pale orange (10YR 8/2) to grayish orange (10YR 7/4), strong reaction to 1N HCl, vuggy, fresh to slightly weathered, moderately fractured. 78.7-80' DOLOMITE, as at 75-76'.		
	80 —	S-23	30-32 50/6 (82)	1.0		80-81.5' Degraded DOLOMITE, same as at 75-76' except not silty.		Run-3: Drilling Pressure: 150-200 psi Kelly Bar RPM: 213, 206 Engine RPM: 1200-1300 Drill Time: 4min 56sec (80-82.5')
	82 	R-3	80%	4.0		81.5-82.2' Same as above except moderately weathered, intensely fractured. 82.2-83.8' DOLOMITE, moderately hard, moderately fractured, pitted porous, moderately weathered, weak reaction to 1N HCl when powdered, pale yellowish brown (10YR 6/2).	/	9min 8sec (82.5-85') Circulation Loss: none
	84 — - - - 86 — - -	R-4	92% (12%)	4.6		83.8-85.0' DOLOMITE, moderately soft, grayish orange (10YR 7/4), thick bedded, fresh, pitted in thin bands, strong reaction to 1N HCl when powdered. 85-92.4' DOLOMITE, moderately hard, slightly to moderately weathered, pitted/porous, fossiliferous, yellowish gray (5Y 7/2), thick bedded, moderately to intensely fractured, strong reaction to 1N HCl, 86-87' rubble, very broken-possible zone of wash out/cave-in, few this bands/pockets of dark brown (5YR 2/2) organic material.		Run-4: Drilling Pressure: 150-200 psi Kelly Bar RPM: 208 Engine RPM: 1300 Drill Time: 6min 42sec (85-85.8') 15min 6sec (85.8-90') Circulation Loss: 30%
DATE FIELD	STARTED COMPLET GEOLOGI KED BY:	ED: 9/1	0		GWL: E GWL: E DRILLII	_	NOTE	S: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'
APPR	OVED BY:			[DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500			



LNP-	OFFSET B	ORING P	ROGRA	М		LOG OF BORING NO. O-2		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	E F	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	I.E	COORDINATES N 1722994.8 E 457937.7	SYMBOL	
EVA] EET I	DEPTH (FEET)	MPLE	3.W/6" 7.% F 7. RG	OVE	PROFILE	SURFACE EL: 42.7	SSY	REMARKS
크		SAI	BLC	REC		DESCRIPTION	nscs	
	88 — 90 — 92 — 94 —	R-5	68% (10%)	3.4		92.4-95' DOLOMITE, soft, dark yellowish orange (10YR 6/6) to moderate yellowish brown (10YR 5/4), intensely weathered, silty-poorly indurated, strong reaction to 1N HCl when powdered, sandy texture, porous.		Run-5: Drilling Pressure: 150 psi Kelly Bar RPM: 209 Engine RPM: 1300 Drill Time: 17min 27sec (90-94') 3min 42sec (94-95')-no recovery Circulation Loss: 100% starting at 92.5'.
	96 —	S-24	(50)	0.4		95-95.3' DOLOMITE as at 85'. 95.3-97.9' DOLOMITE, moderately hard, moderately weathered, thicl bedded, porous/pitted, vuggy, fossiliferous, moderately to intensely fractured, weak reaction to 1N HCl, pale yellowish brown (10YR 6/2).		Run-6: Drilling Pressure: 150 psi Kelly Bar RPM: 208 Engine RPM: 1300 Drill Time: 26min 48sec Circulation Loss: 100%
-56.5	98 —	R-6	100%	5.0		98.1-99.2' DOLOMITE, as at 95.3' except with some dolomite clasts. 99.2 99.2-101.1' LIMESTONE, moderately hard, very pale orange (10YR 8/2), moderately to intensely fractured, thick bedded, strong reaction to 1N HCl, fossiliferous, slightly to moderately weathered, slightly pitted in zones.		Run-7: Drilling Pressure: 150 psi Kelly Bar RPM: 220
-58.4	102 —					101.1 101.1-101.3' DOLOMITE, grayish orange (10YR 7/4) to pale yellowis brown (10YR 6/2), porous/pitted, fossiliferous, moderately hard, thick bedded. 101.3-103.2' Unfractured, then becomes moderately to intensely fractured dolomite and crystalline dolomite mix (102.6-103.2')	h	Engine RPM: 1400 Drill Time: 17min 4sec (100-103.5' 14min 17sec (103.5-105') Circulation Loss: 100%
DATE FIELD	STARTED COMPLET GEOLOG KED BY:	ED: 9/1	0		GWL: D GWL: D DRILLI	DEPTH: 5.2' DATE/TIME: 9/12/09 @ 0715	NOTE	ES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'
APPROVED BY: DRILLING CO.: HUSS						R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



No. Part P	LNP- OFFSET BORING PROGRAM PROJECT NO. 07-3935										
R-7							LOG OF BORING NO. O-2				
R-7	TION ASL)	н (т	NO.	& (N) REC. ID)	۲۲ (ft.)	LE LE		MBOL			
R-7	EVA1	DEPT (FEE	MPLE RUN	ZW/6" R % F & (RQ	COVE	PROF	SURFACE EL: 42.7	SS SY	REMARKS		
104 — 103 2-110 DOLOMITE, moderately hard, fresh to slightly weathered, weak reaction to 1N HCI when powdered, pitted/suggy in thin bands/ zones, fine grained to crystalline, fossiliferous, thick bedded, pale yellowish brown (10°R 62°) to graysh orange (10°R 74). R-8 100% 5.0 2 2 10.10 DOLOMITE, very pale orange (10°R 87) to pale yellowish brown (10°R 62°) to pale yellowish to pale yellowish to pale yellowish (10°R 62°) to pale yellowish to pale yellowish (10°R 62°) to pale yellowish (10°R 62°) to pale yellowish (10°R 62°) to pale yellowish (10°R 62°) to pale yellowish (10°R 62°) to pale yellowish (10°R 62°) to pale yellowish (10°R 62°) to pale yellowish (10°R 62°) to pale yellowish (10°R 62°) to pale yellowish (10°R 62°) to pale yellowish (10°R 62°) to pale yellowish (10°R 62°) to pale yellowish (10°R 62°) to pale yellowish (10°R 62°) to pale yellowish (10°R 62°) to pale yello			S Q	BL(REC		DESCRIPTION	NSC			
104		_	R-7		4.8						
106		104 —					zones, fine grained to crystalline, fossiliferous, thick bedded, pale yellowish brown (10YR 6/2) to grayish orange (10YR 7/4).				
106		_									
R-8		106 —	S-25	50/5	0.9				Kelly Bar RPM: 205 Engine RPM: 1200-1300 Drill Time: 12min 10sec (105-107')		
110		_									
The provided provided area in core. The provided provided area in core. The provided provided area in core. The provided provided area in core. The provided provided area in core. The provided provided provided area in core. The provided provided provided area in core. The provided p		108 	R-8		5.0						
112 — R-9 100% (10%) 5.0 114.3-114.5' Grouted area in core. 114.3-114.5' Grouted area in core. 114.5-1		110 —					brown (10YR 6/2), pitted/porous, strong reaction to 1N HCl when powdered, moderately to intensely fractured, vertical fracture 110-112.2' (all other fractured extend from this vertical fracture), thick bedded, slightly to moderately weathered, moderately hard, few vugs	,	Drilling Pressure: 100 psi Kelly Bar RPM: 214 Engine RPM: 1300-1400 Drill Time: 22min 20sec (110-		
-71.6 -71.8		- 112 — - -	R-9		5.0		few fossils.		13min 7sec (113.2-115)		
DATE STARTED: 9/10/09 DATE COMPLETED: 9/18/09 FIELD GEOLOGIST: JLO Run-10: Drilling Pressure: 100 psi Kelly Bar RPM: 207 Engine RPM: 1300 Drill Time: 12min 24sec (115-116 18min 43sec (116-120') Circulation Loss: 100% Run-10: Drilling Pressure: 100 psi Kelly Bar RPM: 207 Engine RPM: 1300 Drill Time: 12min 24sec (115-116 18min 43sec (116-120') Circulation Loss: 100% NOTES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'		114 —									
Drill Time: 12min 24sec (115-116 18min 43sec (116-120') Circulation Loss: 100% DATE STARTED: 9/10/09 DATE COMPLETED: 9/18/09 FIELD GEOLOGIST: JLO Drill Time: 12min 24sec (115-116 18min 43sec (116-120') Circulation Loss: 100% Drill Time: 12min 24sec (115-116 18min 43sec (116-120') Circulation Loss: 100% NOTES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'		_ _	,					'- 	Drilling Pressure: 100 psi Kelly Bar RPM: 207		
DATE COMPLETED: 9/18/09 FIELD GEOLOGIST: JLO GWL: DEPTH: 4.3' DATE/TIME: 9/19/09 @ 0725 DRILLING METHOD: Continuous SPT/Mud Rotary/PQ3 Coring sampling from 0-20'. Used NWJ rods for SPT sampling below 20'		116 					116.6-118.3' Thin vertical fracture, closed from 117.5-118.3'.		Drill Time: 12min 24sec (115-116') 18min 43sec (116-120')		
GILGALD DI. WUO	DATE FIELD	DATE COMPLETED: 9/18/09 FIELD GEOLOGIST: JLO					EPTH: 4.3' DATE/TIME: 9/19/09 @ 0725	NOTE	sampling from 0-20'. Used NWJ rods for SPT		
APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500 DRILLING CO.: HUSS	APPRO	OVED BY:			_	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500		



LNP- OFFSET BORING PROGRAM PROJECT NO. 07-3935										
						LOG OF BORING NO. 0-2				
ELEVATION (FEET MSL)	F.C	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	LE	COORDINATES N 1722994.8 E 457937.7	SYMBOL			
EVA-	DEPTH (FEET)	MPLE	DW/6' R % F & (RC	OVE	PROFILE	SURFACE EL: 42.7	SS SY	REMARKS		
		SA OF	BL(REC		DESCRIPTION	nscs			
	- 118 — -	R-10	100% (40%)	5.0		118.6-119' As above except not as pitted.				
	120 — - -		32-39			120-121' DOLOMITE, very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2), moderately hard, pitted/porous, few vugs, thick bedded, fresh to slightly weathered, unfractured, fossiliferous, strong reaction to 1N HCl when powdered. 121' Start of fracture, black coating on surface-area becomes soft. 121-122.5' DOLOMITE, highly weathered, as above, black staining or		Run-11: Drilling Pressure: 150-200 psi Kelly Bar RPM: 208 Engine RPM: 1300 Drill Time: 13min 38sec (120-121') Circulation Loss: 100%		
-79.8	122 	S-26	12 (51)	0.7		some pieces, crushed/fracture zone. Horizontal fracture at 121.8'.	<u>'</u> -	Driller notes soft at 121'		
	_	R-11	40%	2.0		ROD DROP 122.5-123.7'.				
-81.0 -81.3	124 —		(16%)		', 	123.7-124.0' DOLOMITE as above. ROD DROP 124.0-125.0'.	1			
00.0	_	S-27	2-3 17 (20)	0.6						
-82.3			(20)			125-127.5' Rubble (see remarks column).		125-126' clean out of rubble/ disturbance caused by split spoon sampling.		
	128 —	R-12	100% (12%)	4.0		127.5-130' DOLOMITE, grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2), moderately hard, slightly to moderately weathered pitted/porous, some vugs, moderately to intensely fractured, strong reaction to 1N HCl when powdered, thick bedded, vertical fracture 127.5-128.4'.	,	Drilling Pressure: 100 psi Kelly Bar RPM: 207 Engine RPM: 1200-1300 Drill Time: 6min 4sec (126-127') 2min 14sec (127-128') 2min 18sec (128-129') 5min 8 sec (129-130') Circulation Loss: 100%		
00 2	130 —					130-131.0' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, weak reaction to 1N HCl when powdered, fresh, slightly pitted, few vugs, thick bedded, unbroken.		Run-13: Drilling Pressure: 150-200 psi Kelly Bar RPM: 207 Engine RPM: 1200-1300		
-88.3 -88.8	_				77,77	ROD DROP 131.0-131.5'.		Drill Time: 8min 22sec (130-132.5') 9min 16sec (132.5-135')		
DATE STARTED: 9/10/09 DATE COMPLETED: 9/18/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS					GWL: D	EPTH: 5.2' DATE/TIME: 9/12/09 @ 0715		ES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'		
APPR	OVED BY: ING CO.:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500		



LNP- OFFSET BORING PROGRAM PROJECT NO. 07-3935										
						LOG OF BORING NO. O-2				
ELEVATION (FEET MSL)	rH T)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	l E	COORDINATES N 1722994.8 E 457937.7	SYMBOL			
EVA-	DEPTH (FEET)	MPLE	DW/6" R % F & (RC	OVE	PROFILE	SURFACE EL: 42.7		REMARKS		
<u>II</u> F)		S O	BL(RE(DESCRIPTION	nscs			
	132 —	R-13	94% (28%)	3.7		131.5-133' DOLOMITE, grayish orange (10YR 7/4) to dark yellowish orange (10YR 6/6), moderately weathered, slightly to moderately fractured, pitted, fossiliferous, vuggy, moderately soft, moderate to strong reaction to 1N HCl when powdered, thick bedded. 132.3-132.5' Intensely weathered/degraded. 133-133.5' Crystalline DOLOMITE, yellowish gray (5Y 7/2), hard, strong reaction to 1N HCl, fine grained, no fossils, medium bedded,		Circulation Loss: 100%		
	134 — —					fresh. 133.5-135' DOLOMITE, as at 131.5-133.0' except moderately to intensely weathered.				
	- -	S-28	4-50/5 (50)	0.3		135-136' Rubble from split spoon disturbance above.		Run-14: Drilling Pressure: 250 psi Kelly Bar RPM: 194 Engine RPM: 1200		
	136 — –		100%			136-137.8' Crystalline DOLOMITE, moderately hard, light gray (N7), thick bedded, moderately to intensely fractured, fresh to slightly weathered, pitted in thin bands, strong reaction to 1N HCI.		Drill Time: 8min 57sec (135-137') 14min 38sec (137-139') 4min 51sec (139-140') Circulation Loss: 100%		
-96.3	138 	R-14	(26%)	5.0		137.8-139' DOLOMITE, pale yellowish brown (10YR 6/2) to grayish orange (10YR 7/4), moderately hard, strong reaction to 1N HCl when powdered, thick bedded, fresh to slightly weathered, vuggy (weathered out fossils), fossiliferous, unfractured, pitted in bands.				
-97.3	 140 					139-140' LIMESTONE rubble, intensely fractured (some pieces). 140 140-141.6' DOLOMITE, very pale orange (10YR 8/2) to pale yellowist brown (10YR 6/2), moderately hard, weak reaction to 1N HCl, thick bedded, intensely fractured, moderately weathered, vuggy, fossiliferous.		Run-15: Drilling Pressure: 150-200 psi Kelly Bar RPM: 203 Engine RPM: 1200-1300		
	142 — - - - 144 —	R-15	94% (46%)	4.7		141.6-142.4' DOLOMITE, medium light gray (N6) and light olive gray (5Y 6/1), moderately hard, fresh, slightly fractured (2 healed vertical fractures-very thin), vuggy band at 141.9', strong reaction to 1N HCI when powdered, thick bedded, moderately weathered zone (porous/vuggy from 142.2-142.3'), with bands of black material (very thin) throughout. 142.4-142.6' Crystalline DOLOMITE. 142.6-146.2' DOLOMITE, moderately hard, moderately weathered, vuggy, pitted/porous, fossiliferous, pale yellowish brown (10YR 6/2) and medium light gray (N6), strong reaction to 1N HCl when powdered, thick bedded, slightly fractured.		Drill Time: 26min 57sec (140-141') 28min 8sec (141-143') 16min 42sec (143-145') Circulation Loss: 100%		
	- - 146							Run-16: Drilling Pressure: 150 psi Kelly Bar RPM: 201 Engine RPM: 1200-1300 Drill Time: 47min 4 sec		
DATE STARTED: 9/10/09 DATE COMPLETED: 9/18/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS					GWL: DEPTH: 5.2' DATE/TIME: 9/12/09 @ 0715 GWL: DEPTH: 4.3' DATE/TIME: 9/19/09 @ 0725 DRILLING METHOD: Continuous SPT/Mud Rotary/PQ3 Coring			ES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'		
APPR	OVED BY:			一	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500		
/	DRILLING CO.: HUSS									



LNP- OFFSET BORING PROGRAM PROJECT NO. 07-3935											
	JIT 02 1 B	OTUITO T	- TOOK-			LOG OF BORING NO. O-2		11100201110.07 0000			
ELEVATION (FEET MSL)	TH (T:	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1722994.8 E 457937.7	SYMBOL				
LEVA'	DEPTH (FEET)	AMPLE R RUN	OW/6' R % F & (RG	SOVE	PROFILE	SURFACE EL: 42.7		REMARKS			
		% O	BLO	RE(DESCRIPTION	nscs				
						146.2-149' As above except fresh to slightly weathered.		Circulation loss: 100%			
	_ _ 148 —	R-16	100% (86%)	5.0		146.9' Horizontal fracture (crushed rock zone infilling).					
	150 —					149-149.5' Crystalline DOLOMITE, fresh as at 142.4'. 149.5-150' DOLOMITE as at 146.2'. 150-152.5' DOLOMITE, pale yellowish brown (10YR 6/2) and mediun light gray (N6), moderately hard, moderately weathered, pitted/porous/vuggy in thin bands, moderately fractured, fossiliferous, strong		Run-17: Drilling Pressure: 150 psi Kelly Bar RPM: 206			
	- 152 — - -	R-17	100%	5.0		reaction to 1N HCl when powdered, thick bedded. 152.5-154' DOLOMITE, moderately hard, light gray (N7) to medium light gray (N6), moderately weathered, fossiliferous-weathering out creating long vugs, pitted/porous, slightly fractured- breaks along vugs.		Engine RPM: 1200-1300 Drill Time: 44min 5sec (150-152.5') 44min 25sec (152.5-155') Circulation loss: 100%			
-114.6	154 — — — — — — — — — — — — — — — — — — —	R-18	100%	5.0		154' As above except more porous, no fossils. 154-155' Vertical fracture-black coating on face-open. 155-155.9' DOLOMITE as at 154' 155.9-157' DOLOMITE, crystalline, pale yellowish brown (10YR 6/2), moderately hard, intensely fractured (some grout infilling fractures). 157-160' Alternating beds of moderately weathered porous/vuggy dolomite and crystalline dolomite as described above, moderately fractured (thin, closed). 157.3	·-	Run-18: Drilling Pressure: 150-200-150 psi Kelly Bar RPM: 202 Engine RPM: 1200-1300 Drill Time: 44min 13sec Circulation loss: 100%			
DATE	158 —	ED: 9/1			GWL: D GWL: D DRILLIN	157.3-163.5' Grout-sidewall of adjacent A-series boring. 160-163.0' DOLOMITE, moderately hard, pale yellowish brown (10YF 6/2), fresh to slightly weathered, pitted/porous, moderately fractured (almost horizontal), with thin bands of dark yellowish brown (10YR 4/2), thick bedded, strong reaction to 1N HCI. EPTH: 5.2' DATE/TIME: 9/12/09 @ 0715	3	Run-19: Drilling Pressure: 200 psi Kelly Bar RPM: 202 Engine RPM: 1200-1300 ES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'			
APPRO	KED BY: OVED BY: ING CO.:	WI HUSS	OS .		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500			



LNP- OFFSET BORING PROGRAM PROJECT NO. 07-3935											
						LOG OF BORING NO. O-2					
ELEVATION (FEET MSL)	E (r	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	밀	COORDINATES N 1722994.8 E 457937.7	SYMBOL				
LEVATEET !	DEPTH (FEET)	AMPLE R RUN	OW/6" R % F & (RC	SOVE	PROFILE	SURFACE EL: 42.7	SS SY	REMARKS			
⊞ "		S O	BLO	RE(-	DESCRIPTION	nscs				
	162 —		100%					Drill Time: 44min 46sec Circulation loss: 100% First 0.3' of Run-19 from the end of R-18.			
-120.8	- - -	R-19	(42%)	5.0		162.4-163' Becomes moderately to intensely fractured. 163-164.5' DOLOMITE, as above except with few (0.1' thick) moderate yellowish brown (10YR 5/4) bands. 163.5					
	164 — — — — — — — — — — — — — — — — — — —	R-20	100%	5.0		164.5-164.7' Crystalline DOLOMITE, moderately to intensely fractured. 164.7-165' DOLOMITE as at 163'. 165-170' DOLOMITE, grayish orange (10YR 7/4) and pale yellowish brown (10YR 6/2), moderately hard, porous/pitted, fossiliferous, few vugs, moderately to intensely fractured, slightly to moderately weathered, strong reaction 1N HCl when powdered. 165.5-165.6' Crystalline DOLOMITE, fresh, pale yellowish brown (10YR 6/2).		Run-20: Drilling Pressure: 200-150 psi Kelly Bar RPM: 200, 201 Engine RPM: 1200-1300 Drill Time: 19min 55sec (165-167') 22min 17sec (167-170') Circulation Loss: 100%			
	170 — - 172 — - 174 —	R-21	100%	5.0		170-171.6' DOLOMITE, pale yellowish brown (10YR 6/2), moderaetly to intensely fractured, fresh to slightly weathered, slightly pitted, porous, few vugs, few fossils, thick bedded, strong reaction to 1N HC when powdered. 171.6-173.2' DOLOMITE, moderately weathered, thin bedded, varigated colors-pale yellowish brown (10YR 6/2), grayish orange (10YR 7/4), dark yellowish orange (10YR 6/6), porous/pitted, some fossils, slightly fractured (horizontal only). 173.2-173.4' Crushed zone. 173.4-175' DOLOMITE, as at 170'.		Run-21: Drilling Pressure: 200 psi Kelly Bar RPM: 202 Engine RPM: 1200-1300 Drill Time: 40min 48sec Circulation Loss: 100%			
	_					175-175.8' Crystalline DOLOMITE, moderately hard to hard, medium light gray (N6), intensely fractured (horizontal and vertical fractures).		Run-22: Drilling Pressure: 200-250 psi			
DATE STARTED: 9/10/09 DATE COMPLETED: 9/18/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS					GWL: D GWL: D DRILLII		NOTE	ES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'			
I						R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500			



LNP- (LNP- OFFSET BORING PROGRAM PROJECT NO. 07-3935										
						LOG OF BORING NO. 0-2					
ELEVATION (FEET MSL)	тн (Т:	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1722994.8 E 457937.7	SYMBOL				
EVA:	ОЕРТН (FEET)	MPLI R RUN	DW/6 R % F & (RC	OVE	PROFILE	SURFACE EL: 42.7		REMARKS			
EI (F		SA OF	BLC	REC		DESCRIPTION	nscs				
	176 — –					175.8-176.1' DOLOMITE as at 170'. 176.1-177' DOLOMITE, moderately soft to soft, dark yellowish orange (10YR 6/6) and dark yellowish brown (10YR 4/2), thin bedded/banded, pitted/porous, sandy texture, poorly indurated, strong reaction to 1N HCl when powdered. 177-178.5' DOLOMITE as at 170' except intensely fractured.	Э	Kelly Bar RPM: 201 Engine RPM: 1200-1300 Drill Time: 37min 24sec Circulation Loss: 100% Driller notes: soft 176-177' and 178-179'.			
	- 178 	R-22	(0%)	5.0		178.5-178.8' DOLOMITE as at 176.1'. 178.8-180' DOLOMITE as at 170'.					
	180 —					180-181.1' DOLOMITE, moderately hard, pale yellowish brown (10YF 6/2), moderately fractured (180.6-180.7'-intensely fractured/crushed), thick bedded, moderately weathered, weak to moderate reaction to 1N HCl when powdered. 181.1-182.7' DOLOMITE, moderately soft to soft, dark yellowish		Run-23: Drilling Pressure: 200 psi Kelly Bar RPM: 220 Engine RPM: 1400 Drill Time: 41min 54sec			
	- 182 — - -	R-23	100% (46%)	5.0		orange (10YR 6/6) to moderate yellowish brown (10YR 5/4), pitted/porous, sandy texture, moderately to severly weathered, fossiliferous vertical fracture from 182-182.4'. 182.2-182.7' Transitional/gradational zone, thin bedded/banded, some rip-up clasts of crystalline dolomite. 182.7-183.3' Crystalline DOLOMITE, moderately hard, light olive gray (5Y 6/1), intensely fractured along vertical fracture. 183.3-184.1' DOLOMITE, similar to 181.1'.		Circulation Loss: 100% Driller notes: 181-182.5' very soft.			
	184 —					184.1-185' DOLOMITE, similar to 182.7' except moderately fractured (all horizontal).					
	186 —					185-186.2' DOLOMITE, moderately hard, pale yellowish brown (10Yf 6/2), moderately weathered, pitted/porous, vuggy, fossiliferous, sand texture in weathered areas, thick bedded, strong reaction to 1N HCI when powdered. 186.2-187' Crystalline DOLOMITE, moderately hard, fresh, moderately fractured, light gray (N7) to light olive gray (5Y 6/1), stron reaction to 1N HCI when dry/powdered. 187-187.8' DOLOMITE as at 185'.	/	Run-24: Drilling Pressure: 200 psi Kelly Bar RPM: 224 Engine RPM: 1400-1500 Drill Time: 33min 13sec Circulation Loss: 100%			
	- 188 	R-24	100% (46%)	5.0		187.8-188.2' Crystalline DOLOMITE as at 186.2'. 188.2-188.8' Severly weathered DOLOMITE, coarse grained, poorly indurated, pitted/porous, sandy texture.					
	190 —					188.8-191.9' DOLOMITE, moderately soft, moderate yellowish brown (10YR 5/4), dark yellowish brown (10YR 4/2) and pale yellowish brown (10YR 6/2), thin bedded/banded, slightly fractured, moderately weathered, some vugs, weak to moderate reaction to 1N HCI when powdered, vertical fracture from 190-191.1'.		Run-25:			
DATE STARTED: 9/10/09 DATE COMPLETED: 9/18/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS					GWL: D GWL: D DRILLIN	9	NOTE	ES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'			
I –					DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500			
D. VILL											



LNP- OFFSET BORING PROGRAM PROJECT NO. 07-3935										
LOG OF BORING NO. O-2										
ION ASL)	Т.)	NO.	& (N) (EC. (D)	RECOVERY (ft.)	IE	COORDINATES N 1722994.8 E 457937.7	SYMBOL			
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N OR % REC. & (RQD)	SOVEF	PROFILE	SURFACE EL: 42.7		REMARKS		
		S Q	BLO	REC		DESCRIPTION	nscs			
	192 —	R-25	100% (18%)	5.0 5.0		191.9-192.2' Crystalline DOLOMITE, moderately to intensely weathered as at 186.2'. 192.2-194.2' DOLOMITE, moderately hard, strong reaction to 1N HCI when powdered, very pale orange (10YR 8/2) to yellowish gray (5Y 7 2) (cream color), slightly to moderately weathered, moderately fractured, fossiliferous, pitted, vuggy, thick bedded. 194.2-195' DOLOMITE as at 188.8'. 195-197.6' DOLOMITE, moderately soft, pale yellowish brown (10YR 6/2), moderately weathered, pitted/porous, unfractured, becomes intensely fractured below 197.3', thick bedded, dark yellowish brown (10YR 4/2) very thin bands from 196.7-197.6', strong reaction to 1N HCI when powdered. 197.6-198.7' Transistion zone, thin alternating layers of dolomite as above and crystalline dolomite, moderately fractured. 198.7-200' Crystalline DOLOMITE, pale yellowish brown (10YR 6/2) to light olive gray (5Y 6/1), moderately hard, vugs (0.05' wide), moderately to intensely fractured (possibly mechanical), thick bedded fresh to slightly weathered, strong reaction to 1N HCI when dry/ powdered. 200-202.4' As above except slightly to moderately weathered, few very thin pitted bands, vertical fracture from 200-201.3'.	,	Drilling Pressure: 200 psi Kelly Bar RPM: 201 Engine RPM: 1200-1300 Drill Time: 26min 9sec Circulation Loss: 100% Run-26: Drilling Pressure: 350 psi Kelly Bar RPM: 227 Engine RPM: 1400-1500 Drill Time: 20min 55sec Circulation Loss: 100% 9/18/09-No water level taken-rods locked in hole. Run-27: Drilling Pressure: 200 psi Kelly Bar RPM: 234 Engine RPM: 1500 Drill Time: 23min 23sec Circulation Loss: 100%		
DATE STARTED: 9/10/09 DATE COMPLETED: 9/18/09 FIELD GEOLOGIST: JLO					GWL: D	DEPTH: 4.3' DATE/TIME: 9/19/09 @ 0725	NOTE	ES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT		
CHEC	GEOLOG KED BY: OVED BY:	WE				RILLING METHOD: Continuous SPT/Mud Rotary/PQ3 Coring RILLER: Eddie Palmer HELPER: Chad/Cody		sampling below 20'		
	ING CO.:				DUILLE	ILLEER. Cliau/Couy	NIG.	i aiiiig 1500		



ELEVATION (FEET MSL) DEPTH (FEET) SAMPLE NO. OR RUN NO. BLOW/6" & (N) OR % REC. & (RQD)	ILE	COORDINATES		1
ソトー ドミ ー 礼口 1%~か1 m	1 1 1	N 1722994.8 E 457937.7	SYMBOL	DEMARKS
CEEEE	PROFILE	SURFACE EL: 42.7	SSS	REMARKS
SP SP OF OF OF OF OF OF OF OF OF OF OF OF OF		DESCRIPTION	nscs	
206 — R-28 92% 4.6 208 —		205-205.6' DOLOMITE, light gray (N7), moderately hard, slightly weathered, vuggy, fossiliferous, pitted, unfractured, moderately weathered at ends of core. 205.6-206.1' DOLOMITE as at 202.4-205'. 206.1-206.5' DOLOMITE gravel, no matrix. 206.5-208.7' DOLOMITE, moderately soft, yellowish gray (5Y 8/1) and yellowish gray (5Y 7/2), thin to very thin bedded, banded with pale yellowish brown (10YR 6/2), fresh to slightly weathered, strong reaction to 1N HCl when powdered, unfractured-breaks along darker colored bands-slickensides. 208' Color change to very light gray (N8). 208.7-210' DOLOMITE, severely weathered, intensely fractured (some mechanical), fossiliferous, sandy texture, pitted/porous, pale yellowish brown (10YR 6/2). 210-213' DOLOMITE, light gray (N7) to medium light gray (N6)-fresh zones, pale yellowish brown (10YR 6/2) on weathered zones, moderately to intensely weathered, moderately to intensely fractured due to weathering, strong reaction to 1N HCl when broken, conglomerate-like appearance (differential weathering), vuggy, fossiliferous, sandy texture, porous. 212-213' As above except more crystalline dolomite clasts (80-90%) and less weathered dolomite "matrix" (10-20%).		Run-28: Drilling Pressure: 200 psi Kelly Bar RPM: 195 Engine RPM: 1200 Drill Time: 11min 20sec Circulation Loss: 100% Driller Notes: 206-209' soft. Run-29: Drilling Pressure: 250-150 psi Kelly Bar RPM: 201, 205 Engine RPM: 1200-1300 Drill Time: 15min 49sec (210-212') 12min 11sec (212-213') 4min 40sec (213-215') Circulation Loss: 100%
216 — 216 — 216 — 218 — 4.8 218 — 9/10/09 DATE STARTED: 9/10/09 DATE COMPLETED: 9/18/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS	GWL: D GWL: D	S		Run-30: Drilling Pressure: 350-400 psi Kelly Bar RPM: 199 Engine RPM: 1200-1300 Drill Time: 18min 5sec Circulation Loss: 100% ES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'
APPROVED BY: DRILLING CO.: HUSS	DRILLE	ILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500		Failing 1500



LNP- 0	OFFSET B	ORING F	ROGRA	M		LOG OF BORING NO. O-2		PROJECT NO. 07-3935		
ELEVATION (FEET MSL)	DEРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1722994.8 E 457937.7 SURFACE EL: 42.7	S SYMBOL	REMARKS		
E F		SA OF	BLC	REC	"	DESCRIPTION	nscs			
	220 — — —					220-221.7' DOLOMITE, moderately soft, moderately to severly weathered, with very thin dark yellowish brown (10YR 4/2) bands, vuggy, pitted/porous in bands, very light gray (N8), moderately fractured (along pitted bands).		Run-31: Drilling Pressure: 300 psi Kelly Bar RPM: 223 Engine RPM: 1400-1500 Drill Time: 23min 41sec Circulation Loss: 100% Water level on 9/19/09 at 0725 is		
	222 — — —	R-31	100% (46%)	5.0		221.7-222.3' DOLOMITE, as above except hard, slightly weathered. 222.3-224' DOLOMITE, soft, severly weathered, grayish orange (10YR 7/4), fossiliferous, area slightly washed out but still intact.		4.3'.		
-182.3	224 — - -					224-225' DOLOMITE, light gray (N7), moderately soft, pitted/porous, vuggy, moderately fractured (vertical fracture 223.1-223.7'), thick bedded, moderately weathered, weak reaction to 1N HCl when powdered, fossiliferous. BOTTOM OF BORING 225'				
	226 — 									
	228 — - -									
	230 — - -									
	232 — - -									
	_ 234									
DATE FIELD	DATE STARTED: 9/10/09 DATE COMPLETED: 9/18/09				GWL: DEPTH: 5.2' DATE/TIME: 9/12/09 @ 0715 GWL: DEPTH: 4.3' DATE/TIME: 9/19/09 @ 0725 DRILLING METHOD: Continuous SPT/Mud Rotary/PQ3 Coring			NOTES: Used AWJ rods for SPT sampling from 0-20'. Used NWJ rods for SPT sampling below 20'		
APPROVED BY: DRILLING CO.: HUSS DRILLER: Eddie Palmer						R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500		



LNP- (Offset Bor	ing Prog	ram			LOG OF BORING NO. O-3			PROJECT NO. 07-3935
ION (JSL)	ΙC	N N O O	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	l l	COORDINATES N 1723189.3 E 458086.9		SYMBOL	
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	7 % R R (RQ	OVEF	PROFILE	SURFACE EL: 42.5		SSYI	REMARKS
크린		SA	BLC	REC		DESCRIPTION		nscs	
32.5	1.5 — 4.5 — 7.5 — 9 — 10.5 —					10.0-15.0' SAND.	-10.0'-	sp	0-15' Destructive drilling, log based on drill cuttings.
DATE FIELD	STARTED COMPLET GEOLOG	ED: 10	0		GWL: D GWL: D DRILLIN	_	N	OTE	S: NA
APPR	KED BY: OVED BY: ING CO.:		J0		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RI	IG:	Failing 1500



LNP-	Offset Bor	ing Prog	ram			LOG OF BORING NO. O-3		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	ОЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1723189.3 E 458086.9 SURFACE EL: 42.5	USCS SYMBOL	REMARKS
		s	BI	RE	<u> </u>	DESCRIPTION) S	
27.5	12— 13.5— 13.5— 15— 16.5— 19.5— 21— 21—	OB-2	80% (40%)	2.8		TOP OF AVON PARK FORMATION 15.0-18.5' DOLOMITE, were ly soft, very pale orange (10YR 8/2) to grayish orange (10YR 7/4), moderately soft, strong reaction to 1N HCI when powdered, slightly weathered, unfractured, thick bedded, slightly pitted. 16.4-17' Becomes moderately to intensely weathered, intensely fractured, fossiliferous. 17-18.5' Slightly weathered, slightly fractured. 18.5-21.3' DOLOMITE, moderately soft, very pale orange (10YR 8/2) to grayish orange (10YR 7/4), slightly weathered, fossiliferous, vuggy silty texture when weathered, unfractured-except 1 horizontal break a 19.5', strong reaction to 1N HCI when powdered.	, tt	Switched to Coring Driller notes: harder at approximately 15 feet. Switched to coring to advance boring, no casing set. Soft-fast drilling 16.5-17.5'.
DATE	DATE STARTED: 9/21/09 DATE COMPLETED: 10/1/09 FIELD GEOLOGIST: JLO					EPTH: 6.3' DATE/TIME: 10/1/09 @ 0720	NOTE	ES: NA
CHECKED BY: WDS						NG METHOD: Mud Rotary/PQ3 Coring		
APPROVED BY: DRILLER: Eddie Palmer DRILLING CO.: HUSS					DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILL	ING CO.:	HUSS						



LNP- (LNP- Offset Boring Program PROJECT NO. 07-3935										
		g . 10g				LOG OF BORING NO. O-3					
ELEVATION (FEET MSL)	гн Т)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	LE LE	COORDINATES N 1723189.3 E 458086.9	SYMBOL				
EVA ⁻	ОЕРТН (FEET)	MPLE	DW/6" R % F & (RC	OVE	PROFILE	SURFACE EL: 42.5	S SY	REMARKS			
		S O	BL(REC		DESCRIPTION	NSCS				
	22.5 — —	OB-3	76% (50%)	3.8		orange (10YR 6/6) to moderate yellowish brown (10YR 5/4), thick bedded, friable, low toughness, no plasticity, low dry strength, slow dilatancy.					
	24 — - - - - - 25.5 —							Driller notes: OB-4, whole run soft drilling.			
	27 — — — — — — — — — 28.5 —	OB-4	60% (16%)	3.0		26.2-27' Becomes moderately to intensely fractured.					
	30 —					30.9-37.7' DOLOMITE, light gray (N7) to medium light gray (N6), moderately hard, strong reaction to 1N HCl, thick bedded, unfractured, fresh, fossiliferous, slightly pitted.					
	_ _ _	OB-5	74% (56%)	3.7							
	STARTED		21/09		GWL: D		NOTE	ES: NA			
	GEOLOG					DEPTH: 6.3' DATE/TIME: 10/1/09 @ 0720 NG METHOD: Mud Rotary/PQ3 Coring					
	KED BY:	W									
APPROVED BY: DI DRILLING CO.: HUSS						R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500			
DRILL	ING CO.:	HUSS									



LNP-	Offset Bor	ing Prog	ram			LOG OF BORING NO. O-3		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	ΗC	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	l l	COORDINATES N 1723189.3 E 458086.9	SYMBOL	
EVAT	DEPTH (FEET)	MPLE RUN	. (RQ	OVEF	PROFILE	SURFACE EL: 42.5	SSY	REMARKS
		SAN	BLO OF	REC		DESCRIPTION	nscs	
-0.7	33 — 34.5 — 36 — 37.5 — 40.5 — 42 — 42 —	OB-6	78% (46%)	2.0		35.0-37.7' As above except slightly fractured (horizontal-along bedding planes). 37.7-38.4' As above except moderately to intensely fractured. 38.4-43.2' SILT with GRAVEL (DEGRADED DOLOMITE), 50% silt, 50% gravel, nonplastic, no dry strength, gravel is very soft, slow to rudilatancy, low toughness, moderate yellowish brown (10YR 5/4) to dark yellowish orange (10YR 6/6), weak reaction to 1N HCl, poorly indurated.	ļ'- D	Driller notes: 38.5-40' soft drilling.
DATE	43.5 — DATE STARTED: 9/21/09					43.2-44.7' DOLOMITE, moderately hard, pitted/porous, moderately weathered, unfractured, thick bedded, fossiliferous, pale yellowish brown (10YR 6/2). EPTH: 4.6' DATE/TIME: 9/22/09 @ 0715	NOTE	ES: NA
DATE	COMPLET	ΓED: 10/			GWL: D	EPTH: 6.3' DATE/TIME: 10/1/09 @ 0720		
	GEOLOG KED BY:	IST: JL0 W[DRILLIN	NG METHOD: Mud Rotary/PQ3 Coring		
	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILL	ING CO.:	HUSS						



LNP- (Offset Bor	ing Prog	ram					PROJECT NO. 07-3935
						LOG OF BORING NO. O-3		
rion ASL)	ΕÇ	. NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)		COORDINATES N 1723189.3 E 458086.9	SYMBOL	
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	2W/6" R % F & (RG	COVE	PROFILE	SURFACE EL: 42.5	SS SY	REMARKS
		δ <u>ο</u>	BL(REC		DESCRIPTION	nscs	
	45 — 46.5 — 48 — 49.5 — 51 — 52.5 — 54 —	OB-9	91% (40%)	4.8		44.7-50' Same as above except 45.3-47.6' moderately to severely weathered, moderately to intensely fractured. 50-51.2' DOLOMITE, moderately hard, pitted/porous, fossiliferous, slightly to moderately weathered, slightly fractured (2 horizontal at 50.3' and 50.7'), thick bedded, pale yellowish brown (10YR 6/2). 51.2-51.7' DOLOMITE, intensely weathered/degraded, soft to very soft, friable, moderate yellowish brown (10YR 5/4), sandy/silty texture, texture, weathering in horizontal layers, moderate yellowish brown (10YR 5/4), moderately to poorly indurated, with very thin organic layers, moderately fractured (bedding planes).		Water level on 9/22/09 @ 0715 4.6'.
DATE FIELD CHEC	DATE STARTED: 9/21/09 DATE COMPLETED: 10/1/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS					EPTH: 4.6' DATE/TIME: 9/22/09 @ 0715 EPTH: 6.3' DATE/TIME: 10/1/09 @ 0720 NG METHOD: Mud Rotary/PQ3 Coring		ES: NA
	OVED BY: ING CO.:	HUSS			DKILLE	R: Eddie Palmer HELPER: Chad/Cody	KIG:	Failing 1500



LNP- (Offset Bor	ing Prog	ram			LOG OF BORING NO. O-3		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	F.C	SAMPLE NO. OR RUN NO.	& (N) (EC. (D)	RECOVERY (ft.)	E E	COORDINATES N 1723189.3 E 458086.9	SYMBOL	
EVAT	DEPTH (FEET)	MPLE	BLOW/6" & (N OR % REC. & (RQD)	OVE	PROFILE	SURFACE EL: 42.5	SSY	REMARKS
크린		SAI	BLC OF	REC		DESCRIPTION	nscs	
	55.5 —							Driller notes: 55.5' very soft.
	57 — - - -	OB-10	80% (16%)	4.0		57-61' DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2 to moderate yellowish brown (10YR 5/4), fresh, slightly pitted (in bands), moderately fractured-mechanical, intensely fractured-rubble from 57.3-58.2', thick bedded, few very thin organic layers.	2)	
	58.5 —							
	61.5 —					61-67.5' DOLOMITE, moderate yellowish brown (10YR 5/4), moderately hard, fresh to slightly weathered, strong reaction to 1N HCl when powdered, thick bedded, slightly fractured (horizontal).		
	63 —	OB-11	68% (38%)	3.4				
	64.5 —							OB-12: Drilling Pressure: 150-200 psi Kelly Bar RPM: 224 Engine RPM: 1400-1500
DATE FIELD	DATE STARTED: 9/21/09 DATE COMPLETED: 10/1/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS				GWL: D GWL: D DRILLIN	9	NOTE	ES: NA
APPR	OVED BY: ING CO.:		- -	_	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- Offset Boring Program PROJECT NO. 07-3935										
						LOG OF BORING NO. O-3				
rion asl)	££	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	빌	COORDINATES N 1723189.3 E 458086.9	SYMBOL			
ELEVATION (FEET MSL)	DEPTH (FEET)	MPLE	DW/6" R % F & (RC	OVE	PROFILE	SURFACE EL: 42.5	SS SY	REMARKS		
		\$ 5	BLO	REC		DESCRIPTION	nscs			
	66 — - -	OB-12	68% (56%)	1.7		67.5' DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2) slightly weathered, pitted/porous, sandy texture, unfractured, thick bedded, with banded appearance, strong reaction to 1N HCl when	,	Drill Time: 8min 23sec Circ. Loss: none Driller notes: 65-66.5' soft then hard.		
	67.5 — —					powdered.		OB-13: Drilling Pressure: 150 psi Kelly Bar RPM: 199 Engine RPM: 1200-1300 Drill Time: 22min 42sec		
	69 -	OB-13	100% (32%)	2.5		Becomes moderately to intensely fractured.		Circ. Loss: none		
	70.5 — -					70-72' Soft zone, possible wash out zone (see driller notes).		Run-1: Drilling Pressure: 150-200 psi Kelly Bar RPM: 240 Engine RPM: 1500-1600 Drill Time: 12min 31sec Circ. Loss: none Driller notes: soft 70-72'.		
	72 — 	R-1	66% (24%)	3.3		72-74.5' DOLOMITE, moderately hard, slightly to moderately weathered, pitted/porous, vuggy, fossiliferous, vertical fracture from 72.5-73.5' open, rough, pale yellowish brown (10YR 6/2), thick beddded, strong reaction to 1N HCl when powdered, slightly fractured.				
	73.5 — — — —					74.5-75' As above except severely weathered to degraded, silty texture to sandy texture, poorly indurated.				
	75 — — — — 76.5 —					75-80' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, slightly to moderately weathered, thick bedded, pitted/porous, fossiliferous, some larger vugs from 77-78' (0.05' wide), moderate to strong reaction to 1N HCl when powdered, fracture at 75.7-76'(stepped), and 76.6'(horiztonal), slightly fractured.		R-2: Drilling Pressure: 150 psi Kelly Bar RPM: 196 Engine RPM: 1200-1300 Drill Time: 22min 33sec Circ. Loss: none Note: no water level taken on 9/23/ 09-still driving casing.		
DATE	OTADTE	. 0/0	1/00	L		EDTU: A CL. DATE/TIME: 0/00/00 © 0745	NOT			
1	STARTED COMPLE		:1/09 /1/09		GWL: D		NOTE	ES: NA		
1	GEOLOG					NG METHOD: Mud Rotary/PQ3 Coring				
1	KED BY:	WE	os	-				- W 4-00		
					DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500		
PIXILL	PRILLING CO.: HUSS									



LNP- Offset Boring Program LOG OF BORING NO. O-3 PROJECT NO. 07-3935										
						LOG OF BORING NO. 0-3	_	Г		
TION MSL)	∃£	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	I E	COORDINATES N 1723189.3 E 458086.9	SYMBOL			
ELEVATION (FEET MSL)	DEPTH (FEET)	AMPLI R RUN	OW/6' R % F & (RC	COVE	PROFILE	SURFACE EL: 42.5	CS SY	REMARKS		
ш		Ø ○	B	RE		DESCRIPTION	Sn			
13 13	78— - 78— - 79.5— - 81— - 82.5— - 84— - 85.5— - 87— - 87—	R-2	98% (82%)	4.9		79.3-79.4' Few very thin black organic layers, becomes slightly to moderately weathered, sandy texture. 80-80.8' Rubble zone (dolomite as above). 80.8-81.2' As above except moderately to intensely fractured. 81.2-81.6' Intensely fractured to crushed. 81.6-85' DOLOMITE, moderately hard, pale yellowish brown (10YR 62), pitted/porous, moderately to intensely fractured, vertical fracture 81.6-85' open, rough, thick bedded, few vugs, fossiliferous, slightly weathered, end of run intensely fractured (mechanical). 85-86' DOLOMITE, fossiliferous, pitted/porous, vuggy, pale yellowish brown (10YR 6/2), thick bedded, moderately to severely weathered (85.3-85.5' crushed/rubble zone), moderately hard. 86-90' DOLOMITE, slightly weathered, few fossils, pitted/porous in thin bands, moderately hard, unfractured except at 86.3' (horizontal), silty/sandy texture at fractures.		R-3: Drilling Pressure: 150 psi Kelly Bar RPM: 226 Engine RPM: 1400-1500 Drill Time: 18min 45sec Circ. Loss: none R-4: Drilling Pressure: 150, 150 psi Kelly Bar RPM: 184, 218 Engine RPM: 1100-1200, 1300-1400 Drill Time: 9min 24sec (85-87') 11min 19sec (87-88.5') 2min 9sec (88.5-90') Circ. Loss: none Driller notes: soft 85-86', Becomes soft at 88.5, soft from 88.5-89' (core loss zone).		
DATE	STARTED		(54%)		GWL: D	87.5' Becomes more pitted/porous and vuggy, few very thin organic DEPTH: 4.6' DATE/TIME: 9/22/09 @ 0715	NOTE	ES: NA		
DATE	COMPLET	ED: 10	/1/09		GWL: D	_				
FIELD	GEOLOGI	ST: JL	С		DRILLI	NG METHOD: Mud Rotary/PQ3 Coring				
CHEC	KED BY:	W	os	L						
APPR	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500		
DRILL	ING CO.:	HUSS								



LNP- Offset Boring Program PROJECT NO. 07-3935										
						LOG OF BORING NO. O-3				
rion asl)	Ħ£	NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)		COORDINATES N 1723189.3 E 458086.9	SYMBOL			
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	OW/6" R % F & (RG	SOVE	PROFILE	SURFACE EL: 42.5		REMARKS		
		/S	BLO	RE		DESCRIPTION	nscs			
	88.5 — -					lenses. 88.5-89.8' Rubble-core loss area.				
	90 —					90-91.8' Rubble, moderately weathered DOLOMITE, as above.		R-5: Drilling Pressure: 150, 150-200, 150 psi Kelly Bar RPM: 205, 221, 214 Engine RPM: 1200-1300, 1400- 1500		
	91.5 —	R-5	100% (24%)	5.0		91.8-92.3' Crystalline DOLOMITE, light gray (N7) to medium light gray (N6) outer core, pale yellowish brown (10YR 6/2) on fresh, hard, no fossils, intensely fractured (possibly mechanical), strong reaction to 1N HCl when dry. 92.3-92.4' Severly weathered. degraded DOLOMITE, very soft, friable. 92.4-92.7' Crystalline DOLOMITE as above. 92.7-95' DOLOMITE, as at 86-90' except with very pale orange (10YR 8/2) dolomite clasts, moderately fractured (45° breaks).		Drill Time: 12min 3sec (90-91') 8min 22sec (91-92') 5min 23sec (92-93') 13min 3sec (93-95') Circ. Loss: none Used new core catcher starting on Run-5.		
	94.5 —					95-95.5' DOLOMITE, moderately hard, pale yellowish brown (10YR 62) with few zones of very pale orange (10YR 8/2), slightly to moderately weathered, pitted/porous, some fossils, weak to moderate reaction to 1N HCl when powdered, thick bedded, slightly fractured. 95.5-96' Crystalline DOLOMITE, pale yellowish brown (10YR 6/2), hard, pitted in bands, strong reaction to 1N HCl when dry, few fossils, thin bedded, intensely fractured, fresh to slightly weathered.	}	R-6: Drilling Pressure: 200-250 psi Kelly Bar RPM: 210 Engine RPM: 1300 Drill Time: 27min 15sec (95-97.5') 12min 46sec (97.5-99') 5min 22sec (99-100')		
	97.5—	R-6	100%	5.0		96-102' DOLOMITE, pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 5/4), moderately hard, moderate to strong reaction to 1N HCl when powdered, pitted/porous, fossiliferous, sand texture, moderately to intensely fractured (few rubble zones), few vugs, thick bedded.	y	Circ. Loss: none Water level 9/28/09 @ 0740 5.7'		
DATE FIELD	DATE STARTED: 9/21/09 DATE COMPLETED: 10/1/09 FIELD GEOLOGIST: JLO					PEPTH: 4.6' DATE/TIME: 9/22/09 @ 0715 PEPTH: 6.3' DATE/TIME: 10/1/09 @ 0720 NG METHOD: Mud Rotary/PQ3 Coring	NOTE	ES: NA		
APPRO	KED BY: OVED BY: NG CO.:)S	_	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500		



		LNP- Offset Boring Program PROJECT NO. 07-3935										
LOG OF BORING NO. O-3												
ELEVATION (FEET MSL) DEPTH (FEET) SAMPLE NO. OR RUN NO. OR RUN NO. BLOW/6" & (N) OR % REC. & (RQD)		COORDINATES N 1723189.3 E 458086.9	SYMBOL									
LEVATICE EET MS DEPTH (FEET) MPLE N R RUN N R R R REG R (RQD)	PROFILE	SURFACE EL: 42.5	S SY	REMARKS								
SA OF OF OF OF OF		DESCRIPTION	nscs									
99— 100.5— 102— R-7 103.5— 105— 106.5— 106.5— 106.5—		102-105' DOLOMITE, same as above except moderately fractured, moderately weathered, sandy texture. 105-106.6' DOLOMITE as above except soft, breaks easily. 106.6-110' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, pitted/porous, strong reaction to 1N HCl when powdered, few		R-7: Drilling Pressure: 150, 150psi Kelly Bar RPM: 211, 199 Engine RPM: 1300-1400, 1200- 1300 Drill Time: 11min 37sec (100-102') 10min 33sec (102-105') Circ. Loss: none R-8: Drilling Pressure: 150 psi Kelly Bar RPM: 209 Engine RPM: 1300 Drill Time: 12min 36sec (105-106') 12min 26sec (106-110') Circ. Loss: 10%								
R-8 100% (0%) 5.0 108 — 109.5 — 109.5 — 9/21/09	GWL: D	fossils, thick bedded, moderately fractured-vertical fracture 106.1-108.4', open-rough, slightly to moderately weathered.	NOTE	ES: NA								
DATE COMPLETED: 10/1/09 FIELD GEOLOGIST: JLO	GWL: D	<u> </u>										
CHECKED BY: WDS APPROVED BY: DRILLING CO.: HUSS	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500								



LNP-	Offset Bor	ing Prog	ram			LOG OF BORING NO. O-3		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	TH ET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1723189.3 E 458086.9	SYMBOL	DEMARKS
LEV/	DEPTH (FEET)	MMPL R RU	0W/6 R % R (R	SOVE	PRO	SURFACE EL: 42.5		REMARKS
<u> </u>		S/A OF	BL(REC		DESCRIPTION	nscs	
						110-111.8' DOLOMITE, as above except slightly weathered, unbroked (except 111.4-111.8' rubble/crushed zone).		R-9: Drilling Pressure: 150 psi Kelly Bar RPM: 203 Engine RPM: 1200-1300 Drill Time: 16min 22sec Circ. Loss: 10%
	112.5 —	R-9	86% (56%)	4.3		111.8-112.2' Crystalline DOLOMITE light gray (N7), hard, pitted in very thin bands, few vugs. 112.2-115' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, pitted/porous, vuggy, some fossils, moderately weathered, sandy texture, becomes more weathered at approximately 114', wea reaction to 1N HCl when powdered, moderately fractured (bedding planes).		
	114 —					115-118.1' DOLOMITE, soft to very soft, moderate yellowish brown (10YR 5/4) to dark yellowish orange (10YR 6/6), severly weathered to		R-10: Drilling Pressure: 100-150 psi
	115.5 — — — — — — — ——————————————————————	R-10	70% (10%)	3.5		degraded, friable, moderately to poorly indurated, sandy texture, vuggy, porous/pitted, fossiliferous, moderately to intensely fractured (mostly along bedding planes).		Kelly Bar RPM: 204 Engine RPM: 1200-1300 Drill Time: 4min 42sec (115-117.5' 12min 52sec (117.5-120') Circ. Loss: 10% SHELBY TUBE ST-1: Down Pressure 900 psi Pushed 3.5" Bottom crushed. Driller notes: soft-fast drilling 115- 117.5' Fast drilling-very soft 119.2-120'
-75.6 -76.3	_ 118.5 					118.1-118.8' LIMESTONE, moderately hard to hard, strong reaction to 1N HCl, fresh, few vugs filled with sandy textured DOLOMITE, few pits, no fossils, medium light gray (N6), thick bedded.		
. 0.0	_ _ _ _ 120 —					118.8-120' DOLOMITE, severly weathered to degraded, very soft to soft, poorly indurated, sandy texture, moderate yellowish brown (10YR 5/4), no plasticity, low to no dry strength, slow dilatancy, low toughness, 60% dolomite, 40% degraded dolomite. 120-125' DOLOMITE, pale yellowish brown (10YR 6/2), moderately		R-11:
	_			<u> </u>		hard, pitted/porous, vuggy, slightly weathered, thick bedded, moderately fractured (vertical fracture 120.7-122.3'), strong reaction to 1N HCl when powdered, some fossils.		Drilling Pressure: 150 psi Kelly Bar RPM: 227 Engine RPM: 1400-1500
	STARTED		21/09		GWL: D		NOTI	ES: NA
	COMPLET GEOLOG				GWL: D	EPTH: 6.3' DATE/TIME: 10/1/09 @ 0720 NG METHOD: Mud Rotary/PQ3 Coring		
	KED BY:	151: JL			νι ΧΙΓΓΙΙ,	No METHOD. Mad Notally/FQ3 Colling		
	OVED BY:		-		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILL	ING CO.:	HUSS						



LNP- (Offset Bor	ing Prog	ram			LOG OF BORING NO. O-3		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	ОЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1723189.3 E 458086.9	SYMBOL	REMARKS
ELEV.		AMP OR RU	OW/ OR % R (F	COV	PRC	SURFACE EL: 42.5	uscs s	NEWANIO
		<i>w</i> 0	II O	RE	71777	DESCRIPTION	🖺	Drill Time: 9min 4sec (120-122')
	- 121.5 - -					123.4-123.6' Becomes intensely fractured/crushed.		6min 41sec (122-125') Circ. Loss: 10%
	123 — - - - -	R-11	100% (42%)	5.0				
	_ 124.5 _ _					125-128' DOLOMITE, pale yellowish brown (10YR 6/2), moderately		R-12:
	126 — —					hard, thick bedded, slightly weathered, pitted/porous, fossiliferous, vuggy, weak to moderate reaction to 1N HCl when powdered, slightly fractured (bedding planes). 126-126.3' Larger vugs (0.05' thick) oblong shaped.		Drilling Pressure: 150-200 psi Kelly Bar RPM: 207, 217 Engine RPM: 1200-1300, 1300- 1400 Drill Time: 8min 46sec (125-128') 7min 55sec (128-129') Locked in hole, using EZ-mud, AIRLIFT 2min 54sec (129-130') Circ. Loss: 100% Driller Notes: 126-126.3' soft-
	- 127.5 — - -	R-12	86% (32%)	4.3				possible core loss zone 127.5-127.8' soft- possible core loss zone 128-128.5' possible core loss zone Water level 9/29/09 @ 0745 5.35'
	129 —					128.5-129.0' DOLOMITE, crystalline, medium light gray (N6), hard with pockets of weathered fossiliferous dolomite (grayish orange (10YR 7/4)), no fossils, medium bedded, fresh to slightly weathered, slightly fractured (1 horizontal break at 128.9'). 129-130.35' DOLOMITE as at 126.3'.		
	- 130.5 — - - -					130.35-130.45' Crystalline DOLOMITE. 130.45-130.6' DOLOMITE, grayish orange (10YR 7/4) and dark yellowish brown (10YR 4/2), moderately soft to soft, friable, fossiliferous, moderately weathered, thin to medium bedded, moderately fractured, weak reaction to 1N HCl when powdered. 130.6-131.4' Crystalline DOLOMITE, light gray (N7) exterior, pale yellowish brown (10YR 4/2) on fresh, moderately hard, strong		R-13: Drilling Pressure: 150 psi Kelly Bar RPM: 204 Engine RPM: 1200-1300 Drill Time:11min 18sec (130-132') 5min 55sec (132-135') Circ. Loss: 100%
DATE FIELD	STARTED COMPLET GEOLOGI KED BY:	ED: 10/)		GWL: D GWL: D DRILLIN		NOTE	ES: NA
APPR	OVED BY:		-	_	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
				_				



LNP- (Offset Bor	ing Prog	ram			LOG OF BORING NO. O-3		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	БЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1723189.3 E 458086.9 SURFACE EL: 42.5	SYMBOL	REMARKS
ELE)	<u> </u>	SAM OR F	NON OR	ECO	l R		nscs	
	_		Ш	₩.	7,17,7	DESCRIPTION reaction to 1N HCl when powdered, thick bedded, pitted in very thin	>	
	132 — - - - - 133.5 —	R-13	94% (8%)	4.7		bands, no fossils, moderately fractured (vertical fracture 130.6-132.0'), fresh to slightly weathered. 131.4-132' DOLOMITE, crystalline, as above except moderately to intensely weathered, friable, poorly indurated, sandy texture. 132-135' DOLOMITE, moderately soft, pale yellowish brown (10YR 6.2), pitted/porous, few vugs, some fossils, thick bedded, moderately to intensely fractured, weak to moderate reaction to 1N HCl, sandy texture, vertical fracture from 132-133.9' open, rough, rubble zone 133.1-133.4'.		
	- - - - 135 — - -					135-136.3' DOLOMITE, grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2), moderately weathered, moderately to intensely fractured, pitted/porous, vuggy, medium bedded, strong reaction to 1N HCl when powdered.		R-14: Drilling Pressure: 150-200, 200 psi Kelly Bar RPM: 213, 204 Engine RPM: 1300-1400, 1200- 1300 Drill Time: 8min 43sec (135-136.6')
	- 136.5 — - - - 138 — -	R-14	92% (20%)	4.6		136.3-137.5' Crystalline DOLOMITE, moderately hard to hard, yellowish gray (5Y 7/2) and light gray (N7), vuggy, pitted in bands, moderately fractured, strong reaction to 1N HCl when powdered, fossiliferous in bands, some vugs filled with porous dolomite (yellowish gray (5Y 7/2)), thick bedded, slightly to moderately weathered. 137.5-140.0' DOLOMITE as at 135-136.3' except light gray (N7) to light olive gray (5Y 6/1).		10min 29sec (136.6-136.8') 29min 38sec (136.8-140') Circ. Loss: 100%
	- 139.5 — - - - 141 — - -					139.3-140' Intensely fractured. 140-144' Crystalline DOLOMITE, with few thin interbeds of pitted dolomite, pale yellowish brown (10YR 6/2), moderately hard, no fossils, fresh, moderately to itensely fractured, medium to thick bedded, strong reaction to 1N HCl when powdered, pitted dolomite is moderately hard, pale yellowish brown (10YR 6/2), pitted/porous, fossiliferous, thin to medium bedded-banded appearance, slightly to moderately weathered, unfractured, moderate to strong reaction to 1N HCl when powdered.		R-15: Drilling Pressure: 150-200 psi Kelly Bar RPM: 219 Engine RPM: 1400 Drill Time: 55min 21sec (140-144') 1min 10sec (144-145') Circ. Loss: 100% Driller notes: soft at 144'(poor recovery last 1 foot)
	 142.5 —	R-15	70%	3.5				
DATE FIELD	DATE STARTED: 9/21/09 DATE COMPLETED: 10/1/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS					EPTH: 4.6' DATE/TIME: 9/22/09 @ 0715 EPTH: 6.3' DATE/TIME: 10/1/09 @ 0720 NG METHOD: Mud Rotary/PQ3 Coring	I Note	I ES: NA
APPR	APPROVED BY:					R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILL	ING CO.:	HUSS						



LNP-	Offset Bo	ring Prog	ram			LOG OF BORING NO. O-3		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	ΞC	SAMPLE NO. OR RUN NO.	& (N) (EC. D)	RECOVERY (ft.)	믜	COORDINATES N 1723189.3 E 458086.9	SYMBOL	
EVAT	DEPTH (FEET)	MPLE	BLOW/6" & (N OR % REC. & (RQD)	OVE	PROFILE	SURFACE EL: 42.5		REMARKS
크린		SAI	BLC OF	REC		DESCRIPTION	nscs	
	144 — 145.5 — 148.5 — 148.5 — 150 — -	ST-2	(14%) 100% (NA%)	3.8		144-145' DOLOMITE, dark yellowish orange (10YR 6/6), soft, fossiliferous (packstone-like), sandy texture. DOLOMITE, as above (144-145') except poorly cemented/indurated, harder piece at bottom of Shelby tube. 146.2-150' DOLOMITE as at 144-145' except moderately to fractured (bedding planes). 147.2-148.0' Crushed zone. 148.4-150.0' Unfractured (1 horizontal break at 149.7').		Shelby Tube ST-2: 145-146.2' Down Pressure: 900 psi Pushed: 14 inches Recovery: 1.2' R-16: Drilling Pressure: 150 psi Kelly Bar RPM: 211 Engine RPM: 1300-1400 Drill Time: 3min 15sec (146.2-147.8') 19min 32sec (147.8-150') Circ. Loss: 100% R-17: Drilling Pressure: 150-200, 300-35 psi Kelly Bar RPM: 215, 210 Engine RPM: 1300-1400, 1300
	151.5 — - - - - 153 — - - STARTEE		90%	1.8	GWL: D	150.7-155' DOLOMITE, moderately hard, pale yellowish brown (10YF 6/2) to dark yellowish orange (10YR 6/6), moderately weathered, pitted/porous, sandy texture, few vugs, slightly to moderately fractured, thick bedded, weak reaction to 1N HCl. 152.1-152.5' Becomes moderately soft. 153.8-154.2' Vertical fracture.		Drill Time: 10min 3sec (150-152.1 9min 34sec (152.1-155') AIRLIFT Circ. Loss: 100% NOTE: Run-17A and R-17B equa R-17. Water level 9/30/09 @ 0725 5.3'.
FIELD	GEOLOG KED BY:)		GWL: D	PEPTH: 6.3' DATE/TIME: 10/1/09 @ 0720 NG METHOD: Mud Rotary/PQ3 Coring		
	OVED BY			\dashv	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP-	Offset Bor	ing Prog	ram					PROJECT NO. 07-3935
						LOG OF BORING NO. O-3		
rion ASL)	ΕÇ	. NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)		COORDINATES N 1723189.3 E 458086.9	SYMBOL	
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	OW/6" R % F & (RQ	SOVE	PROFILE	SURFACE EL: 42.5	USCS SY	REMARKS
		% Ō	BL	RE(DESCRIPTION	NS)	
	154.5 — 156 — 157.5 — 159 — 159 —	R-17B	(62%) (62%)	분 2.6 4.4		DESCRIPTION 155-155.7' DOLOMITE, moderately weathered, thin bedded, sandy texture, fossiliferous, pale yellowish brown (10YR 6/2), moderate yellowish brown (10YR 5/4) and dark yellowish brown (10YR 4/2), pitted/porous, moderately soft, strong reaction to 1N HCI when powdered, unfractured except horiztonal at 155.2'. 155.7-156.1' DOLOMITE, crystalline, hard, yellowish gray (5Y 7/2) to very light gray (N8), fresh, with very thin black organic layers, abrupt top and basal contact, strong reaction to 1N HCI when powdered, thin to moderate bedding, unfractured except vertical fracture from 155.9-157'. 156.1-160.0' DOLOMITE as at 155-155.7'.	n .	R-18: Drilling Pressure: 200-300 psi Kelly Bar RPM: 211 Engine RPM: 1300-1400 Drill Time: 26min 8sec (155-158') 7min 24sec (158-160') Circ. Loss: 100%
-118.0 -119.0	160.5 — - - - - - 162 —					6/2) and dark yellowish brown (10YR 4/2), laminated (thin layers), moderately weathered, sandy texture, pitted/ porous, unfractured, weak to moderate reaction to 1N HCl when powdered. 160.5-161.5' ROD DROP. 161.5-162.8' DOLOMITE, as above except with few very thin layers/ pockets of crystalline dolomite.	<u>'-</u>	Drilling Pressure: 150-200, 200 psi Kelly Bar RPM: 199 Engine RPM: 1200-1300 Drill Time: 3min 48sec (160-160.5') 9min 58sec (161.5-163.5') 3min 10sec (163.5-165') Circ. Loss: 100% Driller Notes: ROD DROP 160.5-161.5' ROD DROP 162.5-163' AIRLIFT
-120.0		R-19	50% (38%)	2.5	/////	162.5 162.5-163.0' ROD DROP.	, <u>.</u>	
-120.5	- 163.5 — - - -					163.0-163.7' DOLOMITE as at 161.5-162.8'. 163.7-165' Washed out zone (piece of core wedged in core barrel shoe.)	,' <u>-</u>	
DATE	STARTED COMPLET	ED: 10/			GWL: D	EPTH: 6.3' DATE/TIME: 10/1/09 @ 0720	NOTE	ES: NA
CHEC APPR	GEOLOGI KED BY: OVED BY:	WE				NG METHOD: Mud Rotary/PQ3 Coring R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DKILL	ING CO.:	HUSS						



LNP- Offset Boring Program		LOG OF BORING NO. O-3		PROJECT NO. 07-3935
ELEVATION (FEET MSL) DEPTH (FEET) SAMPLE NO. OR RUN NO. OR % REC. & (RQD)	RECOVERY (ft.) PROFILE	COORDINATES N 1723189.3 E 458086.9 SURFACE EL: 42.5	SYMBOL	REMARKS
FEE (FEE (FEE (FEE SAM) OR F	RECO PR	DESCRIPTION	NSCS	
165 —		165-165.7' Rubble, cave-in from above.		R-20: Drilling Pressure: 150-200 psi Kelly Bar RPM: 201
-124.2 166.5 — 		165.7-166.7' DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2), moderately weathered, pitted/porous, sandy texture, vuggy, medium bedded, moderately fractured. 166.7-168' ROD DROP.	' -	Engine RPM: 1200-1300 Drill Time: 5min 15sec (165-166') 5min 11sec (166-166.7') 8min 29sec (168-170') Circ. Loss: 100% Driller Notes: 166.7-168' rod drop (166.7-167' no recovery) Changed inner barrel shoe and
(22%)	2.4			core catcher.
-125.5 168 — — — — — — — ———————————————————————		168-170' DOLOMITE, moderately hard, fresh to slightly weathered, moderate yellowish brown (10YR 5/4), porous, few pits and vugs, no fossils, unfractured-healed vertical fracture 168.2-168.7', moderate to strong reaction to 1N HCl when powdered.		
171 —		170-173.4' DOLOMITE, moderately hard, pale yellowish brown (10Yl 6/2), strong reaction to 1N HCl when powdered, very thin bedded/laminated, slightly to moderately weathered, sandy texture in fractured areas, pitted/porous in very thin bands, no fossils, crystalline, intensely fractured (bedding planes, vertical fracture from 172.3-173.5').	3	R-21: Drilling Pressure: 150-200 psi Kelly Bar RPM: 211 Engine RPM: 1300-1400 Drill Time: 17min 5sec (170-172') 18min 28sec (172-175') Circ. Loss: 100%
172.5 — R-21	4.7	173.4-175' DOLOMITE, moderately soft to moderately hard, slightly t moderately weathered, sandy texture, no fossils, no pits or vugs, strong reaction to 1N HCl when powdered, thick bedded, dense, unfractured.	0	
175.5		175-175.7' DOLOMITE, moderately hard, pale yellowish brown (10Yl 6/2), moderately weathered, sandy texture, pitted/porous, medium bedded, fractured at top of run (possibly mechanical), no fossils, no	₹	R-22: Drilling Pressure: 200 psi Kelly Bar RPM: 214
DATE STARTED: 9/21/09 DATE COMPLETED: 10/1/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS	GWL: D GWL: D DRILLII		NOTI	ES: NA
APPROVED BY: DRILLING CO.: HUSS	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP-	Offset Boi	ring Prog	ram			LOG OF BORING NO. O-3		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1723189.3 E 458086.9 SURFACE EL: 42.5 DESCRIPTION	USCS SYMBOL	REMARKS
	- - 177 — - - - 178.5 — - -	R-22	100% (24%)	5.0		vugs, unfractured, weak to moderate reaction to 1N HCl when powdered. 175.7-176.8' DOLOMITE, light gray (N7) exterior, pale yellowish brown (10YR 6/2) when broken, medium bedded, slightly to moderately weathered, moderately to intensely fractured, vuggy (mostly weathered out fossils), slightly pitted, some fossils, strong reaction to 1N HCl when dry (powdered), vertical fracture 175.7-176.8'-open, rough, stepped. 176.8-180' DOLOMITE, pale yellowish brown (10YR 6/2) and dark yellowish orange (10YR 6/6), moderately hard to hard, strong reaction to 1N HCl when powdered, thin bedded (177.7-178.1' thinly laminated), slightly to moderately weathered, sandy texture in weathered areas, slightly to moderately fractured, pitted/porous.	n	Engine RPM: 1300-1400 Drill Time: 31min 31sec Circ. Loss: 100%
	180 — - - - - - 181.5 —					180-180.5' DOLOMITE, crystalline, pale yellowish brown (10YR 6/2), moderately hard to hard, thin to medium bedded, moderately fractured, pitted in very thin bands, fresh to slightly weathered, strong reaction to 1N HCl when powdered. 180.5-182.6' DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2) to very pale orange (10YR 8/2), moderately weathered, pitted/porous, vuggy, slightly fractured (bedding planes), strong reaction to 1N HCl when powdered, thick bedded, few fossils.		R-23: Drilling Pressure: 200 psi Kelly Bar RPM: 220 Engine RPM: 1400 Drill Time: 11min 5sec (180-184') Rods locked in hole 2min 59sec (184-185') Circ. Loss: 100% Driller notes: soft at approximately 184'.
	- 183 — - - - - 184.5 —	R-23	80% (22%)	4.0		182.6-185' Very thin bedded crystalline and moderately weathered sandy textured DOLOMITE (layers are approximately 0.01-0.05' thick), moderately to intensely fractured along bedding planes.		
	186 — STARTED		21/09		GWL: D	0		R-24: Drilling Pressure: 350-400 psi Kelly Bar RPM: 199 Engine RPM: 1200-1300 Drill Time: 31min 51sec Circ. Loss: 100% NOTE: core rods stuck briefly when the trying to retrieve core run. ES: NA
DATE COMPLETED: 10/1/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY: DRILLING CO.: HUSS						DEPTH: 6.3' DATE/TIME: 10/1/09 @ 0720 NG METHOD: Mud Rotary/PQ3 Coring R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- (Offset Bor	ing Prog	ram			LOG OF BORING NO. O-3		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1723189.3 E 458086.9 SURFACE EL: 42.5	SYMBOL	REMARKS
ELE (FE		SAN	BLO/ OR &	ZECC		DESCRIPTION	nscs	
	_						-	Water level on 10/1/09 @ 0720 6.3'.
	187.5 — — — — — —	R-24	90% (40%)	4.5		187-187.4' Moderately to severly weathered DOLOMITE, soft to very soft, moderate yellowish brown (10YR 5/4), sandy texture, friable, poorly indurated, pitted/porous, thin bedded, weak reaction to 1N HCl when powdered. 187.4-187.9' DOLOMITE as at 185-187' except moderately to intensely fractured. 187.9-190.7' Crystalline DOLOMITE, medium light gray (N6) to medium gray (N5), hard, fresh to slightly weathered, pitted in very thir bands, few vugs, no fossils, slightly fractured (horizontal), banded appearance-laminated.		AIRLIFT at end of R-24.
	189 — — — — — ———————————————————————————					190.7-192.8' DOLOMITE, moderately hard to hard, moderately weathered, pitted/porous, fossiliferous in bands (thin to very thin), moderately to intensely fractured-vertical fracture 191-195', dark gray (N3) coating on fracture surfaces, light olive gray (5Y 6/1), thin bedded, interbedded with thin crystalline dolomite laminations.		R-25: Drilling Pressure: 200-250 psi Kelly Bar RPM: 190 Engine RPM: 1200-1300 Drill Time: 46min 34sec Circ. Loss: 100%
	192 — — — — — 193.5 —	R-25	100% (14%)	5.0		192.8-194.3' Crystalline DOLOMITE as at 190' except moderately to intensely fractured.		
	195 — - - - - - 196.5 —					194.3-195.3' DOLOMITE, moderately soft, dark yellowish orange (10YR 6/6) to moderate yellowish brown (10YR 5/4), pitted/porous, sandy texture, few vugs, medium bedded, moderately weathered, slightly fractured, weak to moderate reaction to 1N HCl when powdered. 195.3-198.1' DOLOMITE, moderately hard, strong reaction to 1N HCl when powdered, very thinly laminated, very pale orange (10YR 8/2), pale yellowish brown (10YR 6/2), and moderate yellowish brown (10YR 5/4), moderately to intensely fractured from 195.3-196.5', fossiliferous, vuggy, 196.5-197.4' unfractured, 197.4-198.1' moderately fractured, slightly to moderately weathered.		R-26: Drilling Pressure: 200-250, 200 psi Kelly Bar RPM: 195 Engine RPM: 1200 Drill Time: 54min 38sec Circ. Loss: 100%
			100%					
DATE FIELD	STARTED COMPLET GEOLOG KED BY:	ED: 10	0		GWL: D GWL: D DRILLIN	9	NOTE	ES: NA
	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILL	ING CO.:	HUSS						



LNP- Offset Boring Program	LOG OF BORING NO. O-3	PROJECT NO. 07-3935
ELEVATION (FEET MSL) DEPTH (FEET) SAMPLE NO. OR RUN NO. OR RUN NO. OR % REC. & (RQD) OR % REC.	COORDINATES N 1723189.3 E 458086.9 SURFACE EL: 42.5 DESCRIPTION	TORWAS SAMBOR REMARKS
R-26 (28%) 5.0	DESCRIPTION	<u> </u>
198 —	198.1-200' DOLOMITE, yellowish gray (5Y 7/2), pitted, vuggy, fossiliferous, thick bedded, moderately weathered, intensely fractured (vertical fracture from 198.1-200', open, rough, dolomite more pitted/porous on fracture faces), strong reaction to 1N HCl when powdered.	
199.5 —	200-201.6' DOLOMITE, moderately hard, yellowish gray (5Y 7/2) and	R-27:
201—	pale yellowish brown (10YR 6/2), conglomerate-like appearance, moderately weathered, vuggy, some fossils, weak reaction to 1N HCl when powdered, sandy texture in weathered zones.	Drilling Pressure: 200-300 psi Kelly Bar RPM: 195 Engine RPM: 1200 Drill Time: 48min 33sec Circ. Loss: 100%
202.5 — R-27 100% 5.0	201.6-202' Crystalline DOLOMITE, hard, strong reaction to 1N HCl when dry/powdered, moderately fractured, medium bedded, pale yellowish brown (10YR 6/2). 202-204.0' DOLOMITE, moderately hard, grayish orange (10YR 7/4) and pale yellowish brown (10YR 6/2), moderately weathered, porous/ pitted, fossiliferous, thick bedded, slightly fractured, sandy texture.	
204—	204.0-205.0' DOLOMITE as at 195.3-198.1'.	
-162.5		
205.5 —	BOTTOM OF BORING 205'	
207—		
DATE STARTED: 9/21/09 DATE COMPLETED: 10/1/09 FIELD GEOLOGIST: JLO	GWL: DEPTH: 4.6' DATE/TIME: 9/22/09 @ 0715 N GWL: DEPTH: 6.3' DATE/TIME: 10/1/09 @ 0720 DRILLING METHOD: Mud Rotary/PQ3 Coring	OTES: NA
CHECKED BY: WDS APPROVED BY: DRILLING CO.: HUSS	DRILLER: Eddie Palmer HELPER: Chad/Cody R	IG: Failing 1500



LNP- (Offset Bo	ring Prog	ram					PROJECT NO. 07-3935
		g r 10g				LOG OF BORING NO. O-4		
ELEVATION (FEET MSL)	£¢	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	LE LE	COORDINATES N 1722990.9 E 458053.5	SYMBOL	
EVA ⁻	DEPTH (FEET)	MPLE	NW/6" R % F R (RC	OVE	PROFILE	SURFACE EL: 42.3		REMARKS
		SA	BLC	REC		DESCRIPTION	nscs	
41.9	0		7-12			0.0-0.4' SILTY SAND (sm), 60% sand, 40% silt, sand-fine grained, no plasticity, no dry strength, slow dilatancy, low toughness, black (N9), wet, no reaction to 1N HCI, medium dense.		
	- - 1.5 	S-1	10 (22)	1.0		0.4-1.5' POORLY GRADED SAND (sp), angular to rounded grains, fine grained, no plasticity, no dry strength, rapid dilatancy, low toughness, light gray (N7) to medium light gray (N6), no reaction to 1N HCl, moist, medium dense.		
	- - -	S-2	6-10 11 (21)	1.0		1.5-3.0' POORLY GRADED SAND (sp), angular to subrounded grains, fine to medium grained, no plasticity, no dry strength, rapid dilatancy, low toughness, dark yellowish orange (10YR 6/6), moist, no reaction to 1N HCI, medium dense.	sp	
	3 —		6-10			3.0-5.0' As above except dark yellowish orange (10YR 6/6) to grayish orange (10YR 7/4), medium dense.	sp	
	4.5 —	S-3	11 (21)	1.0			sp	
37.3	- - -	S-4	4-4 2 (6)	0.7		5.0-6.0' POORLY GRADED SAND with SILT (sp-sm), 90% sand, 10% silt, sand-fine grained, subrounded to rounded, no plasticity, no dry strength, rapid dilatancy, low toughness, dusky brown (5YR 2/2), moist, no reaction to 1N HCl, loose.	sp- sm	
36.3	6 —		4-4			6.0-7.5' Same as 3.0-5.0' except loose.	sp	
	- - 7.5 	S-5	3 (7)	1.0		7.5.7.9' Sama as abaya	on.	
34.2	- - -	S-6	3-3 4 (7)	1.1		7.5-7.8' Same as above. 7.8-8.1' POORLY GRADED SAND (sp), medium grained, angular to subrounded grains, no plasticity, no dry strength, rapid dilatancy, low toughness, pinkish gray (5YR 8/1) to very light gray (N8), moist, no reaction to 1N HCI, loose. 8.1		
33.3	9 —					8.1-9.0' FAT CLAY with SAND (ch), 60% clay, 40% sand, sand-fine grained, subrounded to rounded, medium to high plasticity, medium dry strength, no dilatancy, medium toughness, light bluish gray (5B 7 1) to light greenish gray (5G 8/1), moist, weak reaction to 1N HCl, medium stiff.	ch	
	- -	S-7	3-3 5 (8)	0.9		9.0-10.5' Same as 7.8-8.1'.	sp	
31.8	10.5 —					10.5-11' Same as 8.1-9.0'.	ch	
DATE	L STARTED): 10	/6/09	\vdash	GWL: D	DEPTH: 5.1' DATE/TIME: 10/7/09 @ 0745	NOTE	IES: Used NWJ for SPT sampling.
1	COMPLE.				GWL: D		- · -	
FIELD	GEOLOG	IST: JL	0		DRILLIN	NG METHOD: Mud Rotary/Continuous SPT/PQ3 Coring		
	KED BY:	WI	OS					
-	OVED BY:			\longrightarrow	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILL	ING CO.:	HUSS						



LNP- C	Offset Bor	ing Prog	ram					PROJECT NO. 07-3935
		J 13				LOG OF BORING NO. 0-4		
ELEVATION (FEET MSL)	тн Ет)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	-ILE	COORDINATES N 1722990.9 E 458053.5	SYMBOL	
EET	ОЕРТН (FEET)	MPL R RU	2W/6 R % & (R(SOVE	PROFILE	SURFACE EL: 42.3		REMARKS
		SA	BL(REC		DESCRIPTION	nscs	
31.3	_	S-8	6-10 9 (19)	1.0		11-12.0' Same as 9.0-10.5'.	sp	
	12 —					12.0-13.5' POORLY GRADED SAND (sp), fine to medium grained, no plasticity, no dry strength, rapid dilatancy, low toughness, very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2), moist, no	sp	
	- - -	S-9	6-7 9 (16)	0.9		reaction to 1N HCl, medium dense.		
28.8	13.5 — — — —	S-10	3-4 5 (9)	0.5		13.5-15.0' SILTY SAND (sm), 20% silt, 80% sand, sand-fine grained, subangular to rounded grains, low plasticity, low dry strength, slow dilatancy, low toughness, pale yellowish brown (10YR 6/2), moist, weak reaction to 1N HCI, loose.	sm	
27.3	15 	S-11	5-6 6 (12)	0.9		15.0-16.5' POORLY GRADED SAND with SILT (sp-sm), 10% silt, 90% sand, sand-fine grained, angular to subrounded, no plasticity, low dry strength, rapid dilatancy, low toughness, pale brown (5YR 5/2), moist, weak reaction to 1N HCl, medium dense.	sp- sm	
	16.5 — — —	S-12	3-5 3 (8)	1.0		16.5-18.0' As above except with pockets of fat clay (ch), high plasticity, medium to high dry strength, no dilatancy, medium toughness, light bluish gray (5B 7/1) to greenish gray (5G 6/1), moist, no to weak reaction to 1N HCl, medium stiff.	sp- sm	
	18 —				n ande en 1919: En 1909: En 1909: En 1909: En 1909: En	18.0.19.5' Same as above.	sp- sm	
	_	S-13	3-3 3 (6)	1.1				
	19.5 — — — —	S-14	2-3 2 (5)	1.4		19.5-21.0' POORLY GRADED SAND with SILT (sp-sm), 10% silt, 90% sand, sand-fine grained, subangular to rounded grains, no to low plasticity, no dry strength, slow dilatancy, low toughness, pale yellowish brown (10YR 6/2), moist, no reaction to 1N HCl, very loose with few small pockets of moderate yellow (5Y 7/6) fat clay.		
	21 —					21.0-22.5' Same as above except also with few small pockets of silt (ml), very pale orange (10YR 8/2) to grayish orange (10YR 7/4).	sp- sm	
		S-15	2-1 2 (3)	1.5	MARIONE PAR PARAMETERA PARAMETERA			
DATE STARTED: 10/6/09 DATE COMPLETED: 10/12/09 FIELD GEOLOGIST: JLO					GWL: D	9	NOTE	ES: Used NWJ for SPT sampling.
APPRO	KED BY: OVED BY: NG CO.:)S		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- (Offset Bo	ring Prog	ram			LOG OF BORING NO. O-4		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	ОЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1722990.9 E 458053.5 SURFACE EL: 42.3 DESCRIPTION	USCS SYMBOL	REMARKS
19.8	22.5					22.5'	ml	
	- - -	S-16	WOR (0)	1.5		22.5-24' SILT with SAND (ml), 80-90% silt, 10-20% sand, sand-fine grained, low to no plasticity, low dry strength, slow dilatancy, low toughness, pale yellowish brown (10YR 6/2), no reaction to 1N HCl, very soft.		
	24 — - - -	S-17	2-3 5 (8)	0.5		24.0-25.5' SILT (ml), no plasticity, low to no dry strength, slow to no dilatancy, low toughness, grayish orange (10YR 7/4), moist, weak reaction to 1N HCl, medium stiff.	ml	
	25.5 — — —	S-18	7-10 10 (20)	0.8		25.5-27' Same as above except banded apperance, very thin calcereous layers.	ml	
15.2	27 — - - - - 28.5 —	S-19	9-23 27 (50)	0.9		SILT (ml), as above except hard, strong reaction to 1N HCI. 27.1-28.5' POORLY GRADED GRAVEL with SILT (gp-gm), 40-50% gravel (weathered dolomite), granule to large pebble size, soft-breaks easily, no plasticity, low to medium dry strength, slow to no dilatancy, low to medium toughness, grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2), strong reaction to 1N HCI.		
	- - -	S-20	15-17 17 (34)	1.3		28.5-30.0' As above except increase in dolomite, 60-70%, coarse sand to granule size.	gp- gm	
	30 —	S-21	14-32 50/5 (82)	1.3		30-31.4' Same as above.	gp- gm	
10.8	31.5 — — — —					TOP OF AVON PARK FORMATION 31.5-35.2' DOLOMITE, soft to very soft, poorly indurated, grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2), strong reaction to 1N HCl, severly weathered, sandy/silty texture.	-	31.4-31.5' No sample. Switched to Coring Driller notes: some of sample was lost back down the hole while retrieving barrel-too soft to stay in barrel-amount unknown.
DATE FIELD		D: 10/ TED: 10/ SIST: JL(WI)		GWL: E GWL: E DRILLII		NOTE	I ES: Used NWJ for SPT sampling.
	OVED BY: ING CO.:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- (Offset Bor	ina Proa	ram					PROJECT NO. 07-3935
						LOG OF BORING NO. O-4		
rion MSL)	Εç	NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	빌	COORDINATES N 1722990.9 E 458053.5	SYMBOL	
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	2W/6" R % F & (RC	SOVE	PROFILE	SURFACE EL: 42.3		REMARKS
		S O	BL(REC		DESCRIPTION	nscs	
	33 —	OB-1	34% (0%)	1.2				
	34.5 — —							OB-2:
	36 — 					35.2-35.6' DOLOMITE, moderately soft to soft, dark yellowish brown (10YR 4/2), thin bedded, moderately weathered-sandy texture, intensely fractured, weak reaction to 1N HCl when powdered. 35.6-36.3' DOLOMITE, moderately hard, medium bedded, very pale orange (10YR 8/2), pitted/vuggy, slightly to moderately weathered, vertical fracture 35.6-36.5', strong reaction to 1N HCl when powdered 36.3-37.4' DOLOMITE as at 35.2-35.6' except fossiliferous in thin bands.	1.	Drilling Pressure: 250 psi Kelly Bar RPM: 204 Enginer RPM: 1200-1300 Drill Time: 39min 18sec Circ. Loss: none NOTE: Top 4 inches of sample are drill cuttings
	37.5 —	OB-2	92% (22%)	4.6		37.4-40' DOLOMITE, moderately hard, pale yellowish brown (10YR 62), slightly weathered, slightly pitted, few vugs, few fossils, slightly fractured (all horizontal), strong reaction to 1N HCl when powdered, sandy texture when weathered.	6/	
	40.5 —					40-42.7' DOLOMITE, moderately hard, strong reaction to 1N HCl when powdered, pale yellowish brown (10YR 6/2), fresh to slightly weathered, slightly pitted, unfractured, few vugs. 41.2-41.7' Moderately fractured. 41.7-42.5' Vertical fracture.		OB-3: Drilling Pressure: 250 psi Kelly Bar RPM: 210 Enginer RPM: 1300 Drill Time: 31min 17sec Circ. Loss: none Driller notes: Becomes soft at 44'.
	43.5	OB-3	76% (20%)	3.8		42.7-45' DOLOMITE, moderately soft to soft, moderately to severly weathered, poorly indurated, intensely fractured, moderate to strong reaction to 1N HCl when weathered, gradual color change to dark yellowish orange (10YR 6/6), sandy/silty texture, bedding planes not evident.		
DATE	STARTED COMPLET GEOLOG	ΓED: 10/			GWL: D GWL: D DRILLIN	_	NOTE	ES: Used NWJ for SPT sampling.
APPR	KED BY: OVED BY: ING CO.:		os	\perp		R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- (Offset Bori	ng Prog	ram			LOG OF BORING NO. O-4		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	Ħ£.	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1722990.9 E 458053.5	SYMBOL	
EVA ⁻	DEPTH (FEET)	MPLE	3 % F RC R (RC	OVE	PROFILE	SURFACE EL: 42.3	S S	REMARKS
E F		SA	BLC	REC	"	DESCRIPTION	nscs	
DATE	45 — 46.5 — 48 — 49.5 — 51 — 52.5 — 54 — 53 — 54 — 554 — 554 —	OB-4	76% (24%)	4.9	GWL: D	45-46.4' DOLOMITE, very soft, poorly indurated, silty texture, severely weathered to degraded, some areas sandy texture, no bedding evident, slightly fractured 45.7-47.5'. 46.4-47.2' GRAVELLY SILT (ml)/degraded DOLOMITE, 40% dolomite pieces-coarse sand size, soft-breaks easily, no plasticity, low dry strength, slow dilatancy, low toughness, pale yellowish brown (10YR 6/2), moist to wet, moderate to strong reaction to 1N HCI. 47.2-48.2' Same as 45-46.4' except with very thin organic layers/laminations. 48.2-50' As above except moderately soft. 50-55' DOLOMITE, alternating layers of soft to very soft moderate yellowish brown (10YR 5/4), moderately to severly weathered, poorly indurated, bedding structure not evident, slightly to moderately fractured (in zones), weak to moderate reaction to 1N HCI, pitted/porous, sandy texture.	,	OB-4: Drilling Pressure: 200 psi Kelly Bar RPM: 215 Enginer RPM: 1300-1400 Drill Time: 10min 35sec Circ. Loss: none OB-5: Drilling Pressure: 250 psi Kelly Bar RPM: 213 Enginer RPM: 1300-1400 Drill Time: 11min 23sec Circ. Loss: none Note: 50-52.5' soft, fast drilling 0.1' top of run is cuttings. Water level 10/7/09 @ 0745 5.1'.
DATE	COMPLET GEOLOGI	ED: 10	/12/09		GWL: D		NOTE	ES: Used NWJ for SPT sampling
CHECI APPRO	KED BY: OVED BY: ING CO.:	WI		_		R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- Offset Boring Program PROJECT NO. 07-3935										
						LOG OF BORING NO. 0-4				
ION ASL)	ΕÊ	NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)		COORDINATES N 1722990.9 E 458053.5	SYMBOL			
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	"3/W6" R % R & (RQ	COVE	PROFILE	SURFACE EL: 42.3	SS SY	REMARKS		
		& Q	BL(REC		DESCRIPTION	nscs			
	55.5 —					55-60' As above except with very thin organic layers/laminations. 55-57' Intensely fractured.		OB-6: Drilling Pressure: 250 psi Kelly Bar RPM: 197 Enginer RPM: 1200-1300 Drill Time: 13min 40sec Circ. Loss: none		
	57 — - - - - - - 58.5 —	OB-6	78% (38%)	3.9						
	60 —					60.0-65.0' As above except no organic layers.		OB-7: Drilling Pressure: 200 psi Kelly Bar RPM: 202 Enginer RPM: 1200-1300 Drill Time: 11min 27sec Circ. Loss: none		
	61.5 —	OB-7	98% (50%)	4.9						
	64.5 — — — — —					65-67' DOLOMITE, moderately hard, slightly to moderately weathered, pitted/porous, moderately to intensely fractured-vertical fracture 65-66.7', few very thin laminae/pockets of black organic material, thick bedded, strong reaction to 1N HCl when powdered,		Run-1: Drilling Pressure: 200 psi Kelly Bar RPM: 206 Enginer RPM: 1200-1300		
DATE C	STARTED COMPLET GEOLOGI	ED: 10/ ST: JL0	Э		GWL: D GWL: D DRILLIN	9	NOTE	ES: Used NWJ for SPT sampling.		
CHECKED BY: WDS APPROVED BY: DRILLING CO.: HUSS						R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500		



LNP- C	Offset Bor	ing Prog	LNP- Offset Boring Program PROJECT NO. 07-3935										
						LOG OF BORING NO. 0-4							
ELEVATION (FEET MSL)	TH (T.	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	밀	COORDINATES N 1722990.9 E 458053.5	SYMBOL						
EVA-	ОЕРТН (FEET)	MPLE RUN	DW/6" R % F & (RC	COVE	PROFILE	SURFACE EL: 42.3	SS SY	REMARKS					
E E		S O	BL(REC		DESCRIPTION	nscs						
	66 —					pale yellowish brown (10YR 6/2).		Drill Time: 38min 38sec Circ. Loss: none					
	- - - 67.5 —	R-1	100%	5.0		67-68' As above except unfractured.		Circ. Loss. Horie					
	69 —		(44%)			68-74.5' DOLOMITE, moderately hard, pale yellowish brown (10YR 62) to dark yellowish orange (10YR 6/6), pitted/porous, fossiliferous, vuggy/weathered out fossils, moderately weathered, sandy texture, medium to thick bedded, moderate to strong reaction to 1N HCI, slightly to moderately fractured (bedding planes).	/						
	70.5—	•••••						Run-2: Drilling Pressure: 250 psi Kelly Bar RPM: 204 Enginer RPM: 1200-1300 Drill Time: 30min 40sec Circ. Loss: none					
	72 — - - -	R-2	98% (76%)	4.9									
	73.5 —					74.5-75' DOLOMITE, moderately soft, pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 5/4), moderately weathered,							
	75 — — — — 76.5 —					pitted/porous, sandy/silty texture, medium bedded with very thin black (N9) organic laminations, friable, unfractured, weak to moderate reaction to 1N HCl when powdered. 75-80' DOLOMITE, moderately hard, porous/pitted, intensely fractured, pale yellowish brown (10YR 6/2), thick bedded, moderately weathered, sandy texture, moderate to strong reaction to 1N HCl when powdered. 76-76.6' As above except not pitted/porous, few horizontal fractures.		Run-3: Drilling Pressure: 150 psi Kelly Bar RPM: 198 Enginer RPM: 1200-1300 Drill Time: 15min 22sec Circ. Loss: none					
<u></u>			10.10.5	L ,				-0.11.1200000000000000000000000000000000					
DATE STARTED: 10/6/09 DATE COMPLETED: 10/12/09						EPTH: 5.1' DATE/TIME: 10/7/09 @ 0745 EPTH: 5.4' DATE/TIME: 10/13/09 @ 0750	NOTE	ES: Used NWJ for SPT sampling.					
						NG METHOD: Mud Rotary/Continuous SPT/PQ3 Coring							
CHECKED BY: WDS													
	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500					
DRILLI	NG CO.:	HUSS											



ELEVATION (FEET MSL) DEPTH	SAMPLE NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	LOG OF BORING NO. O-4 COORDINATES N 1722990.9 E 458053.5	30L	
	_	BLOW/6" & (OR % REC & (RQD)	RECOVERY (OFILE	N 1722990.9 F 458053.5	I ~	
	_	BLOW/ OR % (F	RECOV			SYMBOL	REMARKS
	_	B	뷨	H	SURFACE EL: 42.3	uscs s	KLIWIAKKO
78	- R-3				DESCRIPTION	Sn_	
		78% (0%)	3.9		77.5-80' As above except intensely fractured/rubble (not cave-in), fossiliferous.		
79.5 81 82.5	R-4	38% (0%)	1.9		80-80.7' DOLOMITE, moderately soft, pale yellowish brown (10YR 6/2), pitted/porous, moderately weathered, moderately to intensely fractured, moderate to strong reaction to 1N HCI when powdered. 80.7-81.2' DOLOMITE, very light gray (N8) to light gray (N7), moderately hard to hard, moderately to severly weathered, vuggy, pitted in bands, intensely fractured, strong reaction to 1N HCI. 81.2-85' DOLOMITE, pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 5/4), soft, friable, sandy/silty texture, with some black (N9) organic laminae, pitted/porous, moderately to intensely weathered, moderate to strong reaction to 1N HCI when powdered.		Run-4: Drilling Pressure: 150 psi Kelly Bar RPM: 190 Enginer RPM: 1100-1200 Drill Time: 4min 30sec (80-82') 3min 4sec (82-85') 0.1' recovery, rig chattering Circ. Loss: 100% Driller Notes: very soft at 82' NOTE: Driller thinks 0.1' recovery harder than material below and softer material was washed out-no a void.
85.5 87 DATE START DATE COMP	LETED: 10		0.5	GWL: D	EPTH: 5.4' DATE/TIME: 10/13/09 @ 0750	NOTE	Shelby Tube ST-1: Pushed: 7.5" Pressure: 100 psi Sample bagged Run-5: Drilling Pressure: 200 psi Kelly Bar RPM: 206 Enginer RPM: 1200-1300 Drill Time: 3min 32sec (85.5-87') 7min 41sec (87-90') Circ. Loss: 100% then circulation returns shortly after starting run ES: Used NWJ for SPT sampling.
CHECKED BY	Y: W	O DS			NG METHOD: Mud Rotary/Continuous SPT/PQ3 Coring		
APPROVED I			\dashv	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2), Kelly Bar RPM: 210	NO. 07-3935	PROJECT NO.						ram	ing Prog	Offset Bor	LNP- (
88.7 Becomes moderately hard, slightly fractured. 90 90-90.7 DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2), slightly weathered, pitted, weak to moderate reaction to 1N HCI, thick bedded, slightly fractured (horizontal break at 93.6'). 91.5 - R-6 (54%) 5.0 93 - Vertical fracture 94.1-95'. 94.5 - 95-96.2' DOLOMITE, moderately hard, weak reaction to 1N HCI when powdered, pitted, few vugs, few yearly hind back (Ng) organic pockets, politing pressure: 250-300 kelly Bar RPM: 210 - 10					LOG OF BORING NO. O-4									
88.7 Becomes moderately hard, slightly fractured. 90 90-90.7 DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2), slightly weathered, pitted, weak to moderate reaction to 1N HCI, thick bedded, slightly fractured (10YR 6/2), slightly weathered. 91.5 - R-6 (54%) 93 - Vertical fracture 94.1-95. Vertical fracture 94.1-95. 94.5 - Pollomite, moderately hard, weak reaction to 1N HCI when powdered, pitted, few vugs, few very thin black (N9) organic pockets, polling pressure: 250-300, which is a significant to 1N HCI when powdered, pitted, few vugs, few very thin black (N9) organic pockets, polling pressure: 250-300, which is a significant powdered, pitted, few vugs, few very thin black (N9) organic pockets, polling pressure: 250-300, Kelly Bar RPM: 210			MBOL			 <u> </u>	RY (ft.)	& (N) (EC.	ON .	Εf	rion ASL)			
88.7 Becomes moderately hard, slightly fractured. 90 90-90.7 DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2), slightly weathered, pitted, weak to moderate reaction to 1N HCI, thick bedded, slightly fractured (horizontal break at 93.6'). 91.5 - R-6 (54%) 5.0 93 - Vertical fracture 94.1-95'. 94.5 - 95-96.2' DOLOMITE, moderately hard, weak reaction to 1N HCI when powdered, pitted, few vugs, few yearly hind back (Ng) organic pockets, politing pressure: 250-300 kelly Bar RPM: 210 - 10	3	REMARKS	SSS		SURFACE EL: 42.3	PROF	COVE	DW/6" R % F & (RG	MPLE	DEP1 (FEE	EVAT			
88.5 — 90 —) N		DESCRIPTION		REC	BL(S Q		III H			
91.5 — R-6 100% (54%) 5.0 29.8 lightly weathered, pitted, weak to moderate reaction to 1N HCI, thick bedded, slightly fractured. 91.5 — 99.5° DOLOMITE, as at 90' except fresh to slightly weathered, few vugs, slightly fractured (horizontal break at 93.6'). Vertical fracture 94.1-95'. Vertical fracture 94.1-95'. Vertical fracture 94.1-95'. Run-7: Doubling Pressure: 200 psi Kelly Bar RPM: 1202-1300 Drill Time: 26min 6sec Circ. Loss: none Vertical fracture 94.1-95'. Run-7: Drilling Pressure: 200 psi Kelly Bar RPM: 198 Enginer RPM: 20 E					88.7' Becomes moderately hard, slightly fractured.		4.5	(13%)	R-5	88.5 — —				
93.— R-6 100% (54%) 94.5.— 94.5.— 95-96.2' DOLOMITE, moderately hard, weak reaction to 1N HCl when powdered, pitted, few vugs, few very thin black (N9) organic pockets, very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2), Kelly Bar RPM: 210	300	Drilling Pressure: 200 psi Kelly Bar RPM: 198 Enginer RPM: 1200-1300 Drill Time: 26min 6sec		CI,	2), slightly weathered, pitted, weak to moderate reaction to 1N HCl, thick bedded, slightly fractured. 90.7-91.6' As above except intensely fractured/rubble, moderately					90 —				
PR-6 (54%) 93 — Vertical fracture 94.1-95'. Vertical fracture 94.1-95'. 95-96.2' DOLOMITE, moderately hard, weak reaction to 1N HCl when powdered, pitted, few vugs, few very thin black (N9) organic pockets, very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2), Kelly Bar RPM: 210				few	91.6-95' DOLOMITE, as at 90' except fresh to slightly weathered, fev vugs, slightly fractured (horizontal break at 93.6').					91.5 — — —				
94.5 — 95-96.2' DOLOMITE, moderately hard, weak reaction to 1N HCl when powdered, pitted, few vugs, few very thin black (N9) organic pockets, very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2), Kelly Bar RPM: 210							5.0	1	R-6	93 —				
powdered, pitted, few vugs, few very thin black (N9) organic pockets, Very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2), Kelly Bar RPM: 210					Vertical fracture 94.1-95'.					94.5 —				
96 — Drill Time: 10min 41sec (9 1.2' recovery 22min 15sec (98-100') circ. Loss: none	400 ec (95-98')	Drilling Pressure: 250-300 Kelly Bar RPM: 210 Enginer RPM: 1300-1400 Drill Time: 10min 41sec (9 1.2' recovery 22min 15sec (98-100')		ets, ut	powdered, pitted, few vugs, few very thin black (N9) organic pockets very pale orange (10YR 8/2) to pale yellowish brown (10YR 6/2), unfractured, thick bedded. 96.2' Becomes moderately to intensely fractured (possible washout zone 96.2-98')					96—				
97.5 — R-7 R-7 88-98.8' DOLOMITE, moderately hard, slightly weathered, pitted, moderately fractured (at 45° angles), fossiliferous, weak reaction to 1N HCl when powdered, pale yellowish brown (10YR 6/2).				to	moderately fractured (at 45° angles), fossiliferous, weak reaction to		3.8	1	R-7	97.5 — — — —				
DATE STARTED: 10/6/09 GWL: DEPTH: 5.1' DATE/TIME: 10/7/09 @ 0745 NOTES: Used NWJ for SPT sate DATE COMPLETED: 10/12/09 GWL: DEPTH: 5.4' DATE/TIME: 10/13/09 @ 0750 FIELD GEOLOGIST: JLO DRILLING METHOD: Mud Rotary/Continuous SPT/PQ3 Coring CHECKED BY: WDS	Γ sampling.	L :S: Used NWJ for SPT sa	I DTE	N	DEPTH: 5.4' DATE/TIME: 10/13/09 @ 0750	GWL: [DATE COMPLETED: 10/12/09 FIELD GEOLOGIST: JLO						
APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500		Failing 1500	G :	R	ER: Eddie Palmer HELPER: Chad/Cody	DRILLE	\dashv							



LNP-	Offset Bor	ing Prog	ram			LOG OF BORING NO. O-4		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	∃£.	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1722990.9 E 458053.5	SYMBOL	
EVA:	DEPTH (FEET)	MPLI	0W/6 R % F 8 (RC	OVE	PROFILE	SURFACE EL: 42.3		REMARKS
山 正		S O	BLC	REC	"	DESCRIPTION	nscs	
	99 —					98.8-101' As above except with very pale orange (10YR 8/2) dolomite clasts (0.01-0.1' round), vuggy.		Run-8:
-59.7		R-8	50% (33%)	1.5		101-101.3' DOLOMITE, pale yellowish brown (10YR 6/2) to grayish orange (10YR 7/4), moderately hard, unfractured, some fossils, strong reaction to 1N HCl when powdered, few vugs, fresh to slightly weathered. 101.3-102' DOLOMITE, moderately hard, light gray (N7), unfractured pitted in very thin bands/pockets, some fossils (in very thin bands), strong reaction to 1N HCl, few vugs, fresh to slightly weathered.		Drilling Pressure: 100-150 psi Kelly Bar RPM: 221 Enginer RPM: 1400-1500 Drill Time: 2min 1sec (100-101') 0.1' recovery 22min 56sec (101-103') Airlift Circ. Loss: 100% Driller Notes: Rod drop of 8" between 102' and 103'.
	-					102' Grout-coincides with rod drop noted by driller.		
-60.7	103.5 — - - - -	ST-2	0%	0.0		Drill cuttings, bentonite chips (from adjacent A-series boring)	r.	Shelby Tube ST-2: Pushed: 2 feet Pressure: 150 psi
	105 — — — — — — — — — — — — — — — — — — —	R-9	66% (8%)	3.3		105-108.5' DOLOMITE, moderately hard, pale yellowish brown (10YF 6/2), pitted, vuggy, intensely fractured, some fossils, weak reaction to 1N HCl when powdered. 108.5-109.7' Rubble (driller does not think it is cave-in).	\$	Run-9: Drilling Pressure: 150 psi Kelly Bar RPM: 201 Enginer RPM: 1200-1300 Drill Time: 11min 45sec (105-107') 0.5' recovery 4min 37sec (107-108.5') 0.7' recovery 8min 26sec (108.5-110') Circ. Loss: 100% Driller notes: very soft at 105' (possible rod drop with cuttings infilled-soft zone from Boring A-18 washed out by previous coring) Airlift
DATE FIELD	STARTED COMPLET GEOLOG KED BY:	ΓED: 10)		GWL: D GWL: D DRILLIN		NOTE	ES: Used NWJ for SPT sampling.
	OVED BY:			—	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- Offset Boring Program PROJECT NO. 07-3935										
		J - 7-9				LOG OF BORING NO. O-4				
ELEVATION (FEET MSL)	TH T)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	l E	COORDINATES N 1722990.9 E 458053.5	SYMBOL			
LEVA ⁻	DEPTH (FEET)	AMPLE R RUN	OW/6" R % F & (RC	SOVE	PROFILE	SURFACE EL: 42.3	SS SY	REMARKS		
		S O	BLO	RE(DESCRIPTION	nscs			
	-					109.7-110' DOLOMITE as at 101-101.3'.				
	111—					110-115' DOLOMITE, moderately hard, pitted/porous, pale yellowish brown (10YR 6/2), slightly weathered, slightly to moderately fractured few rugs, thick bedded, weak reaction to 1N HCl when powdered, few fossils. 111.5-113.3' Vertical fracture.	1,	Run-10: Drilling Pressure: 150 psi Kelly Bar RPM: 217 Enginer RPM: 1300-1400 Drill Time: 24min 33sec Circ. Loss: 100% 0.5' Rubble		
		R-10	86% (48%)	4.3						
	 115.5 — _ _ _ _					115-120' DOLOMITE, as above except slightly fractured (bedding planes).		Run-11: Drilling Pressure: 150-200 psi Kelly Bar RPM: 206 Enginer RPM: 1200-1300 Drill Time: 26min 14sec Circ. Loss: 100% 0.3' Rubble		
	117 — - - - 118.5 — - -	R-11	100% (82%)	5.0						
DATE	120 —					120-121.5' DOLOMITE, moderately hard, pale yellowish brown (10Yl 6/2), slightly weathered, pitted/porous, moderately fractured-vertical fracture 120.4-122.0' open, rough, black coating on surface, strong reaction to 1N HCI when powdered.		Run-12: Drilling Pressure: 200 psi Kelly Bar RPM: 208 Enginer RPM: 1300		
	STARTED COMPLET		/6/09 /12/09		GWL: D	9	NOTE	ES: Used NWJ for SPT sampling.		
1	GEOLOG					NG METHOD: Mud Rotary/Continuous SPT/PQ3 Coring				
CHECKED BY: WDS										
	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500		
DRILL	ING CO.:	HUSS								



LNP- Offset Boring Program PROJECT NO. 07-3935										
						LOG OF BORING NO. 0-4				
ELEVATION (FEET MSL)	F (SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	LE	COORDINATES N 1722990.9 E 458053.5	SYMBOL			
EVAT	DEPTH (FEET)	MPLE	DW/6" R % F & (RG	OVE	PROFILE	SURFACE EL: 42.3		REMARKS		
= =		AS Q	BLC	REC	"	DESCRIPTION	nscs			
	- 121.5 — - -		E69/			121.5-122' Crystalline DOLOMITE, pale yellowish brown (10YR 6/2) to very light gray (N8), moderately hard to hard, few (0.05' round) pitted dolomite, moderately fractured, strong reaction to 1N HCl wher dry/powdered. 122-125' DOLOMITE, moderately hard, grayish orange (10YR 7/4)	1	Drill Time: 20min 8sec (120-123.5') 1' recovery 30sec (123.5-125') No recovery- not a rod drop Circ. Loss: 100% Driller Notes: very soft at 123.5'		
	123 —	R-12	56% (22%)	2.8		and pale yellowish brown (10YR 6/2), moderately weathered, pitted/porous, vuggy, fossiliferous, sandy texture, unfractured, thin to medium bedded.				
	124.5 — - -					Same as above except crushed.		Shelby Tube ST-3: Pushed: 15"		
	126 — —	ST-3	80% (0%)	1.0		126.3-128' DOLOMITE, moderately hard, weak reaction to 1N HCI when powdered, grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2), pitted/porous, sandy texture, vuggy, some fossils, slightly		Pressure: 1000 psi Sample bagged Water level 10/9/09 @ 0755 5.3' Run-13: Drilling Pressure: 200 psi Kelly Bar RPM: 195		
	127.5 —					to moderately fractured (all horizontal), with pockets of crystalline dolomite.		Enginer RPM: 1200 Drill Time: 17min 1sec Circ. Loss: 100% 1.7' rubble		
	129 — - -	R-13	81% (46%)	3.0		128-128.2' Crystalline DOLOMITE, light gray (N7) to medium light gray (N6), hard, very thin bedded, moderately fractured, fresh, pitted in very thin bands, strong reaction to 1N HCl when dry/ powdered. 128.2-130' DOLOMITE, dark yellowish orange (10YR 6/6), moderately hard, moderately weathered, sandy texture, pitted/porous vuggy, some fossils, medium to thick bedded, weak reaction to 1N HCl when powdered, unfractured. 128.8' Color change to light olive gray (5Y 6/1).	÷,			
	130.5 — — — — —					130-135' As above except with zones of pale yellowish brown (10YR 6/2) and dark yellowish orange (10YR 6/6), few pockets of crystalline dolomite, moderately fractured.		Run-14: Drilling Pressure: 200 psi Kelly Bar RPM: 196 Enginer RPM: 1200-1300 Drill Time: 22min 3sec Circ. Loss: 100% 0.5' Rubble Driller Notes: Rod drop 134.5- 135.6'		
DATE STARTED: 10/6/09 DATE COMPLETED: 10/12/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS					GWL: D GWL: D DRILLIN	_	NOTE	ES: Used NWJ for SPT sampling.		
APPR	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500		



LNP-	Offset Bor	ing Prog	ram			LOG OF BORING NO. O-4		PROJECT NO. 07-3935
ION ISL)	IC	0 N 0 O	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	Ш	COORDINATES N 1722990.9 E 458053.5	SYMBOL	
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	W/6" 8 % R (RQ	OVEF	PROFILE	SURFACE EL: 42.3		REMARKS
		SAN	BLO OF OF	REC		DESCRIPTION	nscs	
	132 — — — —	R-14	74% (48%)	3.7		132-132.7' Vertical fracture, moderately to intensely fractured area.		
-92.2	133.5 — - - -					¬ 134.5' Becomes fossiliferous.		
-32.2	_					134.5-135.6' ROD DROP.	1	
-93.3	135 — — —				77777	135.6' 135.6-137' DOLOMITE, moderately soft to moderately hard, grayish	_	Run-15: Drilling Pressure: 150-200 psi Kelly Bar RPM: 218 Enginer RPM: 1300-1400
	136.5 — - - -		54%			orange (10YR 7/4) to dark yellowish orange (10YR 6/6), fossiliferous (sand dollar casts), moderately weathered, sandy texture, pitted/porous, vuggy, moderate to strong reaction to 1N HCl, slightly fractured (along bedding plane at 135.4'). 137-139' Crystalline DOLOMITE, moderately hard to hard, moderately to intensely fractured, pale yellowish brown (10YR 6/2) to light gray (N7), moderate to strong reaction to 1N HCl when dry/		Drill Time: 1min 58sec (135-137') 1 recovery 15min 14sec (137-139') 1' recovery 5min 55sec (139-140') 0.7' recovery, 0.3' rubble Circ. Loss: 100% Driller notes: Rod drop 139.5-140' (0.3' rod drop measured from recovered core).
	138 — - - -	R-15	(30%)	2.7		powdered, fresh, no fossils, pitted in very thin bands, medium to thick bedded. 139-139.7' DOLOMITE, light olive gray (5Y 6/1), moderately hard,		
-97.4	139.5 —					medium to thick bedded, slightly weathered, pitted in very thin bands, unfractured, moderate to strong reaction to 1N HCl when powdered. 139.7		
-97.7 -98.0	- - -				/////	139.7-140' ROD DROP. 140-140.3' DOLOMITE, moderately to severly weathered, moderately soft, grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2), pitted/porous, sandy texture, fossiliferous (sand dollars), moderate to strong reaction to 1N HC when powdered, slightly to moderately		Run-16: Drilling Pressure: 200 psi Kelly Bar RPM: 198 Enginer RPM: 1200-1300 Drill Time: 2min 47sec (140-142')
-98.7	141 —					fractured. 140.3-141' ROD DROP. 141-141.7' DOLOMITE, as above except moderately weathered, vuggy. 141.7-142.6' Banded/laminated apperance.	1	0.8' rubble, rods temporarily stuck Airlift 8min 55sec (142-145') 1.0' rubble Circ. Loss: 100% Driller Notes: Rod drop 140.3-141' and 143-144.5'
	142.5 —	R-16	42%	2.1				
DATE FIELD	STARTED COMPLET GEOLOG	ΓED: 10, IST: JL	Э		GWL: D GWL: D DRILLIN		NOTE	ES: Used NWJ for SPT sampling.
CHECKED BY: WDS APPROVED BY:					DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILL	ING CO.:	HUSS						



LNP- Offset Boring Program PROJECT NO. 07-3935									
						LOG OF BORING NO. O-4			
ELEVATION (FEET MSL)	Ħ.E.	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1722990.9 E 458053.5	SYMBOL		
EVA:	DEPTH (FEET)	MPLI R RUN	2W/6 R % F & (RC	SOVE	PROFILE	SURFACE EL: 42.3] SS S	REMARKS	
		S Q	BL(RE(-	DESCRIPTION	NSCS		
			(26%)		/////	142.6-142.8' Crystalline DOLOMITE as at 137-139'.	+		
-100.7	_ _				',',',',',	143-144.5' ROD DROP.	3'-		
-102.2	144 — – –				7777	144.5-145' DOLOMITE as at 141' except with pockets of crystalline	5'-		
-103.2 -103.4	_ _ 145.5 — _					dolomite, fossiliferous, vuggy. 145-147.2' DOLOMITE, as above, very pale orange (10YR 8/2) to yellowish gray (5Y 8/1), with medium dark gray (N4) dolomite pockets, moderately hard, some vugs, medium bedded, slightly to moderately weathered, moderately to intensely fractured (bedding planes).		Run-17: Drilling Pressure: 150-200 psi Kelly Bar RPM: 195 Enginer RPM: 1200 Drill Time: 20min 22sec (145-147')	
	- - - 147 —					145.5-145.7' ROD DROP. 145.7' Becomes thinly bedded/laminated apperance, elongated vugs (weathered out fossils), moderately weathered, hard, moderate to strong reaction to 1N HCl when powdered, unfractured.	_{7'} _	0.6' recovery 26min 26sec (147-150') Circ. Loss: 100% Driller Notes: Rod drop at approximately 145.5' (2") Rod drop 147.5-148'	
-105.2 -105.7	- - -	R-17	56% (12%)	2.8		147.2-147.5' DOLOMITE, moderately hard, laminated apperance, yellowish gray (5Y 7/2) and pale yellowish brown (10YR 6/2), fresh to slightly weathered, thick bedded, few vugs, strong reaction to 1N HC when powdered, unfractured.	1	Water Level 10/10/09 @ 0800 6.3'	
100.1	_ 148.5 —					147.5-148' ROD DROP. 148-148.6' DOLOMITE, as at 147.2-147.5'.			
	- - - -					148.6-150' DOLOMITE as at 145.7'.			
	150 — — — —					150-151' DOLOMITE, same as at 147.2-147.5'. 151-153.5' DOLOMITE, moderately soft to moderately hard, pitted/		Run-18: Drilling Pressure: 200 psi Kelly Bar RPM: 196 Enginer RPM: 1200-1300 Drill Time: 4min 44sec (150-151') 0.3' recovery-rods temporarily stuci	
	- 151.5 - -					porous, pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 5/4), moderately weathered-sandy texture, some fossils, moderate to strong reaction to 1N HCl when powdered, slightly fractured (horizontal-bedding planes only).	'n	15min 16sec (151-152') Airliff Core recovery from outer barrel 151-152' Changed bit at 152' 10min 25sec (152-155') 0.7' rubble Circ. Loss: none	
	- 153 — -	R-18	86% (54%)	4.3					
<u> </u>	0745===		10.100	<u> </u>	 	EDTIL 541 BATETIME 107/20 C CC.	<u> </u>		
ı	STARTED COMPLET		/6/09 /12/09		GWL: D		NOTE	ES: Used NWJ for SPT sampling.	
FIELD GEOLOGIST: JLO						NG METHOD: Mud Rotary/Continuous SPT/PQ3 Coring			
ı	KED BY:	W							
						R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500	
DRILL	ING CO.:	HUSS							



			LNP- Offset Boring Program PROJECT NO. 07-3935										
LOG OF BORING NO. O-4													
ELEVATION (FEET MSL)	ĦE.	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)		COORDINATES N 1722990.9 E 458053.5	SYMBOL						
EET	DEPTH (FEET)	MPLI R RUN	DW/6' R % F & (RG	OVE	PROFILE	SURFACE EL: 42.3		REMARKS					
<u> </u>		S O	BLO	REC		DESCRIPTION	nscs						
1	_ _ 154.5 —					153.5-155' DOLOMITE, light gray (N7) and pale yellowish brown (10YR 6/2), slightly weathered, not as pitted, few vugs, strong reaction to 1N HCl when powdered, slightly fractured from 153.7-154.1', slightly to moderately weathered.							
	156 —					155-157.6' DOLOMITE, same as above except vuggy/pitted/ fossiliferous in very thin bands.		Run-19: Drilling Pressure: 200 psi Kelly Bar RPM: 207 Enginer RPM: 1200-1300 Drill Time: 10min 47sec (155-158') 0.5' rubble 7min 38sec (158-160') 0.2' rubble Circ. Loss: 100% Rods temporarily stuck.					
1	- 157.5 — - - -	R-19	100% (64%)	5.0		157.6-158.7' DOLOMITE, thinly laminated, moderately weathered, porous/pitted, vuggy, moderately hard, unfractured to moderately fractured along bedding planes.							
	159 — —					158.7-160' Crystalline DOLOMITE, pale yellowish brown (10YR 6/2) to light gray (N7), hard, strong reaction to 1N HCl when dry/powdered, moderately fractured (all horizontal), few vugs, pitted in very thin bands, fresh to slightly weathered.							
1	- 160.5 — - -					160-161.6' DOLOMITE, moderately hard, weak to moderate reaction to 1N HCl when powdered, slightly weathered, some fossils, vuggy, unfractured, thick bedded, light olive gray (5Y 6/1) to medium light gray (N6).		Run-20: Drilling Pressure: 250-300 psi Kelly Bar RPM: 200 Enginer RPM: 1200-1300 Drill Time: 5min 54sec (160-160.5') Airlift					
	162 —	R-20	84% (62%)	4.2		161.6-163.3' DOLOMITE, moderately hard, pitted/porous, some vugs moderately weathered, banded apperance, light olive gray (5Y 6/1) to pale yellowish brown (10YR 6/2), thick bedded, unfractured (161.9-162.1' horizontal fracture), strong reaction to 1N HCl when powdered		6min 48sec (160.5-165') 0.2' rubble Circ. Loss: 100% Special Care Sample 162.0-163.2' Driller Notes: Rod drop 163.3-164.3' (approximately 1 foot, measured 0.8' in core)					
-121.0	_ 163.5 _				<i> </i>	163.3-164.3' ROD DROP.							
-122.0	-				/////	164.3 164.3-165' As above except vuggy, moderately weathered-sandy	4						
DATE C	STARTED COMPLET GEOLOGI (ED BY:	ED: 10/)		GWL: D GWL: D DRILLIN	EPTH: 5.1' DATE/TIME: 10/7/09 @ 0745	NOTE	I ES: Used NWJ for SPT sampling.					
APPRO	VED BY:			_	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500					



100 100	LNP- (Offset Bo	ring Prog	ram			LOG OF BORING NO. O-4		PROJECT NO. 07-3935
185	/ATION :T MSL)	EET)	PLE NO.	//6" & (N) % REC. RQD)	VERY (ft.)	OFILE	COORDINATES N 1722990.9 E 458053.5		REMARKS
185	ELE) (FEE		SAMI	SLOW OR '	ECO	H. H.		SSS	
123.0 166.5 167.		-	-		<u> </u>			1-	
124.0 166.5	-123.0	165 -					6/6), strong reaction to 1N HCl when powdered, pitted/porous, fossiliferous, sandy texture, moderately to severely weathered, thin bedded.	R	Drilling Pressure: 250 psi Kelly Bar RPM: 207 Enginer RPM: 1200-1300
170-170.7' DOLOMITE, moderately hard, light gray (N7) to light olive gray (SY 6'1), pitted/porous in bands, slightly to moderately be weathered, fossils in bands with pits, moderate to strong reaction to N HCI when powderen powderen decide by hard, pale yellowish brown (10YR 612) to yellowish gray (SY 7/2), moderately weathered, sandy taxture, fossiliferous, pitted/porous, vuggy, unfractured to moderately rature, of 20°C in the control of the control o	-124.0	- 166.5 — - -	-	74%			moderately hard to hard, fresh to slightly weathered, porous/pitted in bands, strong reaction to 1N HCl when dry/powdered, slightly to moderately fractured (horizontal only). 165.3-166.3' ROD DROP. 166.3-166.4' DOLOMITE as at 165-165.1'.		11min 30sec (166.3-168.3') Rods stuck-Airlift 7min 30sec (168.3-168.8') 7min 59sec (168.8-170') Circ. Loss: 100% Driller Notes: Rod drop 165.3-
170-170.7' DOLOMITE, moderately hard, light gray (N7) to light olive gray (5Y 6/1), pitted/porous in bands, slightly to moderately weathered. fossils in bands with pits, moderate to strong reaction to 1N HCI when powdered, medium bedded, moderately factured-vertical fracture 170-170.8' (rough, open). 170-170.2' DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2) to yellowish gray (SY 72), moderately weathered-sandy texture, fossiliferous, pitted/porous, vuggy, unfractured to moderately fractured (107.7-171*), strong reaction to 1N HCI when powdered. 172.5 — R-22 (48%) 4.3 (48%) 172.3-173.5' crystalline DOLOMITE, as at 165.1'. 173.5-175' DOLOMITE, moderately hard, grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2), moderately weathered, pitted, slightly fractured (bedding planes), thick bedded, strong reaction to 1N HCI when powdered. 175-180' DOLOMITE, moderately hard, fresh to slightly weathered, pitted, slightly fractured (bedding planes), thick bedded, slight olive gray (5Y 6/1) to light gray (NS), slightly fractured along bedding planes (except) DATE STARTED: 10/6/09 GWL: DEPTH: 5.1' DATE/TIME: 10/7/09 @ 0745 DATE COMPLETED: 10/12/09 GWL: DEPTH: 5.4' DATE/TIME: 10/13/09 @ 0750 DRILLING METHOD: Mud Rotary/Continuous SPT/PQ3 Coring PRILLING METHOD: Mud Rotary/Continuous SPT/PQ3 Coring PRILLING METHOD: Mud Rotary/Continuous SPT/PQ3 Coring Run-22: Drilling Pressure: 250-300 psi (Kelly Bar RPM: 192) Run-23: Drilling Pressure: 250-300 psi (Kelly Bar RPM: 192) NOTES: Used NWJ for SPT sampling. SPT/PQ3 Coring PRILLING METHOD: Mud Rotary/Continuous SPT/PQ3 Coring		- 168 — - -	R-21		3.7				
weathered, fossils in bands with pits, moderate to strong reaction to 1711—1711—1712—1713—1714—1714—1715—1715—1715—1715—1715—1715		- 169.5 — - -							
172.5 — R-22 (48%) 4.3 (48		- 171 — - - -					weathered, fossils in bands with pits, moderate to strong reaction to 1N HCl when powdered, medium bedded, moderately fractured-vertical fracture 170-170.8' (rough, open). 170.7-172.3' DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2) to yellowish gray (5Y 7/2), moderately weathered-sandy texture, fossiliferous, pitted/porous, vuggy, unfractured to moderately		Kelly Bar RPM: 195 Enginer RPM: 1200 Drill Time: 19min 31sec 0.7' cuttings Circ. Loss: 100%
to pale yellowish brown (10YR 6/2), moderately weathered, pitted, slightly fractured (bedding planes), thick bedded, strong reaction to 1N HCl when powdered. 175-180' DOLOMITE, moderately hard, fresh to slightly weathered, pitted/porous in zones, medium to thick bedded, light olive gray (5Y 6/ 1) to light gray (N8), slightly fractured along bedding planes (except) DATE STARTED: 10/6/09 DATE COMPLETED: 10/12/09 GWL: DEPTH: 5.1' DATE/TIME: 10/7/09 @ 0745 GWL: DEPTH: 5.4' DATE/TIME: 10/13/09 @ 0750 DRILLING METHOD: Mud Rotary/Continuous SPT/PQ3 Coring DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500		- 172.5 — - -	R-22		4.3		172.3-173.5' crystalline DOLOMITE, as at 165.1'.		
pitted/porous in zones, medium to thick bedded, light of live gray (5Y 6/ L75.5 Drilling Pressure: 250-300 psi Notes: 10 loght gray (N8), slightly fractured along bedding planes (except Notes: Used NWJ for SPT sampling. DATE STARTED: 10/6/09 GWL: DEPTH: 5.1' DATE/TIME: 10/7/09 @ 0745 DATE COMPLETED: 10/12/09 GWL: DEPTH: 5.4' DATE/TIME: 10/13/09 @ 0750 FIELD GEOLOGIST: JLO DRILLING METHOD: Mud Rotary/Continuous SPT/PQ3 Coring CHECKED BY: WDS APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500		- 174 — -					to pale yellowish brown (10YR 6/2), moderately weathered, pitted, slightly fractured (bedding planes), thick bedded, strong reaction to		
DATE COMPLETED: 10/12/09 GWL: DEPTH: 5.4' DATE/TIME: 10/13/09 @ 0750 FIELD GEOLOGIST: JLO DRILLING METHOD: Mud Rotary/Continuous SPT/PQ3 Coring CHECKED BY: WDS APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500		- - 175.5 <u>-</u>					pitted/porous in zones, medium to thick bedded, light olive gray (5Y 6	6/	Drilling Pressure: 250-300 psi
FIELD GEOLOGIST: JLO DRILLING METHOD: Mud Rotary/Continuous SPT/PQ3 Coring CHECKED BY: WDS APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500								NOTE	ES: Used NWJ for SPT sampling.
APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500	FIELD GEOLOGIST: JLO								
	APPR	OVED BY	:	OS 	_	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP-	Offset Bo	ring Prog	ram			LOG OF BORING NO. O-4		PROJECT NO. 07-3935
						LOG OF BORING NO. 0-4	Ι.	I
ELEVATION (FEET MSL)	E (f.	SAMPLE NO. OR RUN NO.	" & (N) REC. RD)	RECOVERY (ft.)	빌	COORDINATES N 1722990.9 E 458053.5	SYMBOL	
LEVA FEET	DEPTH (FEET)	AMPL R RUI	BLOW/6" & (N OR % REC. & (RQD)	COVE	PROFILE	SURFACE EL: 42.3	USCS S)	REMARKS
ш		\ \delta \cdot \cd	B	ä		DESCRIPTION	l	
-138.7 -139.5 -140.7 -141.1	177 — 177 — 178.5 — 180 — 181.5 — 183 — 184.5 — 184.5 — 186 — 186 — 186 — 187 —	R-24	96% (76%)	3.9	GWL: C	180-180.5' DOLOMITE, moderately hard, thin to medium bedded, fev interlayers of crystalline dolomite, fresh to slightly weathered, pitted in very thin bands, moderately to intensely fractured, then dry/powdered, fresh to slightly weathered, pitted in bands, unfractured, vuggy in bands, light olive gray (SY 6/1) to medium light gray (N6), strong reaction to 1N HCI when powdered. 180.5-181' Crystalline DOLOMITE, medium light gray (N6) to light olive gray (SY 6/1), hard, strong reaction to 1N HCI when dry/powdered, fresh to slightly weathered, pitted in very thin bands, moderately to intensely fractured, thin to medium bedded. 181-181.8' ROD DROP. 181.8-183' DOLOMITE as at 180.5-181'. 183.4-183.5' DOLOMITE as at 180.5', intensely fractured (bedding planes), 183.5-185.2' DOLOMITE same as at 181.8'.		Enginer RPM: 1100-1200 Drill Time: 18min 8sec 0.3' rubble Circ. Loss: 100% Run-24: Drilling Pressure: 200-300 psi Kelly Bar RPM: 221, 203 Enginer RPM: 1400-1500, 1200- 1300 Drill Time: 3min 48sec (180-181.8') 13min 34sec (181.8- 183.4') Airlift 6min 5sec (183.4-183.5') 5min 38sec (183.5-185') Circ. Loss: 100% Rod drop 181-181.8' Rod drop 183-183.4' Run-25: Drilling Pressure: 250 psi Kelly Bar RPM: 210 Enginer RPM: 1300 Drill Time: 13min 18sec Circ. Loss: 100%
DATE COMPLETED: 10/12/09					GWL: DEPTH: 5.4' DATE/TIME: 10/13/09 @ 0750			
FIELD GEOLOGIST: JLO						NG METHOD: Mud Rotary/Continuous SPT/PQ3 Coring		
CHECKED BY: WDS								
CHECKED BY: WDS APPROVED BY:					DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILL	ING CO.:	HUSS						



LNP- (Offset Bor	ing Prog	ram			LOG OF BORING NO. O-4		PROJECT NO. 07-393
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1722990.9 E 458053.5 SURFACE EL: 42.3 DESCRIPTION	USCS SYMBOL	REMARKS
	187.5 — — — —	R-25	90% (70%)	4.5		friable, moderately to severly weathered, pitted/porous, thin to medium bedded, undulating abrupt basal contact. 186.5-192.9' Alternating bands of crystalline DOLOMITE (0.2-0.3' thick), slightly fractured (bedding planes) and fossiliferous weathered DOLOMITE (0.3-0.8' thick). Crystalline DOLOMITE, hard, light gray (N7), fresh, pitted in very thir bands, strong reaction to 1N HCl when dry. Fossiliferous DOLOMITE, yellowish gray (5Y 7/2), moderately hard, pitted/porous, moderately weathered, weak to moderate reaction to 1N HCl when powdered.		
	189 — — — — — — 190.5 —							Run-26: Drilling Pressure: 200-250 psi Kelly Bar RPM: 216 Enginer RPM: 1300-1400 Drill Time: 14min 52sec 0.3' rubble Circ. Loss: 100%
	192 — — — — —	R-26	96% (72%)	4.8		192.9-193.6' DOLOMITE as at 186.2-186.5' except moderately fractured.		
	193.5 — — — — — — —					193.6-195' DOLOMITE, light olive gray (5Y 6/1) to medium light gray (N6), slightly to moderately weathered, vuggy, pitted/porous in bands moderate to strong reaction to 1N HCl when powdered, thick bedded moderately fractured (bedding planes). 195-196.9' DOLOMITE, moderately soft to moderately hard, pitted/	,	Run-27:
	- - - 196.5					porous, moderately weathered, dark yellowish orange (10YR 6/6), thin banded/laminated apperance, moderate to strong reaction to 1N HCl when powdered, few fossils with few thin bands of crystalline dolomite, undulating abrupt basal contact, moderately fractured (bedding planes).		Drilling Pressure: 250-300 psi Kelly Bar RPM: 206 Enginer RPM: 1200-1300 Drill Time: 8min 55sec Circ. Loss: 100%
DATE	STARTED COMPLET GEOLOG	ΓED: 10			GWL: D	9	NOTE	ES: Used NWJ for SPT sampling
APPR	KED BY: OVED BY: ING CO.:		OS 		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- (Offset Boi	ing Prog	ram			LOG OF BORING NO. 0-4		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1722990.9 E 458053.5 SURFACE EL: 42.3	USCS SYMBOL	REMARKS
		l				DESCRIPTION	Š	
	198 — - -	R-27	(28%)	5.0		when powdered, silty texture in weathered areas, with very thin pockets of medium light gray (N6) material.		
	- 199.5 — - -					200-202.3' DOLOMITE, as at 195-196.9'.		Run-28:
	201 — - - - -							Drilling Pressure: 250 psi Kelly Bar RPM: 196 Enginer RPM: 1200-1300 Drill Time: 13min 33sec 0.3' rubble Circ. Loss: 100%
	202.5 — - - - - 204 —	R-28	90% (24%)	4.5		202.3-205' Crystalline DOLOMITE, moderately hard to hard, intensely fractured, light olive gray (5Y 6/1) to very light gray (N8), fresh to slightly weathered, pitted/vuggy in very thin bands, strong reaction to 1N HCl when dry/powdered.	,	Final water level 10/13/ 09 @ 0750 5.4'.
	_							
-162.7	_				7,1,7,7	BOTTOM OF BORING 205'		
	205.5 — - - - -							
	207 —							
DATE FIELD	STARTED COMPLE GEOLOG KED BY:	TED: 10/)		GWL: D GWL: D DRILLIN		NOTE	ES: Used NWJ for SPT sampling.
APPR	OVED BY:		-		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILL	ING CO.:	HUSS						



LNP- Offest Boring Progra	am		LOG OF BORING NO. 0-5		PROJECT NO. 07-3935
ELEVATION (FEET MSL) DEPTH (FEET) SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD) RECOVERY (ft.)	, I	COORDINATES N 1724150.2 E 457769.9	SYMBOL	
EVATIO EET MS DEPTH (FEET)	*% F (RQ	PROFILE	SURFACE EL: 42.6	SSY	REMARKS
SAN SAN OR			DESCRIPTION	- Sosa	
0			7.0-7.4' Weathered DOLOMITE.	sp	0-22' destructive drilling, log based on cuttings.
DATE STARTED: 10/1 DATE COMPLETED: 10/2 FIELD GEOLOGIST: WDS CHECKED BY: JLO	8/09 S	GWL: D GWL: D DRILLIN		NOTE	ES: NA
APPROVED BY: DRILLING CO.: HUSS		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



20.6 22 24 25 25 25 25 25 25	LNP- Offest Boring Program			PROJECT NO. 07-3935
20.6 22 TOP OF AVON PARK FORMATION 22.0" TOP OF AVON PARK FORMATION 22.0" 22.0" TOP OF AVON PARK FORMATION 22.0 Switched to Coring OB-1: Drilling Pressure. 450 pai New York Annual Pressure 23.0 27 of DOLOMITE, soft to moderately soft, highly weathered. Slightly fractured. For the bedded, weather excellor to In WH.C. of the pressure of the pressure and painting of the pressure and paintin		LOG OF BORING NO. 0-5		2222113.0. 3000
20.6 22 — TOP OF AVON PARK FORMATION 22.0" 20.6 22 — TOP OF AVON PARK FORMATION 22.0" 20.6 22 — TOP OF AVON PARK FORMATION 22.0" 20.27 OF DOLOMITE, soft to moderately soft, lightly weathered. Slightly fractured. Slightly fractured. Slightly fractured. Printing Pressure. 450 pair Replication for the part of the pair Replication for the pair R	MSL) HH T) T) T) ANO. ANO. ANO. ARC. AD)		MBOL	
20.6 22 — TOP OF AVON PARK FORMATION 22.0" 20.6 22 — TOP OF AVON PARK FORMATION 22.0" 20.6 22 — TOP OF AVON PARK FORMATION 22.0" 20.27 OF DOLOMITE, soft to moderately soft, lightly weathered. Slightly fractured. Slightly fractured. Slightly fractured. Printing Pressure. 450 pair Replication for the part of the pair Replication for the pair R	EEVATEET (FEE (FEE NW/6")	SURFACE EL: 42.6	SS SY	REMARKS
20.6 22 — 22.0° 20.6 22 — 22.0° 20.6 22 — 22.0° 20.6 22 — 22.0° 20.6 22 — 22.0° 20.6 22 — 22.0° 20.6 22 — 22.0° 20.6 22 — 22.0° 20.6 22 — 22.0° 20.6 22 — 22.0° 20.6 23 — 22.0° 20.0	SA OF OF OF		DSO	
Drill Time: 5min 49sec Circulation loss: 100 % DATE STARTED: 10/19/09 DATE COMPLETED: 10/28/09 FIELD GEOLOGIST: WDS Drill Time: 5min 49sec Circulation loss: 100 % DATE/TIME: 10/20/09 @ 0750 DATE/TIME: 10/28/09 @ 1015 DRILLING METHOD: Mud Rotary/PQ3 coring	20.6 22 —	TOP OF AVON PARK FORMATION 22.0-23.0' DOLOMITE, soft, highly weathered, slightly fractured, thin bedded, weak reaction to 1N HCl, olive gray (5Y 3/2). 23.0-27.0' DOLOMITE, soft to moderately soft, highly weathered, weak reaction to 1N HCl, grayish orange (10YR 7/4) to very pale orange (10YR 8/2), moderately fractured.		Switched to Coring OB-1: Drilling Pressure: 450 psi Kelly Bar RPM: 196 Engine RPM: 1200-1300 Drill Time: 10min 3sec Circulation loss: 100% OB-2: Drilling Pressure: 250 psi Kelly Bar RPM: 197
DATE COMPLETED: 10/28/09 GWL: DEPTH: 6.3' DATE/TIME: 10/28/09 @ 1015 FIELD GEOLOGIST: WDS DRILLING METHOD: Mud Rotary/PQ3 coring	OB-2 50% 1.5			Circulation loss: 100 %
	DATE COMPLETED: 10/28/09	GWL: DEPTH: 6.3' DATE/TIME: 10/28/09 @ 1015	.01	
LOUEOVED DV 110 I		DRILLING METHOD: Mud Rotary/PQ3 coring		
CHECKED BY: JLO APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500		DRILLER: Eddie Palmer HFI PFR: Chad/Cody 5	RIG [.]	Failing 1500
DRILLING CO.: HUSS		PRIEEE/C. Edulo Fairnoi Field Etc. Oriad/Oody	ιι υ .	- aming 1000



LNP- Offest Boring Program I OG OF BORING NO. 0-5												
LNP-	LOG OF BORING NO. 0-5											
ELEVATION (FEET MSL)	ГН Т.)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1724150.2 E 457769.9	SYMBOL					
EVA ⁻	DEPTH (FEET)	MPLE RUN	3W/6' R % F & (RG	OVE	PROFILE	SURFACE EL: 42.6	SSY	REMARKS				
<u> E</u>		SA	BLC	REC	"	DESCRIPTION	nscs					
	30 —					30.0-33.0' DOLOMITE, very weathered-soft drilling, no recovery of material but cuttings, similar to material above.		OB-3: Drilling Pressure: 200 psi Kelly Bar RPM: 204 Engine RPM: 1200-1300 Drill Time: 13min 32sec				
	32 	OB-3	36% (0%)	1.8				2" of material fall in from above. Driller Notes: very soft from 130'- 133'				
	34 —					33.0-35.0' DOLOMITE, very weathered, intensely fractured (bedding planes), no reaction to 1N HCl, moderate reaction when powdered, moderately hard to hard, grayish orange (10YR 7/4).						
	- 36 -					35.0-37.0' DOLOMITE, moderately weathered, moderately fractured (bedding planes), no reaction to 1N HCl, moderately hard to hard, light olive gray (5Y 5/2).		OB-4: Drilling Pressure: 250 psi Kelly Bar RPM: 200 Engine RPM: 1200-1300 Drill Time: 10min 43sec Circulation loss: 90%				
	- 38 	OB-4	28% (14%)	1.4		37.0-45.0' DOLOMITE, intensely weathered, soft, no recovery of material but cuttings similar to material above.						
	40 —							OB-5: Drilling Pressure: 200 psi Kelly Bar RPM: 214 Engine RPM: 1300-1400 Drill Time: 2min 23sec Circulation loss: 100 % NOTE: No picture taken since no				
	42 — - - -	OB-5	0% (0%)	0.0				sample recovered.				
DATE FIELD	DATE STARTED: 10/19/09 DATE COMPLETED: 10/28/09 FIELD GEOLOGIST: WDS CHECKED BY: JLO					DEPTH: 5.9' DATE/TIME: 10/20/09 @ 0750 DEPTH: 6.3' DATE/TIME: 10/28/09 @ 1015 NG METHOD: Mud Rotary/PQ3 coring	NOTE	ES: NA				
APPR	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500				
DRILL	ING CO.:	HUSS										



LNP- (Offest Bor	ing Prog	ram					PROJECT NO. 07-3935
						LOG OF BORING NO. 0-5		
TION ASL)	н. (Т	: NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	LE LE	COORDINATES N 1724150.2 E 457769.9	SYMBOL	
ELEVATION (FEET MSL)	ОЕРТН (FEET)	SAMPLE NO. OR RUN NO.	DW/6" R % F & (RG	OVE	PROFILE	SURFACE EL: 42.6		REMARKS
		% o	BLO	RE(DESCRIPTION	nscs	
	46 —	OB-6	16% (0%)	0.8		45.0-50.0' DOLOMITE, soft, intensely weathered, intensely fractured no reaction to 1N HCI, moderate reaction when powdered, light olive gray (5Y 5/2) to olive gray (5Y 3/2).	,	OB-6: Drilling Pressure: 200 psi Kelly Bar RPM: 199 Engine RPM: 1200-1300 Drill Time: 4min 13sec Circulation loss: 100%
	50 —	OB-7	92% (80%)	4.6		50.0-52.8' DOLOMITE, moderately hard, light olive gray (5Y 5/2), argillaceous, thick bedded, slightly fractured (horizontal-bedding planes), moderately weathered, no reaction to 1N HCl. 50.2' Horizontal fracture.		OB-7: Drilling Pressure: 400 psi Kelly Bar RPM: 200 Engine RPM: 1200-1300 Drill Time: 15min 57sec Circulation loss: None Water level 10/20/09 @ 0750 5.9'.
	54 — 554 — 56 —		80%			52.8-55.0' DOLOMITE, soft, moderate yellowish brown (10YR 5/4), sandy, thinly bedded, slightly fractured, moderately to intensely weathered, no reaction to 1N HCl, moderate reaction when powdered. 55.0-58.8' DOLOMITE, moderately soft, light olive gray (5Y 5/2), sandy, thick bedded, slightly fractured (horizontal-bedding planes), moderately weathered, no reaction to 1N HCl, moderate reaction when powdered.		OB-8: Drilling Pressure: 300 psi Kelly Bar RPM: 206 Engine RPM: 1200-1300 Drill Time: 26min 17sec Circulation loss: None 1" of material fall in from above. Driller Notes: soft from 57.8-58.8'.
	58 	OB-8	(74%)	4.0				
	STARTED		19/09		GWL: DEPTH: 5.9' DATE/TIME: 10/20/09 @ 0750			ES: NA
l .	COMPLET GEOLOG				GWL: DEPTH: 6.3' DATE/TIME: 10/28/09 @ 1015 DRILLING METHOD: Mud Rotary/PQ3 coring			
l .	GEOLOG KED BY:	JL(PIXIELI	TO METHOD. Widd Notally/FQ3 Colling		
	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILL	ING CO.:	HUSS				·		



COORDINATES COORDINATES	LNP- C	Offest Bor	ina Proa	ram					PROJECT NO. 07-3935
58.8.6.0 / DOLOMITE, hard, pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 6/4), crystalline, thick bedded, undertactured, fresh to slightly weathered, no reaction to 1N HCI, moderate reaction when powdered. 60.0-6.0 / SA above except yellowish gray (5Y 8Y). 60.5-63.4 DOLOMITE, thinly laminated with some pits, yellowish brown (10YR 5/4). 61.00 / SA 60.0-60 / SA above except yellowish gray (5Y 8Y). 62.00 / SA 60.0-60 / SA above except yellowish brown (10YR 5/4). 63.4-65.0 DOLOMITE, moderately soft, moderate yellowish brown (10YR 5/4). 64.00 / SA 60.0-60 / SA above except yellowish brown (10YR 5/4). 65.0 / DOLOMITE, moderately soft, moderate yellowish brown (10YR 5/4). 65.0 / DOLOMITE, moderately soft, moderate yellowish brown (10YR 5/4). 65.0 / DOLOMITE, moderately soft, moderate reaction when powdered. 65.0 / DOLOMITE, moderately bard, pale yellowish brown (10YR 5/4). 66.0 - R-2 / SA 6/5 / SModerately soft. 66.0 / SA 6/5 / SModerately soft. 67.0 / DOLOMITE, moderately soft, moderate reaction when powdered. 68.0 / SA 6/5 / SModerately soft. 69.0 / SA 6/5 / SMODERATE (10YR 5/4). 60.0 / SA 6/5 / SMODERATE (10YR							LOG OF BORING NO. 0-5		
58.8.6.0 / DOLOMITE, hard, pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 6/4), crystalline, thick bedded, undertactured, fresh to slightly weathered, no reaction to 1N HCI, moderate reaction when powdered. 60.0-6.0 / SA above except yellowish gray (5Y 8Y). 60.5-63.4 DOLOMITE, thinly laminated with some pits, yellowish brown (10YR 5/4). 61.00 / SA 60.0-60 / SA above except yellowish gray (5Y 8Y). 62.00 / SA 60.0-60 / SA above except yellowish brown (10YR 5/4). 63.4-65.0 DOLOMITE, moderately soft, moderate yellowish brown (10YR 5/4). 64.00 / SA 60.0-60 / SA above except yellowish brown (10YR 5/4). 65.0 / DOLOMITE, moderately soft, moderate yellowish brown (10YR 5/4). 65.0 / DOLOMITE, moderately soft, moderate yellowish brown (10YR 5/4). 65.0 / DOLOMITE, moderately soft, moderate reaction when powdered. 65.0 / DOLOMITE, moderately bard, pale yellowish brown (10YR 5/4). 66.0 - R-2 / SA 6/5 / SModerately soft. 66.0 / SA 6/5 / SModerately soft. 67.0 / DOLOMITE, moderately soft, moderate reaction when powdered. 68.0 / SA 6/5 / SModerately soft. 69.0 / SA 6/5 / SMODERATE (10YR 5/4). 60.0 / SA 6/5 / SMODERATE (10YR	TION MSL)	тн (Т:	N NO.	" & (N) REC. 2D)	RY (ft.)	빌		MBOL	
58.8.6.0 / DOLOMITE, hard, pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 6/4), crystalline, thick bedded, undertactured, fresh to slightly weathered, no reaction to 1N HCI, moderate reaction when powdered. 60.0-6.0 / SA above except yellowish gray (5Y 8Y). 60.5-63.4 DOLOMITE, thinly laminated with some pits, yellowish brown (10YR 5/4). 61.00 / SA 60.0-60 / SA above except yellowish gray (5Y 8Y). 62.00 / SA 60.0-60 / SA above except yellowish brown (10YR 5/4). 63.4-65.0 DOLOMITE, moderately soft, moderate yellowish brown (10YR 5/4). 64.00 / SA 60.0-60 / SA above except yellowish brown (10YR 5/4). 65.0 / DOLOMITE, moderately soft, moderate yellowish brown (10YR 5/4). 65.0 / DOLOMITE, moderately soft, moderate yellowish brown (10YR 5/4). 65.0 / DOLOMITE, moderately soft, moderate reaction when powdered. 65.0 / DOLOMITE, moderately bard, pale yellowish brown (10YR 5/4). 66.0 - R-2 / SA 6/5 / SModerately soft. 66.0 / SA 6/5 / SModerately soft. 67.0 / DOLOMITE, moderately soft, moderate reaction when powdered. 68.0 / SA 6/5 / SModerately soft. 69.0 / SA 6/5 / SMODERATE (10YR 5/4). 60.0 / SA 6/5 / SMODERATE (10YR	EVA:	DEP'	MPLI R RUN	OW/6' R % F & (RC	SOVE	 NOF 	SURFACE EL: 42.6		REMARKS
moderate yellowish brown (10YR 5/4), crystalline, thick bedded, unfractured, fish to slightly weathered, no reaction to 1N HCl, moderate reaction when powdered. 80 - 80 - 80 - 80 - 80 - 80 - 80 - 80			S, O.	BLO	REC		DESCRIPTION	OSC	
60.5-63.4* DOLOMITE, thinly laminated with some pits, yellowish brown (10YR 5/4). R-1 100% (100%) 5.0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2		- 60 —					moderate yellowish brown (10YR 5/4), crystalline, thick bedded, unfractured, fresh to slightly weathered, no reaction to 1N HCl, moderate reaction when powdered.		Run 1:
R-1 100% 5.0 63.4-65.0' DOLOMITE, moderately soft, moderate yellowish brown (10YR 6/4), sandy, thinly bedded, pitted, pitted, unfractured, moderately weathered, or praction to 1N HCI, moderate reaction when powdered. 65.0-70.0' DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2) to moderately settled, slightly fractured (bedding) planes), no reaction to 1N HCI, moderate reaction when powdered. 70		62 —					60.5-63.4' DOLOMITE, thinly laminated with some pits, yellowish		Drilling Pressure: 300 psi Kelly Bar RPM: 204 Engine RPM: 1200-1300 Drill Time: 24min 35sec Circulation loss: none Picture of sample in tray shows Run# but not number 1, depth is
weathered, no reaction to 1N HCI, moderate reaction when powdered. 65.0-70.0° DOLOMITE, moderately hard, pale yellowish brown (10°VR 6.0°2) to moderate yellowish brown (10°VR 5.0°4), thin to medium bedded, slightly to moderately weathered, few pits, slightly factured (bedding planes), no reaction to 1N HCI, moderate reaction when powdered. 70 - R-2 (64%) 5.0 (64%) 5.0 (64%) 5.0 (66.6-67.8° Moderately) soft. 70 - R-3 (64%) 5.0 (64%) 5.0 (10°VR 5.0°4), thin by bedded, few pits, intensely weathered, no reaction to 1N HCI, moderately soft. 70 - R-3 (64%) 5.0 (68%) 5.0 (10°VR 5.0°4), thin by bedded, few pits, intensely weathered, no reaction to 1N HCI, weak reaction to powdered. 70.8-72.3° DOLOMITE, hard, light gray (N7) thick bedded, some pitting, moderate reaction to 1N HCI, weak reaction to powdered. 70.8-72.3° DOLOMITE, soft, moderately ellowish brown (10°VR 5/4), think bedded, severely weathered, no reaction to 1N HCI, weak reaction to 1N HCI, weak reaction to 50°C includition loss: 0% Dillier Notes: bottom 2° soft. DATE STARTED: 10/19/09 GWI: DEPTH: 5.9' DATE/TIME: 10/20/09 @ 0750 NOTES: NA DATE COMPLETED: 10/28/09 FIELD GEOLOGIST: WDS		62 - - -	R-1		5.0				correct on picture.
66 — R-2 100% (84%) 5.0 2 2 2 2 3-74.6 DOLOMITE, moderate yellowish brown (10YR 5/4), thin to medium bedded, sellowed from the computation to 1N HCl, wask reaction to 1N H		64 —					weathered, no reaction to 1N HCl, moderate reaction when powdered.		Pun 2
Run 3: To.0-70.7' As above except pale yellowish brown (10YR 6/2). 70.0-70.7' As above except pale yellowish brown (10YR 6/2). 70.7-70.8' DOLOMITE, moderately soft, moderate yellowish brown (10YR 5/4), thinly bedded, few pits, intensely weathered, no reaction to 1N HCl, weak reaction to 1N HCl		66 — 					6/2) to moderate yellowish brown (10YR 5/4), thin to medium bedded slightly to moderately weathered, few pits, slightly fractured (bedding planes), no reaction to 1N HCI, moderate reaction when powdered.	١,	Drilling Pressure: 300 psi Kelly Bar RPM: 209 Engine RPM: 1200-1300 Drill Time: 31min 17sec
70.7-70.8' DOLOMITE, moderately soft, moderate yellowish brown (10YR 5/4), thinly bedded, few pits, intensely weathered, no reaction to 1N HCl, weak reaction when powdered. 70.8-72.3' DOLOMITE, hard, light gray (N7), thick bedded, some pitting, moderate reaction to 1N HCl, weak reaction to powdered, fresh, slightly fractured (bedding planes). 72.3-74.6' DOLOMITE, soft, moderate yellowish brown (10YR 5/4), pitted, thinly bedded, severely weathered, no reaction to 1N HCl, strong reaction when powdered, intensely fractured. DATE STARTED: 10/19/09 DATE COMPLETED: 10/28/09 FIELD GEOLOGIST: WDS DATILING METHOD: Mud Rotary/PQ3 coring		68 	R-2		5.0				
70.8-72.3' DOLOMITE, hard, light gray (N7), thick bedded, some pitting, moderate reaction to 1N HCI, weak reaction to powdered, fresh, slightly fractured (bedding planes). 72.3-74.6' DOLOMITE, soft, moderate yellowish brown (10YR 5/4), pitted, thinly bedded, severely weathered, no reaction to 1N HCI, strong reaction when powdered, intensely fractured. DATE STARTED: 10/19/09 DATE COMPLETED: 10/28/09 FIELD GEOLOGIST: WDS ONUMBER 10/28/109 FIELD GEOLOGIST: WDS ONUMBER 10/28/109 ONU		70 — —					70.7-70.8' DOLOMITE, moderately soft, moderate yellowish brown (10YR 5/4), thinly bedded, few pits, intensely weathered, no reaction		Drilling Pressure: 300 psi Kelly Bar RPM: 207 Engine RPM: 1200-1300 Drill Time: 41min 26sec
DATE COMPLETED: 10/28/09 GWL: DEPTH: 6.3' DATE/TIME: 10/28/09 @ 1015 FIELD GEOLOGIST: WDS DRILLING METHOD: Mud Rotary/PQ3 coring		72 	R-3		3.2		70.8-72.3' DOLOMITE, hard, light gray (N7), thick bedded, some pitting, moderate reaction to 1N HCl, weak reaction to powdered, fresh, slightly fractured (bedding planes). 72.3-74.6' DOLOMITE, soft, moderate yellowish brown (10YR 5/4), pitted, thinly bedded, severely weathered, no reaction to 1N HCl,		
I CHECKEU DT: JLU I	DATE FIELD	DATE COMPLETED: 10/28/09					EPTH: 6.3' DATE/TIME: 10/28/09 @ 1015	NOTE	ES: NA
APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500 DRILLING CO.: HUSS	APPRO	OVED BY:			_	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- (Offest Bor	ng Prog	ram			LOG OF BORING NO. 0-5		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	ОЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724150.2 E 457769.9 SURFACE EL: 42.6	SYMBOL	REMARKS
ELE)	10 F)	SAMI OR F	COV OR '	ECO	H H		nscs	
			<u> </u>	~	\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	DESCRIPTION	-	
-32.4 -34.5	74 — - - 76 — - - 78 —	R-4	100% (52%)	5.0		74.6-75.0' DOLOMITE, moderately hard, moderate yellowish brown (10YR 5/4), some vugs and pits, thinly bedded, weak reaction to 1N HCI, intensely fractured. 75.0-77.1' LIMESTONE, very hard, crystalline, thick bedded, very light gray (N8), 75-75.6' some pitting, slightly fractured (horizontal-bedding planes), moderate to strong reaction to 1N HCI. 77.1-77.5' DOLOMITE, moderately soft, thinly bedded, moderate yellowish brown (10YR 5/4), intensely fractured, no reaction to 1N HCI.	,· <u>-</u>	Run 4: Drilling Pressure: 300 psi Kelly Bar RPM: 213 Engine RPM: 1300-1400 Drill Time: 35min 53sec (75.0-77.524min 40sec (77.5-80.0') Circulation loss: None Note: Picture in tray mislabeled-shows RUN 3.
	80 —	R-5	100%	5.0		77.5-79.3' Same as 75.0-77.1' except slightly pitted, moderately fractured. 79.3-80.0' DOLOMITE, moderately soft, thinly bedded to laminated, pitted, moderate yellowish brown (10YR 5/4), moderately fractured, no reaction to 1N HCl. 80.0-80.7' As above except moderate yellowish brown (10YR 5/4) and light gray (N7). 80.7-81.3' As above except intensely fractured. 81.3-85.9' DOLOMITE, thick bedded, moderately hard, pitted, few small vugs, light gray (N7), very slightly fractured (horizontal break at 84'), no reaction to 1N HCl, weak reaction when powdered.		Run 5: Drilling Pressure: 250 psi Kelly Bar RPM: 201 Engine RPM: 1200-1300 Drill Time: 16min 24sec Circulation loss: none
DATE	84 — 86 — STARTED	ED: 10		5.0	GWL: D	EPTH: 6.3' DATE/TIME: 10/28/09 @ 1015		Run-6: Drilling Pressure: 250 psi Kelly Bar RPM: 199 Engine RPM: 1200-1300 Drill Time: 16min 52sec Circulation loss: None
FIELD GEOLOGIST: WDS CHECKED BY: JLO APPROVED BY:						NG METHOD: Mud Rotary/PQ3 coring R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
	ING CO.:	HUSS		\dashv	DIVILLE	TILLI ET. Offau/Couy	MG.	i aming 1500



LNP- C	Offest Bo	ring Prog	ram					PROJECT NO. 07-3935
		99				LOG OF BORING NO. 0-5		
ELEVATION (FEET MSL)	H (F	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1724150.2 E 457769.9	SYMBOL	
LEVA'	DEPTH (FEET)	MPLE RUN	OW/6' R % F & (RC	SOVE	PROFILE	SURFACE EL: 42.6	SS SY	REMARKS
🛚 🖰		8 10	BLO	RE(DESCRIPTION	nscs	
	88 —					brown (10YR 4/2), no reaction to 1N HCl, weak reaction when powdered, slightly weathered.		
	_					88.4' Fracture, filled with organics, no odor.		
	-					89.1-90.0' DOLOMITE, soft, thin bedded, very pale orange (10YR 8/2), no reaction to 1N HCl, moderately to severely weathered, moderately fractured.		
	90 —					90.0-91.8' DOLOMITE, thick bedded, hard, very pale orange (10YR 82), unfractured, some pits filled with dolomite (grayish orange (10YR 7/4)) and a fewer thin streaks (dusky yellowish brown (10YR 2/2)), strong reaction to 1N HCI, fresh to slightly weathered.	s/	Run-7: Drilling Pressure: 200 psi Kelly Bar RPM: 204 Engine RPM: 1200-1300 Drill Time: 41min 29sec Circulation loss: None
	92 —	R-7	86% (32%)	4.3		91.8'-92.3' DOLOMITE, moderately soft, thick bedded, pale yellowish brown (10YR 6/2), slightly fractured, severely weathered, no reaction to 1N HCl. 92.3-93.2' Same as 90.0-91.8' except intensely fractured.		Driller Notes: soft 94-95'.
	94 —					93.2-95.7' DOLOMITE, moderately soft, thin bedded, dark yellowish brown (10YR 4/2) with black (N1) streaks, severly weathered, intensely fractured, no reaction to 1N HCl, slight reaction when powdered, pitted.		
	96 —					95.7-100.0' DOLOMITE, moderately soft, thick bedded, moderately to intensely fractured (vertical), moderately weathered, few pits, very pale orange (10YR 8/2), no reaction to 1N HCI, moderate reaction when powdered.)	Run-8: Drilling Pressure: 250 psi Kelly Bar RPM: 203 Engine RPM: 1200-1300 Drill Time: 15min 9sec Circulation loss: None Material from above: 2"
	98 	R-8	100%	5.0				
	100 —					100.0-102.9' As above except slightly fractured (bedding planes).		Run-9: Drilling Pressure: 250 psi Kelly Bar RPM: 221 Engine RPM: 1400-1500 Drill Time: 15min 50sec Circulation loss: 100%
			11010-		\(\frac{\fin}{\frac{\fir}{\fir}}}}}}}}}{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac}\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\frac{\fra			
	STARTEI COMPLE): 10, TED: 10,	/19/09 /28/09		GWL: DEPTH: 5.9' DATE/TIME: 10/20/09 @ 0750 GWL: DEPTH: 6.3' DATE/TIME: 10/28/09 @ 1015			ES: NA
l		IST: W				NG METHOD: Mud Rotary/PQ3 coring		
l .	KED BY:	JL	0					
	OVED BY			\dashv	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
υKILLI	NG CO.:	побб						



LNP- Offest	Boring Prog	ram			LOG OF BORING NO. 0-5		PROJECT NO. 07-393
(FEET MSL) DEPTH	SAMPLE NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	E E	COORDINATES N 1724150.2 E 457769.9	SYMBOL	
EET MS DEPTH	MPLE	NW/6" R % F R (RC	OVE	PROFILE	SURFACE EL: 42.6	\S SX	REMARKS
					DESCRIPTION	nscs	
	R-9	98% (66%)	4.9		102.9-105.0' As above except moderately to intensely fractured.		
104					105.0-112.9' As above except slightly fractured (vertical fractures at 106-106.3' and 106.8-107.5').		Run-10: Drilling Pressure: 200 psi Kelly Bar RPM: 205 Engine RPM: 1200-1300 Drill Time: 18min 15sec Circulation loss: partial Catcher malfunction, 0.4' added to
108	- R-10	100%	5.0				R-10 from R-11.
110	- - -	100%	5.0				Run-11: Drilling Pressure: 150 psi Kelly Bar RPM: 214 Engine RPM: 1300-1400 Drill Time: 7min 29sec Circulation loss: 30% Material from above: 0.4' Note solid core from above core run (added to Run-10).
114	- R-11 - - -	(78%)	5.0		112.9-115.9' DOLOMITE, grayish orange (10YR 7/4), moderately soft, thin bedded, moderately fractured, severely weathered, pitted, vuggy, no reaction to 1N HCI, moderate reaction when powdered, sandy.		
116					115.9-116.9' DOLOMITE, moderately soft, pale yellowish brown (10YR 6/2), sandy, thinly bedded, slightly weathered, moderately fractured, no reaction to 1N HCI, moderate reaction when powdered.		Run-12: Drilling Pressure: 400 psi Kelly Bar RPM: 211 Engine RPM: 1300-1400 Drill Time: 8min 23sec Circulation loss: 50% Water level 10/26/09 @ 0830 6.5'. Picture taken in tray has incorrect
DATE STAR DATE COMF FIELD GEOL CHECKED E	PLETED: 10. OGIST: WI	os		GWL: D GWL: D DRILLIN	9	NOTE	ES: NA
APPROVED		RIG:	Failing 1500				



LNP- C	Offest Bor	ing Prog	ram					PROJECT NO. 07-3935
						LOG OF BORING NO. 0-5		
ELEVATION (FEET MSL)	H)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	빌	COORDINATES N 1724150.2 E 457769.9	SYMBOL	
EVA'	DEPTH (FEET)	MPLE	OW/6' R % F & (RG	OVE	PROFILE	SURFACE EL: 42.6	S SY	REMARKS
 日 -		SA	BLC	REC	"	DESCRIPTION	nscs	
	118 —	R-12	100% (62%)	5.0		116.9-117.4' DOLOMITE, moderately hard, very pale orange (10YR 8/2), crystalline, thin bedded, slightly weathered, moderately fractured, moderate reaction to 1N HCI. 117.4-118.7' DOLOMITE, moderately soft, grayish orange (10YR 7/4), sandy, thin bedded, moderately weathered, slightly fractured, no reaction to 1N HCI.		date.
	<u> </u>					118.7-120.0' DOLOMITE, moderately soft, pale yellowish brown (10YR 6/2), pitted, fossiliferous, moderately to severely weathered, thin bedded, intensely fractured, no reaction to 1N HCI.		
	120 					120.0-120.5' DOLOMITE, moderately hard, grayish orange (10YR 7/4), crystalline to sandy, thin bedded, slightly weathered, unfractured, no reaction to 1N HCI, moderate reaction when powdered. 120.5-121.5' As above except intensely fractured-vertical fracture from 120.5-122.0'.		Run-13: Drilling Pressure: 350 psi Kelly Bar RPM: 202 Engine RPM: 1200-1300 Drill Time: 11min 45sec Circulation loss: 50%
	122 —	R-13	96%	4.8		121.5-122.4' As above except slightly fractured. 122.4-126.2' DOLOMITE, moderately hard, crystalline, very pale		Driller Notes: end of core fell in hole as he was bringing core out. NOTE: picture shows 84% recovery since it was taken before the following core run retrieved the
	- 124 		(52%)			orange (10YR 8/2), pitted, slightly weathered, unfractured, no reaction to 1N HCl, moderate reaction when powdered.	n	fallen piece. Picture in tray has incorrect date.
	- 126 — - -	R-14	96%	4.8		126.2-126.6' Same as above except laminated, moderately fractured very pale orange (10YR 8/2), no pits. 126.6-127.0' DOLOMITE, soft, pitted, fossiliferous, pale yellowish brown (10YR 6/2), severely weathered, intensely fractured, moderate reaction to 1N HCI. 127.0-128.0' Same as 126.2-126.6'.		Run-14: Drilling Pressure: 250 psi Kelly Bar RPM: 201 Engine RPM: 1200-1300 Drill Time: 9min 54sec Circulation loss: 50% Material from above: 0.6' Picture in tray shows incorrect date.
	128 — — — —		(66%)			128.0-130.0' DOLOMITE, moderately soft, pale yellowish brown (10YR 6/2), pitted, fossiliferous, moderately weathered, slightly fractured, no reaction to 1N HCl, weak reaction when powdered.		
	130 					130.0-132.7' DOLOMITE, moderately soft, thinly laminated, grayish orange (10YR 7/4), layers of dark yellowish brown (10YR 4/2), very pale orange (10YR 8/2), and pale yellowish brown (10YR 6/2), some pits and fossils, slightly to moderately weathered, slightly fractured (horizontal-bedding planes), no reaction to 1N HCI, moderate reaction when powdered.		Run-15: Drilling Pressure: 250 psi Kelly Bar RPM: 206 Engine RPM: 1200-1300 Drill Time: 10min 50sec Circulation loss: 50%
1	STARTED		19/09		GWL: D	9	NOTE	ES: NA
1	COMPLET				GWL: D	C		
1	GEOLOG KED BY:	IST: VVL JL(PKILLI	NG METHOD: Mud Rotary/PQ3 coring		
APPRO	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILLI	NG CO.:	HUSS						



LNP- (Offest Bor	ing Prog	ram			LOG OF BORING NO. 0-5		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	БЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724150.2 E 457769.9 SURFACE EL: 42.6	USCS SYMBOL	REMARKS
Ш		Ø 0	BL	RE		DESCRIPTION	ns	
	132 —	R-15	100% (74%)	5.0		132.7-136.4' DOLOMITE, moderately hard, thinly bedded, sandy to crystalline, pale yellowish brown (10YR 8/2), some pits, slightly weathered, slightly to moderately fractured (horizontal-bedding planes), no reaction to 1N HCI, moderate reaction when powdered,		Picture in tray shows incorrect date.
	134 — – –					some laminations-dark yellowish brown (10YR 4/2) at 134.7'.		Run-16: Drilling Pressure: 300 psi
	136 — — —	R-16	100%	5.0		136.4-136.9' As above except pale yellowish brown (10YR 6/2), unfractured. 136.9-140.0' DOLOMITE, hard, crystalline, thick bedded, pale yellowish brown (10YR 6/2) and moderate yellowish brown (10YR 5/4), pitted, some vugs, moderately weathered, intensely fractured, no		Kelly Bar RPM: 213 Engine RPM: 1300-1400 Drill Time: 30min 42sec Circulation loss: 50%
	138 		(32%)			reaction to 1N HCl, some fossils.		
	140 — — — —					140.0-141.8' DOLOMITE, very hard, pale yellowish brown (10YR 6/2) with medium gray (N5) bands, laminated, some pits, slightly weathered at 141.6' (moderate yellowish brown (10YR 5/4) and more pitted), slightly fractured, crystalline, no reaction to 1N HCl, moderate reaction when powdered.		Run-17: Drilling Pressure: 250 psi Kelly Bar RPM: 217 Engine RPM: 1300-1400 Drill Time: 28min 24sec Circulation loss: 50% Material from above: 5"
	142 — — — — — — — — — — — — — — — — — — —	R-17	100% (100%)	5.0		141.8-145.8' DOLOMITE, moderately hard, very pale orange (10YR 8/2) and pale yellowish brown (10YR 6/2), sandy to crystalline, thin bedded, unfractured, very slightly weathered, no reaction to 1N HCl, moderate reaction when powdered.		
	146 —					145.8-148.1' DOLOMITE, very hard, pale yellowish brown (10YR 6/2 crystalline, few fossils, more pitted at 147.7' to 148.1', unfractured,),	Run-18: Drilling Pressure: 250 psi Kelly Bar RPM: 208 Engine RPM: 1200-1300 Drill Time: 19min 50sec
DATE FIELD	STARTED COMPLET GEOLOG KED BY:	ED: 10/	os		GWL: D GWL: D DRILLIN	9	NOTE	ES: NA
	OVED BY: ING CO.:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- Offest Boring Program	LOG OF BORING NO. 0-5		PROJECT NO. 07-3935
ELEVATION (FEET MSL) DEPTH (FEET) SAMPLE NO. OR RUN NO. BLOW/6" & (N) OR % REC. & (RQD)	COORDINATES N 1724150.2 E 457769.9 SURFACE EL: 42.6	S SYMBOL	REMARKS
SA SA OF O	DESCRIPTION	nscs	
R-18 86% 4.5 148 -	very slightly weathered, thin bedded, no reaction to 1N HCl, moderate to high reaction when powdered. 148.1-148.7' DOLOMITE, moderately soft, moderate yellowish brown (10YR 5/4), sandy, thinly laminated, severly weathered, moderately fractured along bedding planes, pitted, no reaction to 1N HCl. 148.7-150.0' DOLOMITE, moderately hard, thinly laminated, very pale orange (10YR 8/2) with light gray (N7) bands, moderately weathered, unfractured, weak reaction to 1N HCl. 150.0-150.3' As above except pale yellowish brown (10YR 6/2). 150.3-152.1' As above except grayish orange (10YR 7/4). 152.1-153.0' As above except pitted, grayish orange (10YR 7/4). 153.0-154.0' As above except not pitted, pale yellowish brown (10YR 6/2). 154.0-154.6' DOLOMITE, hard, thinly laminated, crystalline, yellowish gray (5Y 8/1) and light gray (N7), fresh, moderately fractured, no reaction to 1N HCl, slight reaction when powdered. 154.6-155.0' Same as 153.0'-154.0' 155.0-156.2' DOLOMITE, moderately hard, very pale orange (10YR 8/2) to grayish orange (10YR 7/4), sandy to crystalline, pitted, slightly weathered, unfractured, weak reaction to 1N HCl. 156.2-156.6' As above except pale yellowish brown (10YR 6/2), unfractured. 156.6-157.3' Same as 155.0-156.2'.	R D K E D C	Run-19: Prilling Pressure: 200 psi Celly Bar RPM: 215 Engine RPM: 1300-1400 Prill Time: 14min 57sec Circulation loss: 50% Run-20: Prilling Pressure: 200 psi Celly Bar RPM: 200 Engine RPM: 1200-1300 Prill Time: 12min 5sec Circulation loss: 50%
DATE STARTED: 10/19/09	160.0-161.2' As above except unfractured. GWL: DEPTH: 5.9' DATE/TIME: 10/20/09 @ 0750	D K	Run-21: Irilling Pressure: 250 psi (elly Bar RPM: 213 Ingine RPM: 1300-1400 : NA
DATE COMPLETED: 10/28/09 FIELD GEOLOGIST: WDS	GWL: DEPTH: 6.3' DATE/TIME: 10/28/09 @ 1015 DRILLING METHOD: Mud Rotary/PQ3 coring		
CHECKED BY: JLO APPROVED BY: DRILLING CO.: HUSS	, ,	RIG: Fa	ailing 1500



LNP- C	Offest Bor	ing Prog	ram					PROJECT NO. 07-3935
						LOG OF BORING NO. 0-5		
ELEVATION (FEET MSL)	тн ≘т)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	:ILE	COORDINATES N 1724150.2 E 457769.9	SYMBOL	
LEVA FEET	DEPTH (FEET)	AMPL R RU	OW/6)R % & (R(COVE	PROFILE	SURFACE EL: 42.6		REMARKS
E E		/S IO	BL	RE		DESCRIPTION	nscs	
-118.6	162 —	R-21	92% (50%)	4.6		161.2-161.9' DOLOMITE, hard, crystalline, medium light gray (N6), intensely fractured along bedding planes, fresh, no reaction to 1N HCl, moderate reaction when powdered. 161.9-163.0' DOLOMITE, moderately hard, sandy, pale yellowish brown (10YR 6/2) and light gray (N7), moderately weathered, moderately to intensely fractured along bedding planes, no reaction t 1N HCl, some pits.		Drill Time: 19min 54sec Circulation loss: 50%
	164 — 					163.0-163.8' DOLOMITE, moderately soft, sandy, dark yellowish brown (10YR 4/2), pitted, moderately weathered, moderately fractured, no reaction to 1N HCI, thin bedded. 163.8-165.0' DOLOMITE, hard, pitted with some vugs, thinly laminated, moderate yellowish brown (10YR 5/4), moderately weathered, moderately fractured along bedding planes, no reaction to 1N HCI.		
	166 —					165.0-166.4' DOLOMITE, moderately hard, thinly bedded, organic, sandy to crystalline, very pale orange (10YR 8/2), slightly pitted, slightly weathered, moderately fractured along bedding planes, no reaction to 1N HCl, weak reaction when powdered. 166.4-166.5' Same as 161.2-161.9'.		Run-22: Drilling Pressure: 300 psi Kelly Bar RPM: 195 Engine RPM: 1200-1300 Drill Time: 11min 48sec Circulation loss: 50%
	168 —	R-22	100% (54%)	5.0		166.5-169.3' Same as 165-166.4' except very pale orange (10YR 8/2 and moderate yellowish brown (10YR 4/2), thinly laminated from 169 169.3'.		
	- 170 — - -					169.3-170.0' DOLOMITE, hard, sandy to crystalline, pale yellowish brown (10YR 6/2), some pits,moderately fractured (vertical fractures) slightly weathered, no reaction to 1N HCI, weak reaction when powdered. 170.0-172.2' Vertical fracture.	,	Run-23: Drilling Pressure: 250 psi Kelly Bar RPM: 200 Engine RPM: 1200-1300 Drill Time: 20min 44sec Circulation loss: 50% AIRLIFT at 170.0'
	172 — - -	R-23	98% (46%)	4.9		172.2-172.4' Same as 161.2' to 161.9' except unfractured. 172.4-172.7' DOLOMITE, moderately hard, thinly laminated, moderate yellowish brown (10YR 5/4) with black (N1) bands (perpendicular to bedding), moderately to severely weathered, moderately fractured along bedding planes, sandy, no reaction to 1N HCI.		
	174 — — —					172.7-173.1' Same as 170.0-172.2'. 173.1-173.5' Same as 172.4-172.7' except intensely fractured. 173.5-175.3' DOLOMITE, hard, thin bedded, crystalline, pale yellowish brown (10YR 6/2), moderate yellowish brown (10YR 5/4) filled vugs, light gray (N7) beds, pitted, slightly weathered, moderatel fractured, no reaction to 1N HCl, weak reaction when powdered. 175.3-176.9' DOLOMITE, hard, thin bedded, broken at 175.3' and	/	Run-24: Drilling Pressure: 300 psi
DATE	STARTED	: 10/	19/09		GWL: D	EPTH: 5.9' DATE/TIME: 10/20/09 @ 0750	NOTE	ES: NA
1	COMPLET GEOLOG				GWL: D	EPTH: 6.3' DATE/TIME: 10/28/09 @ 1015 NG METHOD: Mud Rotary/PQ3 coring		
	GEOLOG KED BY:	JL(DKILLII.	NO INIETHOD. INIER ROLLING		
	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILLI	NG CO.:	HUSS						



176	LNP- C	Offest Bor	ing Prog	ram			LOG OF BORING NO. 0-5		PROJECT NO. 07-3935
176	EVATION EET MSL)	ОЕРТН (FEET)	MPLE NO.	W/6" & (N) R % REC. R (RQD)	OVERY (ft.)	ROFILE	COORDINATES N 1724150.2 E 457769.9		REMARKS
yellowish brown (10YR 8/4) and grayish orange (10YR 7/4), no reaction to TN HCI. R-24 (gray) 178 — 1	- 교원		SAI	BLC OF	REC		DESCRIPTION	nsc	
R-24		176 —					yellowish brown (10YR 5/4) and grayish orange (10YR 7/4), no		Engine RPM: 1100-1200 Drill Time: 23min 38sec Circulation loss: 50%
brown (10YR 5/4), thinly laminated, moderately pitted, or reaction to 1N HCl. 180 —		178 —	R-24		5.0		brown (10YR 5/4) and light gray (N7), moderately fractured, slightly weathered, no reaction to 1N HCl. 177.6-178.3' DOLOMITE, very hard, crystalline, light gray (N7),		Trace 10021/00 @ 01 10 0.01
180 — R-25 100% 5.0 181.2 DOLOMITE, hard, fossiliferous, pale yellowish brown (10YR 6/2), slightly weathered, sandy, slightly fractured, pitted, no reaction to 1N HCI, thick bedded, 181.5 182.5 DOLOMITE, hard, sandy to crystalline, moderate yellowish brown (10YR 6/2) and grayish orange pink (5YR 7/2). 1815-182.5 DOLOMITE, hard, sandy to crystalline, moderate yellowish brown (10YR 6/2) and grayish orange pink (5YR 7/2). 1815-182.5 DOLOMITE, hard, sandy to crystalline, moderate yellowish brown (10YR 6/2) and grayish orange (10YR 6/6), fresh, slightly fractured, no reaction to 1N HCI, laminated, and leave yellowish brown (10YR 6/6), fresh, slightly fractured, no reaction to 1N HCI, laminated, and derive yellowish brown (10YR 6/6), fresh, slightly fractured, no reaction to 1N HCI, laminated, and derive yellowish brown (10YR 8/4) and very light gray (N8), thinly laminated, and moderately be defined by moderately weathered, moderately be intensely fractured along bedding planes, no reaction to 1N HCI, weak reaction when powdered, pitted. 185.0-185.9 As above except unfractured. 185.0-185.9 As above except unf		_					brown (10YR 5/4), thinly laminated, moderately weathered, pitted, slightly to moderately fractured, no reaction to 1N HCl.		
182 — R-25 100% 5.0 100% 5.0 100% 5.0 183 - 185.2 DOLOMITE, hard, sandy to crystalline, moderate yellowish brown (10YR 5/2) and light gray (N7), slightly weathered, moderately in the property of the propert		180 —					180.0-181.2' DOLOMITE, hard, fossiliferous, pale yellowish brown (10YR 6/2), slightly weathered, sandy, slightly fractured, pitted, no		Drilling Pressure: 300-250 psi Kelly Bar RPM: 196-194
183.1-185.0' DOLOMITE, moderately hard, moderate yellowish brown (10YR 5/4) and very light gray (N8), thinly laminated, sandy, moderately bedding planes, no reaction to 1N HCI, weak reaction when powdered, pitted. 186— 186— 186— R-26 90% 4.5 185.9-186.2' DOLOMITE, same as 182.5-183.1'. 186.2-188.3' DOLOMITE, same as 182.5-183.1'. 186.2-188.3' DOLOMITE, moderately soft, thinly laminated, moderate yellowish brown (10YR 5/4) with dark gray (N3) bands, sandy, moderately in tensely wathered, intensely sands, sandy, moderately in tensely wathered, intensely sands, sandy, moderately in tensely wathered, intensely fractured along bedding planes, no reaction to 1N HCI, very soft and weathered at 188.1- 188.3' (possible core loss zone). 188.3-190.0' DOLOMITE, crystalline, very hard, thick bedded, intensely fractured, fresh, blocky, light gray (N7), no reaction to 1N HCI. 188.3-190.0' DOLOMITE, moderately hard, fossiliferous, thick Run-27: DATE STARTED: 10/19/09 GWL: DEPTH: 5.9' DATE/TIME: 10/20/09 @ 0750 DATE COMPLETED: 10/28/09 GWL: DEPTH: 6.3' DATE/TIME: 10/20/09 @ 1015 DEILLING METHOD: Mud Rotary/PQ3 coring DRILLING METHOD: Mud Rotary/PQ3 coring		182 —	R-25		5.0		(10YR 6/2) and grayish orange pink (5YR 7/2). 181.5-182.5' DOLOMITE, hard, sandy to crystalline, moderate yellowish brown (10YR 5/4) and light gray (N7), slightly weathered, moderately fractured, no reaction to 1N HCl, laminated. 182.5-183.1' DOLOMITE, very hard, crystalline, thin bedded, dark yellowish orange (10YR 6/6), fresh, slightly fractured, no reaction to		Drill Time: 13min 58sec (180-183') 8min 26sec (183-185')
186— R-26 90% 4.5 188.3° DOLOMITE, same as 182.5-183.1'. 186.2-188.3° DOLOMITE, moderately soft, thinly laminated, moderately yellowish brown (10YR 5/4) with dark gray (N3) bands, sandy, moderately to intensely weathered, intensely fractured along bedding planes, no reaction to 1N HCl. very soft and weathered at 188.1-188.3° (possible core loss zone). DATE STARTED: 10/19/09 DATE STARTED: 10/19/09 GWL: DEPTH: 5.9° DATE/TIME: 10/20/09 @ 0750 DATE COMPLETED: 10/28/09 FIELD GEOLOGIST: WDS CHECKED BY: JLO APPROVED BY: Universely same as 182.5-183.1'. 185.9-186.2' DOLOMITE, same as 182.5-183.1'. 185.9-186.2' DOLOMITE, same as 182.5-183.1'. 185.9-186.2' DOLOMITE, same as 182.5-183.1'. 185.9-186.2' DOLOMITE, moderately soft, thinly laminated, moderately pedicing planes, no reaction to 1N HCl. very soft and weathered at 188.1-188.3' (possible core loss zone). Material from above: 1" BR.3-190.0' DOLOMITE, crystalline, very hard, thick bedded, intensely fractured, fresh, blocky, light gray (N7), no reaction to 1N HCl. Run-27: NOTES: NA PRILLING METHOD: Mud Rotary/PQ3 coring DRILLING METHOD: Mud Rotary/PQ3 coring DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500		184 — 					183.1-185.0' DOLOMITE, moderately hard, moderate yellowish brown (10YR 5/4) and very light gray (N8), thinly laminated, sandy, moderately weathered, moderately to intensely fractured along bedding planes, no reaction to 1N HCl, weak reaction when	1	
188.3-190.0' DOLOMITE, crystalline, very hard, thick bedded, intensely fractured, fresh, blocky, light gray (N7), no reaction to 1N HCl. 190 — 190.0-192.0' DOLOMITE, moderately hard, fossiliferous, thick DATE STARTED: 10/19/09 DATE COMPLETED: 10/28/09 GWL: DEPTH: 5.9' DATE/TIME: 10/20/09 @ 0750 PIELD GEOLOGIST: WDS CHECKED BY: JLO APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500		186 —	R-26		4.5		185.9-186.2' DOLOMITE, same as 182.5-183.1'. 186.2-188.3' DOLOMITE, moderately soft, thinly laminated, moderate yellowish brown (10YR 5/4) with dark gray (N3) bands, sandy, moderately to intensely weathered, intensely fractured along bedding planes, no reaction to 1N HCl, very soft and weathered at 188.1-		Drilling Pressure: 200 psi Kelly Bar RPM: 198 Engine RPM: 1200-1300 Drill Time: 10min 54sec Circulation loss: 100%
DATE STARTED: 10/19/09 GWL: DEPTH: 5.9' DATE/TIME: 10/20/09 @ 0750 NOTES: NA DATE COMPLETED: 10/28/09 GWL: DEPTH: 6.3' DATE/TIME: 10/28/09 @ 1015 FIELD GEOLOGIST: WDS DRILLING METHOD: Mud Rotary/PQ3 coring CHECKED BY: JLO APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500		188 —		(26%)			intensely fractured, fresh, blocky, light gray (N7), no reaction to 1N		
DATE STARTED: 10/19/09 GWL: DEPTH: 5.9' DATE/TIME: 10/20/09 @ 0750 NOTES: NA DATE COMPLETED: 10/28/09 GWL: DEPTH: 6.3' DATE/TIME: 10/28/09 @ 1015 FIELD GEOLOGIST: WDS DRILLING METHOD: Mud Rotary/PQ3 coring WIG: Failing 1500 CHECKED BY: JLO APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500		190 —					190.0-192.0' DOLOMITE, moderately hard, fossiliferous, thick		Run-27:
APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500	DATE FIELD	DATE COMPLETED: 10/28/09 FIELD GEOLOGIST: WDS				GWL: D	EPTH: 5.9' DATE/TIME: 10/20/09 @ 0750 EPTH: 6.3' DATE/TIME: 10/28/09 @ 1015	NOTE	•
	APPRO	APPROVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- C	Offest Bori	ng Prog	ram			LOG OF BORING NO. 0-5		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724150.2 E 457769.9 SURFACE EL: 42.6	USCS SYMBOL	REMARKS
			В	2.2		DESCRIPTION	Š	
	- - 192 — - -	R-27	92% (12%)	4.6		bedded, very pale orange (10YR 8/2), sandy to crystalline, slightly weathered, moderately fractured (angular and vertical), no reaction to 1N HCl, weak reaction when powdered. 192.0-192.2' Same as above except crushed. 192.2-194.2' DOLOMITE, moderately hard, sandy, pitted, pale yellowish brown (10YR 6/2), thin bedded to laminated at 194.0-194.2' moderately weathered, moderately fractured, no reaction to 1N HCl.		Drilling Pressure: 200 psi Kelly Bar RPM: 201 Engine RPM: 1200-1300 Drill Time: 6min 7sec Circulation loss: 100% Material from above: 4"
	194 — – –					194.2-195.0' DOLOMITE, moderately hard, thinly laminated, sandy to crystalline, pale yellowish brown (10YR 6/2) with dark yellowish brown (10YR 4/2) bands, slightly weathered, slightly fractured, no reaction to 1N HCI. 195.0-195.3' Same as 188.3-190.0'.	n	Run-28:
-153.0	196 — - - 198 — -	R-28	79% (8%)	3.9		195.0-195.6' Same as above except intensely fractured and broken. 195.6-197.0' DOLOMITE, moderately hard, thin bedded, intensely fractured, slightly weathered, sandy to crystalline, pale yellowish brown (10YR 6/2), no reaction to 1N HCI. 197.0-201.0', DOLOMITE, hard, sandy, pitted, slightly fractured, thin bedded, moderate yellowish brown (10YR 5/4), moderately weathered, no reaction to 1N HCI.	-	Drilling Pressure: 200 psi Kelly Bar RPM: 225 Engine RPM: 1400-1500 Drill Time: 8min 8sec Circulation loss: 100% Material from above: 0.8"
	200 —	R-29	72% (20%)	3.6		201.0-202.6' DOLOMITE, moderately hard, sandy, intensely fractured, moderately weathered, light olive gray (5Y 6/1), no reaction to 1N HCl. 202.6-202.8' Same as above except very soft. 202.8-203.4' DOLOMITE, hard, sandy to crystalline, thinly laminated, yellowish gray (5Y 8/1), slightly weathered, moderately fractured (vertical fracture), no reaction to 1N HCl, moderate reaction when powdered. 203.4-205.0' Same as 195.3-195.6'.		Run-29: Drilling Pressure: 250 psi Kelly Bar RPM: 199 Engine RPM: 1200-1300 Drill Time: 10min 40sec Circulation loss: 100% Material from above: 0.4"
DATE FIELD	STARTED COMPLET GEOLOGI KED BY:	ED: 10	os		GWL: D GWL: D DRILLII		<u> </u> Note	ES: NA
APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 150 DRILLING CO.: HUSS								Failing 1500



LNP- (Offest Bor	ing Prog	ram			LOG OF BORING NO. 0-5		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	H (E	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	:RY (ft.)	:ILE	COORDINATES N 1724150.2 E 457769.9	SYMBOL	
EVA EET	DEPTH (FEET)	MPL RUI	DW/6 R % I & (RC	RECOVERY	PROFILE	SURFACE EL: 42.6		REMARKS
		S O O	BL(REC		DESCRIPTION	nscs	
	206—	R-30	66%	3.3		205.0-208.2' DOLOMITE, broken, intensely fractured/rubble, pitted, medium light gray (N6) and pale yellowish brown (10YR 6/2), weathered, crystalline to sandy, no reaction to 1N HCl.		Run-30 Drilling Pressure: 450 psi Kelly Bar RPM: 195 Engine RPM: 1200-1300 Drill Time: 2min 58sec (205-208') 4min 52sec (208-210') Circulation loss: 100% Material from above: 5" Driller Notes: soft drilling from 205'-208', chattering.
	208 —		(0%)			208.2-208.7' DOLOMITE, soft, powdery, very pale orange (10YR 8/2) with pale yellowish brown (10YR 6/2), thin bedded, severely weathered, intensely fractured, no reaction to 1N HCl. 208.7-210.9' DOLOMITE, moderately hard, sandy, pitted, pale yellowish brown (10YR 6/2), moderately weathered, moderately to intensely fractured, no reaction to 1N HCl.		Run-31:
	212 —					210.9-211.6' DOLOMITE, moderately soft, laminated, very pale orange (10YR 8/2) and pale yellowish brown (10YR 6/2), some pits, powdery, moderately weathered, unfractured, no reaction to 1N HCI. 211.6-212.4' As above except fossiliferous.		Drilling Pressure: 250 psi Kelly Bar RPM: 201 Engine RPM: 1200-1300 Drill Time: 9min 5sec Circulation loss: 100%
	214 —	R-31	(48%)	4.5		212.4-212.6' As above except intensely fractured. 212.6-212.9' DOLOMITE, very hard, crystalline, moderately fractured (angular and vertical), light gray (N7), fresh, weak reaction to 1N HCI. 212.9-213.3' DOLOMITE, moderately soft, thinly laminated, moderately weathered, unfractured, sandy, moderate yellowish browr (10YR 5/4), no reaction to 1N HCl, weak reaction when powdered. 213.3-215.0', DOLOMITE, moderately soft, yellowish gray (5Y 7/2), moderately weathered, unfractured, pits filled with very pale orange (10YR 8/2), no reaction with 1N HCl.		
	216 —					215.0-217.5' As above except intensely fractured/crushed/rubble.		R-32: Drilling Pressure: 250 psi Kelly Bar RPM: 215 Engine RPM: 1300-1400 Drill Time: 6min 42sec (215-217') 2min 28sec (217-220') Circulation loss: 100% Material from above: 0.4' from first drill run. 0.6' from second drill run.
	218 — —	R-32	66%	3.3		217.5-217.9' DOLOMITE, moderately hard, sandy with shells, fossiliferous, pale yellowish brown (10YR 6/2), severely weathered, pitted, moderately fractured, no reaction to 1N HCI. 217.9-219.3' DOLOMITE, moderately soft, severely weathered, sandy, some pits, grayish orange pink (5YR 7/2), slightly fractured, no reaction to 1N HCI.)	dilirituii. 6.6 iloin second dilirituii.
DATE FIELD	DATE STARTED: 10/19/09 DATE COMPLETED: 10/28/09 FIELD GEOLOGIST: WDS CHECKED BY: JLO				GWL: D GWL: D DRILLIN		NOTE	ES: NA
APPRO	APPROVED BY:					R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILL	ING CO.:	HUSS						



LNP- (Offest Bor	ing Prog	ram			LOG OF BORING NO. 0-5		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	ОЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724150.2 E 457769.9 SURFACE EL: 42.6	S SYMBOL	REMARKS
<u> </u> <u> </u> <u> </u>		SA	BLC	REC		DESCRIPTION	nscs	
	220 — –					219.3-221.1' DOLOMITE, moderately hard, sandy to crystalline, slightly weathered, intensely fractured, grayish orange (10YR 7/4), thick bedded, no reaction to 1N HCI.		R-33: Drilling Pressure: 250 psi Kelly Bar RPM: 214 Engine RPM: 1300-1400
	222 — - - - 224 —	R-33	78% (18%)	3.9		221.1-222.0' DOLOMITE, moderately soft, sandy, grayish orange (10YR 7/4), thin bedded, severely weathered, unfractured, no reaction to 1N HCI. 222.0-222.5' DOLOMITE, soft, sandy, severely weathered, pale yellowish brown (10YR 6/2), intensely fractured, thin bedded, no reaction to 1N HCI. 222.5-223.1' DOLOMITE, moderately hard, thinly laminated, grayish orange (10YR 7/4) and very pale orange (10YR 8/2), sandy, slightly weathered, moderately fractured, no reaction to 1N HCI. 223.1-223.3' As above except intensely fractured/crushed. 223.3-228.0' DOLOMITE, soft, sandy, severely weathered, intensely fractured, moderate yellowish brown (10YR 5/4), pitted, no reaction with 1N HCI.		Drill Time: 3min 35sec Circulation loss: 100% Material from above: 0.4'
	- - 226 —					WILL IN FIG.		Run-34: Drilling Pressure: 250 psi Kelly Bar RPM: 201 Engine RPM: 1200-1300 Drill Time: 1min 29sec Circulation loss: 100% Material from above: 0.6'
	- 228 — - -	R-34	74% (18%)	3.7		228.0-228.3' As above except very soft. 228.3-230.0' As above except moderately soft.		
	230 — - - - 232 — -	R-35	8% (0%)	0.4		230.0-234.5' DOLOMITE as above.		Run-35: Drilling Pressure: 250 psi Kelly Bar RPM: 207 Engine RPM: 1200-1300 Drill Time: 4min 48sec Circulation loss: 100% Material from above: 0.4' Driller Notes: very soft except last 6". Possibly piece stuck in bottom of shoe affected recovery. Drillers had to AIRLIFT two times to
DATE	234		(40/00			EDTIL FOL DATE/TIME: 40/20/20 O 2750	NOT	clean hole of cuttings from soft dolomite.
DATE FIELD	STARTED COMPLET GEOLOG KED BY:	ED: 10/	os		GWL: D GWL: D DRILLIN	9	NOTE	ES: NA
-	OVED BY: ING CO.:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- (LNP- Offest Boring Program LOG OF BORING NO. 0-5											
ELEVATION (FEET MSL)	БЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724150.2 E 457769.9 SURFACE EL: 42.6 DESCRIPTION	USCS SYMBOL	REMARKS				
-197.4	236 — 238 — 240 — 244 — 244 — 244 — 244 — 244 — 244 —	R-36	86% (40%)	4.3		234.5-235.0' DOLOMITE, very hard, fresh, crystalline, intensely fractured, thick bedded, grayish orange (10YR 7/4), no reaction to 1N HCI. 235.0-237.4' DOLOMITE, moderately hard, hard at 236.7', sandy to crystalline, pale yellowish brown (10YR 6/2), slightly to moderately fractured along bedding planes, slightly weathered, broken at 235.8' and 236.6', no reaction to 1N HCI, thick bedded. 237.4-240.0' DOLOMITE, moderately soft, thinly laminated, grayish orange (10YR 7/4) to moderate yellowish brown (10YR 5/4), sandy, intensely fractured, intensely weathered, no reaction to 1N HCI. BOTTOM OF BORING 240'		Run-36 Drilling Pressure: 350 psi Kelly Bar RPM: 194 Engine RPM: 1200 Drill Time: 4min 54sec Circulation loss: 100% Material from above: 0.6' NOTE: Includes a large piece of hard dolomite which had been stuck in core barrel. This was affecting the recovery from above based on drillers statement. Water level 10/28/09 @ 1015 6.3'				
DATE FIELD	STARTED COMPLET GEOLOG KED BY:	ΓED: 10/	os		GWL: D GWL: D DRILLIN	<u> </u>	NOTE	ES: NA				
APPR	OVED BY:		RIG:	Failing 1500								



LNP-	Offset Bor	ing Prog	ram			LOG OF BORING NO. O-6		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	ОЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724065.3 E 457853.4 SURFACE EL: 42.2 DESCRIPTION	USCS SYMBOL	REMARKS
37.2	1.5 — 4.5 — 7.5 — 9 — 10.5 —					5.0-13.0' SANDY CLAY (cl), low plasticity, sand-fine grained (40%), clay (60%).	sp	0-14' Drilled destructively-log based on cuttings.
DATE FIELD CHEC	STARTED COMPLET GEOLOG KED BY: OVED BY:	TED: 11 IST: JL WI				EPTH: 5.7' DATE/TIME: 11/2/09 @ 0845 NG METHOD: Mud Rotary/PQ3 Coring		ES: NA
	ING CO.:				DKILLE	R: Eddie Palmer HELPER: Chad/Cody	KIG:	Failing 1500



LNP- Offset Boring Program	LOG OF BORING NO. O-6	PROJECT NO. 07-3935
ELEVATION (FEET MSL) DEPTH (FEET) SAMPLE NO. OR RUN NO. OR RUN NO. OR % REC. & (RQD) OR % REC.	COORDINATES N 1724065.3 E 457853.4 SURFACE EL: 42.2	TO MW REMARKS
ELEY (FEE (FEE (FEE (FEE (FEE (FEE (FEE (F	DESCRIPTION	nscs
29.2 13.5 — 28.2 16.5 — OB-1 76% (34%) 3.8 19.5 — 21 — OB-2 92% (54%) 4.6 DATE STARTED: 10/29/09	13.0-14.0' CLAYEY SAND. 13.0-14.0' CLAYEY SAND. 14 TOP OF AVON PARK FORMATION 14.0-19.0' DOLOMITE, moderately hard, grayish orange (10YR 7/4), weak reaction to 1N HCl when powdered, fresh to slightly weathered, slightly pitted, few vugs, slightly fractured (horizontal-bedding planes) thick bedded, coarse grained. 17.6-19' Vertical fracture, becomes moderately soft. 19.0-22.3' DOLOMITE, as above except fossiliferous, slightly to moderately weathered, slightly fractured (horizontal).	Switched to Coring OB-1: Drilling Pressure: 250-300 psi
DATE STARTED: 10/29/09 DATE COMPLETED: 11/2/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS	GWL: DEPTH: 5.8 DATE/TIME: 10/30/09 @ 0745 GWL: DEPTH: 5.7' DATE/TIME: 11/2/09 @ 0845 DRILLING METHOD: Mud Rotary/PQ3 Coring	NOTES. NA
APPROVED BY: DRILLING CO.: HUSS	DRILLER: Eddie Palmer HELPER: Chad/Cody	RIG: Failing 1500



LOG OF BORING NO. 0-6 COORDINATES N 1774065.3 E 457853.4 SURFACE EL: 42.2 DESCRIPTION 22.5 — 22.5 — OB-3 72% OB-3 72% OB-3 72% OB-3 72% OB-3 24.— OB-3 72% OB-3 25.5 — OB-3 72% OB-3 25.5 — OB-3 72% OB-3 26. — OB-3 72% OB-3 27.— OB-3 72% OB-3 28.5 — OB-3 72% OB-3 29.30° DOLOMITE, moderately hard to moderately soft, moderately weathered, pilted/porous, some fossils, thick bedded, slightly tractured (bedding planes), grayish orange (10YR 7/4) to dark yellowish orange (10YR 6/6), moderate to strong reaction to 1N HCl when powdered, coarse grained, friable. OB-3 27.— OB-3 72% OB-3 72% OB-3 OB-4 DB-4 DB-4 DB-6	LNP- (Offset Bor	ina Proa	ram					PROJECT NO. 07-3935
22.5 22.5 Rubble zone. 22.5 24 DOLOMITE, as above except moderately hard to hard, few lossls, vertical fracture 22.5 24.0°, more crystalline. 24.29 DOLOMITE, moderately hard to moderately soft, moderately weathered, pilited/prorus, some fossils, thick bedded, slightly fractured (bedding planes), prayish orange (10YR 16/l), doark yellowish orange (10YR 16/l), moderate to strong reaction to 1N HCI before 25.5 — 25.5 — OB-3 1776, (Me/h) 3.6 229.30 DOLOMITE, moderately hard, unfractured, thick bedded, slightly weathered, coarse grained, friable. 28.5 — OB-3 1776, (Me/h) 3.6 229.30 DOLOMITE, moderately hard, unfractured, thick bedded, slightly weathered, fossiliferous, few rugs, weak reaction to 1N HCI before 25.00 pair (10YR 6/l). 10 29.30 DOLOMITE, moderately hard, unfractured, thick bedded, slightly weathered, fossiliferous, few rugs, weak reaction to 1N HCI before 25.00 pair (10YR 6/l). 10 30 — 28.5 — OB-3 1776, (Me/h) 3.6 229.30 DOLOMITE, moderately hard, unfractured, thick bedded, slightly weathered, fossiliferous, few rugs, weak reaction to 1N HCI before 25.00 pair (10YR 6/l). 10 30 — 28.5 — OB-3 1776, (Me/h) 3.6 229.30 DOLOMITE, moderately hard, unfractured, thick bedded, slightly weathered, fossiliferous, few rugs, weak reaction to 1N HCI before 25.00 pair (10YR 6/l). 10 30 — 1							LOG OF BORING NO. O-6		
22.5 22.5 Rubble zone. 22.5 24 DOLOMITE, as above except moderately hard to hard, few lossls, vertical fracture 22.5 24.0°, more crystalline. 24.29 DOLOMITE, moderately hard to moderately soft, moderately weathered, pilited/prorus, some fossils, thick bedded, slightly fractured (bedding planes), prayish orange (10YR 16/l), doark yellowish orange (10YR 16/l), moderate to strong reaction to 1N HCI before 25.5 — 25.5 — OB-3 1776, (Me/h) 3.6 229.30 DOLOMITE, moderately hard, unfractured, thick bedded, slightly weathered, coarse grained, friable. 28.5 — OB-3 1776, (Me/h) 3.6 229.30 DOLOMITE, moderately hard, unfractured, thick bedded, slightly weathered, fossiliferous, few rugs, weak reaction to 1N HCI before 25.00 pair (10YR 6/l). 10 29.30 DOLOMITE, moderately hard, unfractured, thick bedded, slightly weathered, fossiliferous, few rugs, weak reaction to 1N HCI before 25.00 pair (10YR 6/l). 10 30 — 28.5 — OB-3 1776, (Me/h) 3.6 229.30 DOLOMITE, moderately hard, unfractured, thick bedded, slightly weathered, fossiliferous, few rugs, weak reaction to 1N HCI before 25.00 pair (10YR 6/l). 10 30 — 28.5 — OB-3 1776, (Me/h) 3.6 229.30 DOLOMITE, moderately hard, unfractured, thick bedded, slightly weathered, fossiliferous, few rugs, weak reaction to 1N HCI before 25.00 pair (10YR 6/l). 10 30 — 1	TION MSL)	ΕĒ	ON NO.	' & (N) REC. ND)	RY (ft.)	빌		MBOL	
22.5 22.5 Rubble zone. 22.5 24 DOLOMITE, as above except moderately hard to hard, few lossls, vertical fracture 22.5 24.0°, more crystalline. 24.29 DOLOMITE, moderately hard to moderately soft, moderately weathered, pilited/prorus, some fossils, thick bedded, slightly fractured (bedding planes), prayish orange (10YR 16/l), doark yellowish orange (10YR 16/l), moderate to strong reaction to 1N HCI before 25.5 — 25.5 — OB-3 1776, (Me/h) 3.6 229.30 DOLOMITE, moderately hard, unfractured, thick bedded, slightly weathered, coarse grained, friable. 28.5 — OB-3 1776, (Me/h) 3.6 229.30 DOLOMITE, moderately hard, unfractured, thick bedded, slightly weathered, fossiliferous, few rugs, weak reaction to 1N HCI before 25.00 pair (10YR 6/l). 10 29.30 DOLOMITE, moderately hard, unfractured, thick bedded, slightly weathered, fossiliferous, few rugs, weak reaction to 1N HCI before 25.00 pair (10YR 6/l). 10 30 — 28.5 — OB-3 1776, (Me/h) 3.6 229.30 DOLOMITE, moderately hard, unfractured, thick bedded, slightly weathered, fossiliferous, few rugs, weak reaction to 1N HCI before 25.00 pair (10YR 6/l). 10 30 — 28.5 — OB-3 1776, (Me/h) 3.6 229.30 DOLOMITE, moderately hard, unfractured, thick bedded, slightly weathered, fossiliferous, few rugs, weak reaction to 1N HCI before 25.00 pair (10YR 6/l). 10 30 — 1	EVA'	DEP.	MPLI R RUN	DW/6' R % F & (RG	OVE	PROF	SURFACE EL: 42.2	SS SY	REMARKS
22.5 - Complete to the complet			AS O	BL(REC		DESCRIPTION)SN	
weathered, pilted/porous, some fossils, thick hedded, slightly weathered, pilted/porous, some fossils, thick hedded, slightly weathered, pilted/porous, some fossils, thick hedded, slightly weathered, pilted/porous, grayish orange (10YR 74) to day. 28.5 — OB-3 72%, (48%) 3.6 228.5 — OB-4 (48%) 3.6 228.5 — OB-3 72%, (48%) 3.6 228.5 — OB-4 (28%) 3.6 228.5 — OB-		22.5 — —					22.5-24' DOLOMITE, as above except moderately hard to hard, few		
28.5 — OB-3 (46%) 3.6 29-30' DOLOMITE, moderately hard, unfractured, thick bedded, slightly weathered, fossiliferous, few vugs, weak reaction to 1N HCI when prodered, grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2). 30.0-34.0' DOLOMITE, same as 24.0-29.0'. 30.0-34.0' DO		24 — - - - -					weathered, pitted/porous, some fossils, thick bedded, slightly fractured (bedding planes), grayish orange (10YR 7/4) to dark yellowish orange (10YR 6/6), moderate to strong reaction to 1N HCl		Drilling Pressure: 200-250 psi Kelly Bar RPM: 211 Engine RPM: 1300-1400 Drill Time: 20min 6sec Circ. Loss: None
28.5 — 29-30' DOLOMITE, moderately hard, unfractured, thick bedded, slightly weathered, fossiliferous, few vugs, weak reaction to 1N HCI when powdered, grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2). 30 — 30.0-34.0' DOLOMITE, same as 24.0-29.0'. DATE STARTED: 10/29/09 GWL: DEPTH: 5.8' DATE/TIME: 10/30/09 @ 0745 OWL DEPTH: 5.7' DATE/TIME: 11/2/09 @ 0845 DRILLING METHOD: Mud Rotary/PQ3 Coring		25.5 — — — —	OB-3	72%	36				
29-30' DOLOMITE, moderately hard, unfractured, thick bedded, slightly weathered, fossiliferous, few vugs, weak reaction to 1N HCl when powdered, grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2). 30.0-34.0' DOLOMITE, same as 24.0-29.0'. Dilling Pressure: 150-200 psi Kelly Bar RPM: 217 Engine RPM: 1300-1400 Drill Time: 10min 45sec Circ. Loss: None NOTE: Picture for OB-4 not take in tray before being put into box DATE STARTED: 10/29/09 DATE COMPLETED: 11/2/09 FIELD GEOLOGIST: JLO DATE STARTED: 10/29/09 GWL: DEPTH: 5.8' DATE/TIME: 10/30/09 @ 0745 NOTES: NA OB-4: Drilling Pressure: 150-200 psi Kelly Bar RPM: 217 Engine RPM: 1300-1400 Drill Time: 10min 45sec Circ. Loss: None NOTE: Picture for OB-4 not take in tray before being put into box		27 — - - -	050	(46%)	0.0				
30.0-34.0' DOLOMITE, same as 24.0-29.0'. 31.5 — OB-4 58% (32%) 2.9 2.		28.5 — — —					slightly weathered, fossiliferous, few vugs, weak reaction to 1N HCI when powdered, grayish orange (10YR 7/4) to pale yellowish brown		Drilling Pressure: 150-200 psi Kelly Bar RPM: 217
31.5		30 —							Drill Time: 10min 45sec
DATE COMPLETED: 11/2/09 GWL: DEPTH: 5.7' DATE/TIME: 11/2/09 @ 0845 FIELD GEOLOGIST: JLO DRILLING METHOD: Mud Rotary/PQ3 Coring		31.5 —	OB-4		2.9				
	DATE	COMPLE	ΓED: 11/	2/09		GWL: D	PEPTH: 5.7' DATE/TIME: 11/2/09 @ 0845	NOTE	ES: NA
APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500 DRILLING CO.: HUSS	CHEC APPRO	CHECKED BY: WDS APPROVED BY:						RIG:	Failing 1500



LNP- (LNP- Offset Boring Program LOG OF BORING NO. O-6 PROJECT NO. 07-393										
						LOG OF BORING NO. O-6					
ELEVATION (FEET MSL)	TH (T:	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	밀	COORDINATES N 1724065.3 E 457853.4	SYMBOL				
LEVA	DEPTH (FEET)	AMPLI R RUN	OW/6' R % F & (RC	COVE	PROFILE	SURFACE EL: 42.2	CS S)	REMARKS			
		10 /s	BLO	RE		DESCRIPTION	nscs				
	33 — 34.5 — 34.5 — 37.5 — 40.5 — 42 — 43.5 —	OB-5	94% (72%)	1.0		39-40' DOLOMITE, pale yellowish brown (10YR 6/2), moderately hard, slightly weathered, some fossils, slightly fractured (horizontal-bedding planes), few vugs, moderate to strong reaction to 1N HCl when powdered, thick bedded. 39-40' DOLOMITE, moderately hard to moderately soft, pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 5/4), strong reaction to 1N HCl when powdered, thick bedded, with thin lenses of dark yellowish brown (10YR 4/2), moderately weathered, pitted, sandy texture, moderately fractured (bedding planes). 40.0-41.0' DOLOMITE, as at 34.0-39.0'. 41.0-41.4' Degraded DOLOMITE, pale yellowish brown (10YR 6/2), 80% silt, 20% dolomite gravel, no plasticity, gravel crushes easily. 41.4-50.0' DOLOMITE, pale yellowish brown (10YR 6/2), moderately soft, pitted/porous, moderately to severly weathered, coarse grained, few vugs, some fossils, medium bedded, intensely fractured, moderate to strong reaction to 1N HCl when powdered.		OB-5: Drilling Pressure: 250 psi Kelly Bar RPM: 1300-1400 Drill Time: 39min 8sec Circ. Loss: None NOTE: 0.2' fall-in from above. OB-6: Drilling Pressure: 300 psi Kelly Bar RPM: 214 Engine RPM: 1300-1400 Drill Time: 1min 40sec Circ. Loss: None Set casing to 40'. Run-1: Drilling Pressure: 250-300 psi Kelly Bar RPM: 192 Engine RPM: 190 Engine RPM: 190 Drill Time: 8min 20sec Circ. Loss: None			
DATE FIELD	STARTED COMPLET GEOLOG KED BY:	ΓED: 11/)		GWL: D GWL: D DRILLIN		NOTE	ES: NA			
APPR	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500			
DRILL	ING CO.:	HUSS									



LNP- (Offset Bor	ing Prog	ram			LOG OF BORING NO. O-6		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	ŦC	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	E E	COORDINATES N 1724065.3 E 457853.4	SYMBOL	
EVAT	DEPTH (FEET)	MPLE	. (RQ	OVEF	PROFILE	SURFACE EL: 42.2	SSY	REMARKS
믜 문		SAI	BLC OF	REC		DESCRIPTION	nscs	
	45 — 46.5 — 48 — 49.5 — 49.5 —	R-2	60% (18%)	3.0		45.0' Becomes moderately fractured (horizontal).		Run-2: Drilling Pressure: 200 psi Kelly Bar RPM: 209 Engine RPM: 1300 Drill Time: 10min 20sec Circ. Loss: None 0.2' Fall-in from above.
	51 — 52.5 — 54 — 54 — 55		90% (30%)	4.5	GWL: C	9		Run-3: Drilling Pressure: 200-250 psi Kelly Bar RPM: 197 Engine RPM: 1200-1300 Drill Time: 13min 1sec Circ. Loss: None Water level 10/30/09 @ 0745 5.8'.
FIELD	COMPLETED GEOLOGICS KED BY:		0		GWL: D	EPTH: 5.7' DATE/TIME: 11/2/09 @ 0845 NG METHOD: Mud Rotary/PQ3 Coring		
APPR	OVED BY: ING CO.:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP-	Offset Bori	ing Prog	ram					PROJECT NO. 07-3935		
						LOG OF BORING NO. O-6	_			
ELEVATION (FEET MSL)	ΞĒ	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	밀	COORDINATES N 1724065.3 E 457853.4	SYMBOL			
EVA ⁻	DEPTH (FEET)	MPLE	DW/6" R % F & (RC	OVE	PROFILE	SURFACE EL: 42.2	SS SY	REMARKS		
		S O	BLO	REC		DESCRIPTION	nscs			
	55.5 —					55.0-61.6' DOLOMITE, same as above except 55.7-55.9' thin layer of crystalline dolomite, pale yellowish brown (10YR 6/2), moderately hard to hard, pitted in very thin bands, strong reaction to 1N HCl when dry/powdered, thin bedded, no fossils, moderately fractured (horizontal).		Run-4: Drilling Pressure: 200 psi Kelly Bar RPM: 209 Engine RPM: 1300 Drill Time: 14min 10sec Circ. Loss: None		
	57 — - - - - - 58.5 —	R-4	88%	4.4						
	60 —					Vertical fracture 60.0-64.6'.		Run-5: Drilling Pressure: 200 psi Kelly Bar RPM: 192 Engine RPM: 1100-1200 Drill Time: 25min 50sec Circ. Loss: None		
	61.5 —	R-5	96% (28%)	4.8		61.6-62.0' DOLOMITE, moderately soft, friable, dark yellowish orange (10YR 6/6) to moderate yellowish brown (10YR 5/4), thinly laminated with dark yellowish brown (10YR 4/2) layers, weak to moderate reaction to 1N HCl when powdered, slightly fractured, moderately weathered, silty/sandy texture, pitted, no fossils. 62.0-64.2' DOLOMITE, moderately hard to hard, pale yellowish brown (10YR 6/2), pitted in bands, moderately fractured, some very thin organic (black) lenses throughout, weak to moderate reaction to 1N HCl when powdered.				
	64.5 —	•••••				64.2-65' DOLOMITE, same as 61.6-62.0'. 65.0-66.4' DOLOMITE, same as 64.2-65.0'.		Run-6: Drilling Pressure: 150 psi Kelly Bar RPM: 211 Engine RPM: 1400-1500		
DATE FIELD	STARTED COMPLET GEOLOGI	ED: 11			GWL: D GWL: D DRILLIN	<u> </u>	NOTE	ES: NA		
1	KED BY: OVED BY:	WI	os 		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500		
DRILL	APPROVED BY: DRILLING CO.: HUSS DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500 RIG: Failing 1500									



REMARKS REM	LNP- (Offset Bori	ng Prog	ram			LOC OF BODING NO. O. C		PROJECT NO. 07-3935
66 — 100% 56.4-69.1* DOLOMITE, moderately hard to moderately soft, pale yellowish brown (10YR 562) to grayash cange (10YR 745), thick bedset organic lenses, leve fossils, moderately fractured. 56.4-69.1* DOLOMITE, moderately fractured 56.4-69.1* Internetly fractured 56.					_		LOG OF BORING NO. O-6	1 .	I
66 — 100% Section	TION MSL)	E (f.	N N NO O	" & (N) REC. 2D)	RY (ft.	LE I		/MBOL	
66 — 100% Section	LEVA =EET	DEP (FEE	AMPL R RUI	OW/6 DR % I & (RC	COVE	PROF	SURFACE EL: 42.2	CS S)	REMARKS
69 — R-6 (225) 5.0 69 — R-7 (225) 5.0 R-7 (225) 3.6 R-7 (225) 3	ШΞ		S) O	BL	RE		DESCRIPTION	ns	
DATE STARTED: 10/29/09 DATE COMPLETED: 11/2/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS APPROVED BY: To black organic lenses, moderately fractured (horizontal break at 75.3'), moderate to strong reaction to 1N HCl when powdered. 75.5-80.0' Crystalline DOLOMITE, pale yellowish brown (10YR 6/2) to light olive gray (5G 6/1), moderately to intensely fractured, pitted/ fossiliferous in bands, strong reaction to 1N HCl when dry, fresh to slightly weathered, thick bedded. GWL: DEPTH: 5.8' DATE/TIME: 10/30/09 @ 0745 DRILLING METHOD: Mud Rotary/PQ3 Coring DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500		67.5 —	R-6	100% (32%)	5.0		66.4-69.1' DOLOMITE, moderately hard to moderately soft, pale yellowish brown (10YR 6/2) to grayish orange (10YR 7/4), thick bedded, moderately weathered, pitted/porous, few vugs, few very thi black organic lenses, few fossils, moderately fractured-mostly horizontal along bedding planes (67.7-68' and 68.7-69.1' intensely fractured), moderate to strong reaction to 1N HCl when powdered. 69.1-69.5' As above except very pitted/fossiliferous. 69.5-70.0' DOLOMITE, as at 65.0-66.4'. 70.0-71.0' DOLOMITE, moderately hard, pale yellowish brown (10YF 6/2), slightly to moderately weathered, pitted/porous, few vugs, some fossils, thick bedded, unfractured (1 horizontal break at 70.7'), moderate to strong reaction to 1N HCl when powdered. 71.0-72.0' As above except with lenses/very thin layers of crystalline dolomite, intensely fractured.	1	Run-7: Drilling Pressure: 200 psi Kelly Bar RPM: 197 Engine RPM: 1200-1300 Drill Time: 22min 10sec (70-72.5') 2.4' recovery 22min 21sec (72.5-75') Circ. Loss: None
APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500	DATE FIELD	76.5 — STARTED COMPLET GEOLOGI	ED: 11	/2/09 O		GWL: D	pitted/porous, fossiliferous, few vugs, medium bedded, few very thin black organic lenses, moderately fractured (horizontal break at 75.3') moderate to strong reaction to 1N HCl when powdered. 75.5-80.0' Crystalline DOLOMITE, pale yellowish brown (10YR 6/2) t light olive gray (5G 6/1), moderately to intensely fractured, pitted/fossiliferous in bands, strong reaction to 1N HCl when dry, fresh to slightly weathered, thick bedded. EPTH: 5.8' DATE/TIME: 10/30/09 @ 0745 EPTH: 5.7' DATE/TIME: 11/2/09 @ 0845	0	Drilling Pressure: 150 psi Kelly Bar RPM: 209 Engine RPM: 1300 Drill Time: 45min 14sec Circ. Loss: None NOTE: 0.5' fall-in from above.
DRILLING CO.: HUSS	APPR	OVED BY:		OS 	_	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



LNP- 0	LNP- Offset Boring Program PROJECT NO. 07-3935										
						LOG OF BORING NO. O-6					
ELEVATION (FEET MSL)	H.E.	SAMPLE NO. OR RUN NO.	' & (N) REC. ND)	RECOVERY (ft.)	빌	COORDINATES N 1724065.3 E 457853.4	SYMBOL				
EVA ⁻	DEPTH (FEET)	MPLE RUN	BLOW/6" & (N OR % REC. & (RQD)	COVE	PROFILE	SURFACE EL: 42.2] 	REMARKS			
		& Q	BLO	REC		DESCRIPTION	nscs				
	78 — - - - - - 79.5 —	R-8	74% (14%)	3.7		76.9' Becomes moderately weathered (dark yellowish orange (10YR 6/6)), friable in very thin zones.					
-37.8	81 — — — 81 — — — — 82.5 —	R-9	80%	4.0		80.0-81.5' LIMESTONE, very light gray (N8) to light olive gray (5Y 6/1), moderately hard, medium bedded, with some light gray (N7) lenses, strong reaction to 1N HCl, vug at 80.5-80.6'-not continuous, fresh to slightly weathered, slightly fractured, pitted/fossiliferous in thin bands, 81.2-81.5', intensely fractured. 81.5-81.8' Crystalline DOLOMITE as at 75.5-80.0'. 81.8-85' DOLOMITE, dark yellowish orange (10YR 6/6) to moderate yellowish brown (10YR 5/4), moderately hard, moderately weathered pitted/porous, fossiliferous, thick bedded, slightly fractured (horizontal-bedding planes only), strong reaction to 1N HCl when powdered, few vugs.	·L	Run-9: Drilling Pressure: 200 psi Kelly Bar RPM: 208 Engine RPM: 1300 Drill Time: 36min 10sec Circ. Loss: None NOTE: 0.8' fall-in from above.			
	84 — 85.5 — 87 —	R-10	92%	4.6		85.0-88.2' DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2), slightly weathered, pitted, fossiliferous, few vugs, thick bedded, slightly to moderately fractured (vertical fractures 86.5-87.2' and 87.5 88.1'), few thin pockets of black organic material, strong reaction to 1N HCl when powdered.		Run-10: Drilling Pressure: 150 psi Kelly Bar RPM: 212 Engine RPM: 1300-1400 Drill Time: 23min 32sec Circ. Loss: None NOTE: 0.1' fall-in from above.			
DATE	DATE STARTED: 10/29/09 DATE COMPLETED: 11/2/09 FIELD GEOLOGIST: JLO					EPTH: 5.8' DATE/TIME: 10/30/09 @ 0745 EPTH: 5.7' DATE/TIME: 11/2/09 @ 0845 NG METHOD: Mud Rotary/PQ3 Coring	NOTE	ES: NA			
APPR	KED BY: OVED BY: ING CO.:	WI HUSS	os 		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500			



LNP-	Offset Bori	ng Prog	ram			LOG OF BORING NO. O-6		PROJECT NO. 07-393
ELEVATION (FEET MSL)	Εſ	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	LE LE	COORDINATES N 1724065.3 E 457853.4	SYMBOL	
EVA-	DEPTH (FEET)	MPLE RUN	NW/6" R % F R (RC	OVE	PROFILE	SURFACE EL: 42.2	S SY	REMARKS
밀민		SA	BLC	REC	"	DESCRIPTION	nscs	
	88.5 —					88.1-88.2' Crushed zone. 88.2-90.0' DOLOMITE, moderately hard to moderately soft, yellowish gray (5Y 8/1) to very pale orange (10YR 8/2), mottled with light bluish gray (5B 7/1), strong reaction to 1N HCl when powdered, slightly to moderately weathered, medium to thick bedded, slightly fractured (horizontal fracture at 89.0').		
	91.5 —					90.0-91.9' DOLOMITE, dark yellowish orange (10YR 6/6) to pale yellowish brown (10YR 6/2), moderately hard, moderately weathered pitted, fossiliferous, thick bedded, slightly fractured (horizontal-bedding planes only), few very thin black organic lenses, strong reaction to 1N HCl when powdered.	,	Run-11: Drilling Pressure: 200 psi Kelly Bar RPM: 205 Engine RPM: 1200-1300 Drill Time: 37min 45sec Circ. Loss: None
	93 —	R-11	100%	5.0		91.9-93.0' Transitional zone, mix of DOLOMITE as above and DOLOMITE, yellowish gray (5Y 7/2), moderately soft, fresh to slightly weathered, no fossils, silty texture when weathered, strong reaction t 1N HCI when powdered, few pits, medium to thick bedded, unfractured. 93.0-95.0' DOLOMITE (yellowish gray (5Y 7/2) as above) except with very thin laminae of medium light gray (N6).	o	
	94.5 —					94.1-95.0' Becomes moderately to intensely fractured.		
	96 —					95.0-95.8' DOLOMITE, as above except intensely fractured-vertical fractures. 95.8-96.2' Very thinly laminated DOLOMITE and black organic material, moderately soft to soft, moderately weathered, moderately to intensely fractured (vertical fracture 95.8-96.8'), strong reaction to 1N HCI when powdered. 96.2-100.0' DOLOMITE, yellowish gray (5Y 7/2), moderately hard to moderately soft, moderately weathered, pitted/porous, fossiliferous, some vugs, strong reaction to 1N HCI when powdered, thick bedded slightly fractured, some black organic material (vertical orientation).		Run-12: Drilling Pressure: 200 psi Kelly Bar RPM: 211 Engine RPM: 1300-1400 Drill Time: 10min 25sec Circ. Loss: None
DATE	97.5 — — — — — STARTED	R-12	100% (50%)	5.0	GWL: D	98.6-99.1' Becomes slightly weathered, slightly pitted.	NOTE	ES: NA
	COMPLET GEOLOGI				GWL: D	PEPTH: 5.7' DATE/TIME: 11/2/09 @ 0845 NG METHOD: Mud Rotary/PQ3 Coring		
APPR	KED BY: OVED BY: ING CO.:	WI	os	計	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



COORDINATES N 1724065.3 E 457853.4 SURFACE EL: 42.2 DESCRIPTION 99 100.5 100.0-106.1' DOLOMITE, moderately hard to moderately soft, moderately weathered, pitted, fossiliferous, yellowish gray (5Y 7/2), thick bedded, slightly fractured (vertical fracture 101.1-101.9'), few very thin black organic layers, strong reaction to 1N HCl when powdered. REMARKS REMARKS 100.0-106.1' DOLOMITE, moderately hard to moderately soft, moderately weathered, pitted, fossiliferous, yellowish gray (5Y 7/2), thick bedded, slightly fractured (vertical fracture 101.1-101.9'), few very thin black organic layers, strong reaction to 1N HCl when powdered. Run-13: Drilling Pressure: 200 psi Kelly Bar RPM: 205 Engine RPM: 1200-1300 Drill Time: 9min 38sec Circ. Loss: None	NO. 07-3935	PROJECT NO.		LOG OF BORING NO. O-6												
100.0-106.1' DOLOMITE, moderately hard to moderately soft, moderately weathered, pitted, fossiliferous, yellowish gray (5Y 7/2), thick bedded, slightly fractured (vertical fracture 101.1-101.9'), few very thin black organic layers, strong reaction to 1N HCl when powdered. Run-13: Drilling Pressure: 200 psi Kelly Bar RPM: 205 Engine RPM: 1200-1300 Drill Time: 9min 38sec Circ. Loss: None	5	REMARKS	SCS SYMBOL	COORDINATES N 1724065.3 E 457853.4 SURFACE EL: 42.2	PROFILE	ECOVERY (ft.)	LOW/6" & (N) OR % REC. & (RQD)	SAMPLE NO. OR RUN NO.	DEPTH (FEET)	ELEVATION (FEET MSL)						
100.0-106.1' DOLOMITE, moderately hard to moderately soft, moderately weathered, pitted, fossiliferous, yellowish gray (5Y 7/2), thick bedded, slightly fractured (vertical fracture 101.1-101.9'), few very thin black organic layers, strong reaction to 1N HCl when powdered. Run-13: Drilling Pressure: 200 psi Kelly Bar RPM: 205 Engine RPM: 1200-1300 Drill Time: 9min 38sec Circ. Loss: None			_	DESCRIPTION	7,7,7	R	<u> </u>	0, 0								
moderately weathered, pitted, fossiliferous, yellowish gray (5Y 7/2), thick bedded, slightly fractured (vertical fracture 101.1-101.9'), few very thin black organic layers, strong reaction to 1N HCl when powdered. Drilling Pressure: 200 psi Kelly Bar RPM: 205 Engine RPM: 1200-1300 Drill Time: 9min 38sec Circ. Loss: None		Run-13:		100.0-106.1' DOLOMITE, moderately hard to moderately soft.					99 —							
	00	Kelly Bar RPM: 205 Engine RPM: 1200-1300 Drill Time: 9min 38sec		moderately weathered, pitted, fossiliferous, yellowish gray (5Y 7/2), thick bedded, slightly fractured (vertical fracture 101.1-101.9'), few very thin black organic layers, strong reaction to 1N HCl when					100.5 — — — — —							
R-13 94% 4.7 102.1- 102.7' Intensely fractured.				102.1- 102.7' Intensely fractured.		4.7		R-13	102 —							
103.5 —									- - -							
Run-14: Drilling Pressure: 200 psi Kelly Bar RPM: 202 Engine RPM: 1200-1300 Drill Time: 10min 23sec Circ. Loss: None	00	Drilling Pressure: 200 psi Kelly Bar RPM: 202 Engine RPM: 1200-1300 Drill Time: 10min 23sec		106.1-107.5' DOLOMITE, as above except intensely fractured.					- - -							
R-14 108 R-14 107.5-108.0' As above except moderately fractured (vertical fracture 107-110'). 108.0-110.0' As above except not as pitted, silty texture at weathered zones.				107-110').108.0-110.0' As above except not as pitted, silty texture at weathered		4.3		R-14	- - -							
109.5				<u>, </u>		L.,]								
DATE COMPLETED: 11/2/09 GWL: DEPTH: 5.7' DATE/TIME: 11/2/09 @ 0845 FIELD GEOLOGIST: JLO CHECKED BY: WDS GWL: DEPTH: 5.7' DATE/TIME: 11/2/09 @ 0845 DRILLING METHOD: Mud Rotary/PQ3 Coring		ES: NA	NOTE	DEPTH: 5.7' DATE/TIME: 11/2/09 @ 0845	GWL: [DATE COMPLETED: 11/2/09 FIELD GEOLOGIST: JLO										
APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500 RIG: Failing 1500		Failing 1500	RIG:	R: Eddie Palmer HELPER: Chad/Cody	DRILLE	\dashv										



LNP- (Offset Bor	ing Prog	ram			LOG OF BORING NO. O-6		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	Ŧ£.	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1724065.3 E 457853.4	SYMBOL	
EVA	DEPTH (FEET)	MPLI	3.W/6 7.8.F 8.(RC	OVE	PROFILE	SURFACE EL: 42.2		REMARKS
급匠		SA	BLC	REC		DESCRIPTION	nscs	
	- - - 111 —	•••••				110.0-115.0' DOLOMITE, moderately soft to moderately hard, yellowish gray (5Y 7/2), slightly weathered, slightly fractured, strong reaction to 1N HCl when powdered, slightly pitted, few fossils, few healed vertical fractures throughout, black infilling, thick bedded.		Run-15: Drilling Pressure: 200 psi Kelly Bar RPM: 202 Engine RPM: 1200-1300 Drill Time: 9min 40sec Circ. Loss: None
	112.5 — - - - - -	R-15	92% (40%)	4.6		113.1-115.0' Vertical fracture-open.		
	114 — — — — — 115.5 —					115-116.6' DOLOMITE, moderately soft, yellowish gray (5Y 7/2), moderately weathered, sandy texture, thick bedded, moderately fractured (115-155.3' intensely fractured), strong reaction to 1N HCl when powdered, some fossils, coarse grained.		Run-16: Drilling Pressure: 200 psi Kelly Bar RPM: 216 Engine RPM: 1300-1400 Drill Time: 4min 17sec Circ. Loss: None
	117 —	R-16	100%	5.0		116.6-118.1' DOLOMITE as above except fossiliferous, pitted/vuggy.		NOTE: 0.4' fall-in from above. Water level 10/31/09 @ 0755 6.3'.
						118.1-118.4' DOLOMITE, same as 115-116.6'. 118.4-119.5' DOLOMITE, same as 116.6-118.1'. 119.5-121.3' DOLOMITE, as at 115-116.6'.		
	120 — — —							Run-17: Drilling Pressure: 250 psi Kelly Bar RPM: 190 Engine RPM: 1100-1200
DATE FIELD	STARTED COMPLET GEOLOG KED BY:	ΓED: 11	0		GWL: D GWL: D DRILLIN	9	NOTE	ES: NA
APPR	OVED BY:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILL	ING CO.:	HUSS						



LNP- Offset Bo	ring Prog	ıram			LOG OF BORING NO. O-6		PROJECT NO. 07-3935
(FEET MSL) DEPTH (FEET)	SAMPLE NO. OR RUN NO.	& (N) REC. ID)	RECOVERY (ft.)	E E	COORDINATES N 1724065.3 E 457853.4	SYMBOL	
EET MS EET MS DEPTH (FEET)	MPLE	BLOW/6" & (N OR % REC. & (RQD)	OVE	PROFILE	SURFACE EL: 42.2		REMARKS
크음	SAI	BLC	REC		DESCRIPTION	NSCS	
121.5 —					121.3-123.4' DOLOMITE, as at 116.6-118.1'.		Drill Time: 6min 3sec Circ. Loss: None
123 — 	R-17	100%	5.0		123.4-125.0' DOLOMITE, as at 119.5-121.3'.		
124.5 — 	- - - - - - - -				125.0-125.6' DOLOMITE, moderately hard, yellowish gray (5Y 7/2), few vugs, medium to thick bedded, slightly weathered, unfractured, strong reaction to 1N HCl when powdered, few fossils. 125.6' Wavy Contact.		Run-18: Drilling Pressure: 200 psi Kelly Bar RPM: 208 Engine RPM: 1300
126 —	- - - - -	100%			125.6-128.8' DOLOMITE, moderately hard, yellowish gray (5Y 7/2), some vugs, some fossils, thick bedded, strong reaction to 1N HCl when powdered, unfractured, slightly weathered.		Drill Time: 10min 0sec Circ. Loss: None
127.5 — - - - - 129 —	R-18	100% (96%)	5.0		128.8-130.2' DOLOMITE, moderately hard, yellowish gray (5Y 7/2), fossiliferous, coarse grained, moderately weathered, strong reaction to 1N HCl when powdered, thick bedded, very slightly fractured (horizontal).		
130.5 — - - - -	 				130.2-130.8' DOLOMITE, same as 125.6-128.8' except moderately fractured (all horizontal-bedding planes). 130.8-133.0' DOLOMITE, same as 128.8-130.2' except moderately fractured (all horizontal-bedding planes).		Run-19: Drilling Pressure: 250-300 psi Kelly Bar RPM: 201 Engine RPM: 1200-1300 Drill Time: 8min 56sec Circ. Loss: None Added 0.2' from Run-20, recaluate percent recovery, RQD not affected.
DATE STARTE DATE COMPLE FIELD GEOLOG CHECKED BY:	TED: 11			GWL: D GWL: D DRILLIN	C	NOTE	ES: NA
APPROVED BY				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500



COORDINATES N 1724065.3 E 457853.4 SURFACE EL: 42.2 DESCRIPTION	
R-19 R-19 132 — 133.0-135.0' DOLOMITE, same as 130.2-130.8', thinly laminated in zones with black organic layers.	
R-19 R-19 132 — 133.0-135.0' DOLOMITE, same as 130.2-130.8', thinly laminated in zones with black organic layers.	
R-19 Same as 130.2-130.8', thinly laminated in zones with black organic layers.	
135.0-135.8' DOLOMITE, moderately hard to moderately soft, yellowish gray (5Y 7/2), coarse grained, thinly laminated, moderately weathered, moderately weathered, moderately fossils, strong reaction to 1N HCl when powdered. 135.0-135.8' DOLOMITE, moderately hard to moderately soft, yellowish gray (5Y 7/2), coarse grained, thinly laminated, moderately brilling Pressure: 200 psi Kelly Bar RPM: 196 Engine RPM: 1200-1300 Drill Time: 17min 26sec moderately soft, slightly to moderately weathered (silty texture in weathered zones), pitted, some fossils, few vugs, slightly fractured (horizontal-bedding planes), thick bedded, strong reaction to 1N HCl when powdered.)
R-20 R-20 138 — 138 — 137.7-137.9' DOLOMITE, moderately hard to moderately soft, slightly weathered, light olive gray (5Y 5/2), with very thin bands of DOLOMITE as at 135-135.8', thin bedded, strong reaction to 1N HCI when powdered, unfractured. 137.9-139.3' DOLOMITE, moderately hard to moderately soft, slightly weathered, light olive gray (5Y 5/2), with very thin bands of DOLOMITE as at 135-135.8', thin bedded, strong reaction to 1N HCI when powdered, unfractured. 137.9-139.3' DOLOMITE, moderately hard, yellowish gray (5Y 8/1) as at 135.8-137.7' except with pockets of light bluish gray (5B 7/1) limestone (possible rip-up clasts).	
139.5— 139.3-143.0' Crystalline DOLOMITE, continuous vugs, grayish orange (10YR 7/4) to yellowish gray (5Y 7/2), hard, strong reaction to 1N HCl, some fossils, pitted in bands, thick bedded, fresh to slightly weathered, slightly to moderately fractured. Run-21: Drilling Pressure: 200 psi Kelly Bar RPM: 202 Engine RPM: 1200-1300 Drill Time: 44min 6sec Circ. Loss: None	
142.5 — R-21 96% 4.8	
DATE STARTED: 10/29/09 GWL: DEPTH: 5.8' DATE/TIME: 10/30/09 @ 0745 NOTES: NA	
APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500 DRILLING CO.: HUSS	_



LNP- (Offset Bor	ing Prog	ram			LOG OF BORING NO. O-6		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724065.3 E 457853.4 SURFACE EL: 42.2	USCS SYMBOL	REMARKS
			(60%)	22	 	DESCRIPTION) j	
	 144 					143.0-143.5' Crystalline DOLOMITE, yellowish gray (5Y 7/2), thin to medium bedded, no fossils, fresh, pitted in very thin bands, unfractured. 143.5-145.0' DOLOMITE, moderately hard, pale yellowish brown (10YR 6/2) to yellowish gray (5Y 7/2), strong reaction to 1N HCI when powdered, thick bedded, fossiliferous, unfractured, slightly weathered		Run-22:
	145.5 — — — — — — — 147 —	R-22	100%	5.0		light olive gray (5Y 5/2), some fossils to fossiliferous, slightly fractured (vertical fracture 146.6-147'), all others horizontal-bedding planes), thinly bedded/ laminated appearance, moderately weathered, strong reaction to 1N HCl when powdered.		Drilling Pressure: 200 psi Kelly Bar RPM: 200 Engine RPM: 1200-1300 Drill Time: 12min 2sec Circ. Loss: None 0.2' Fall-in from above.
	- - 148.5 - -	N-22	(80%)	3.0		149.5-149.7' With thin beds of crystalline DOLOMITE.		
	150 — - - - - 151.5 —					150.0-151.9' DOLOMITE, moderately hard to hard, yellowish gray (5Y 7/2), few vugs, some fossils, fresh, unfractured, thick bedded, moderate to strong reaction to 1N HCl when powdered.		Run-23: Drilling Pressure: 200 psi Kelly Bar RPM: 193 Engine RPM: 1200 Drill Time: 22min 17sec Circ. Loss: None
	- - - 153 —	R-23	100% (50%)	5.0		151.9-153.0' Becomes thinly laminated, yellowish gray (5Y 7/2), grayish yellow (5Y 8/4) to light olive gray (5Y 5/2) moderately fractured (horizontal). 153.0-153.5' Becomes soft, friable, intensely fractured (approximately 45° en-echelon).		
DATE STARTED: 10/29/09 DATE COMPLETED: 11/2/09 FIELD GEOLOGIST: JLO					GWL: D GWL: D DRILLIN	G	NOTE	I ES: NA
APPR	KED BY: OVED BY:		J3	_	DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DKILL	ING CO.:	побб						



LNP- 0	Offset Bor	ing Prog	ram					PROJECT NO. 07-3935		
		9 9				LOG OF BORING NO. O-6				
ELEVATION (FEET MSL)	ОЕРТН (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724065.3 E 457853.4 SURFACE EL: 42.2	S SYMBOL	REMARKS		
II E		SA	BLC	REC	"	DESCRIPTION	NSCS			
	_ _ 154.5 —					153.5-154.0' DOLOMITE as at 150-151.9' except pale yellowish brown (10YR 6/2). 154.0-155.0' DOLOMITE as at 153-153.5'.				
	156 — - -					155.0-155.2' DOLOMITE, moderately hard, fossiliferous, coarse grained, thin bedded, unfractured, moderately weathered, yellowish gray (5Y 8/1), strong reaction to 1N HCl when powdered. 155.2-156.1' DOLOMITE, moderately hard to moderately soft, coarse grained, pitted/porous, moderately weathered, slightly fractured, thin to medium bedded, with few layers of crystalline DOLOMITE (very thin bands), strong reaction to 1N HCl when powdered, pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 5/4), some fossils. 156.1-156.5' Crystalline DOLOMITE, very light gray (N8), hard, fresh intensely fractured, no fossils, pitted in very thin bands, thin bedded,	h	Run-24: Drilling Pressure: 300 psi Kelly Bar RPM: 210 Engine RPM: 1300 Drill Time: 12min 40sec Circ. Loss: None Water level 11/2/09 @ 0845 5.7'.		
	_ 157.5 _ _ _	R-24	98% (68%)	4.9		strong reaction to 1N HCl when powdered. 156.5-160.0' DOLOMITE as at 155.2-156.1' except yellowish gray (5' 7/2), fossiliferous, no crystalline dolomite bands, thick bedded, slightl fractured.				
	159 — - -									
	160.5 — — — —					160.0-160.5' DOLOMITE, as at 155.2-156.1'. 160.5-163.1' DOLOMITE, moderately hard to moderately soft, yellowish gray (5Y 8/1), moderately weathered, moderately fractured (vertical fracture 161.2-162.0'), strong reaction to 1N HCl when powdered, some fossils in bands, thick bedded.		Run-25: Drilling Pressure: 250-300 psi Kelly Bar RPM: 199 Engine RPM: 1200-1300 Drill Time: 11min 44sec Circ. Loss: None		
	- 162 	R-25	80% (22%)	4.0						
	- 163.5 — - - -					163.1-163.4' DOLOMITE as above except moderately to severely weathered, intensely fractured/crushed. 163.4-165.0' Crystalline DOLOMITE, medium light gray (N6) to light olive gray (5Y 6/1), hard, strong reaction to 1N HCl when dry, thin to medium bedded, pitted in bands, no fossils, fresh, moderately fractured.				
DATE	STARTED COMPLET	ED: 11/			GWL: DEPTH: 5.8' DATE/TIME: 10/30/09 @ 0745 GWL: DEPTH: 5.7' DATE/TIME: 11/2/09 @ 0845 DRILLING METHOD: Mud Rotary/PQ3 Coring			NOTES: NA		
CHEC APPR	KED BY: OVED BY: ING CO.:	WE				R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500		



LNP- (Offset Bo	ring Prog	ram			LOG OF BORING NO. O-6		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724065.3 E 457853.4 SURFACE EL: 42.2	SCS SYMBOL	REMARKS
	_	0,0	l m	<u> </u>	\	DESCRIPTION	5	
-123.4	165 — - -					165.0-165.2' DOLOMITE, same as 163.1-163.4'. 165.2-165.6' Crystalline DOLOMITE, slightly weathered, light olive gray (5Y 6/1), hard, pitted, strong reaction to 1N HCl when powdered unfractured, medium bedded.		Run-26: Drilling Pressure: 300 psi Kelly Bar RPM: 198 Engine RPM: 1200-1300 Drill Time: 4min 37sec (165-167')
-123.8	166.5 — - - -		90%			165.6-166.0' ROD DROP. 166.0-166.2' Crystalline DOLOMITE as above except fresh. 166.2-167.1' DOLOMITE, moderately hard, moderately weathered, pitted/porous, fossiliferous, strong reaction to 1N HCl when powdered, thick bedded, coarse grained, slightly fractured (horizontal bedding planes only), dark yellowish orange (10YR 6/6) to moderate yellowish brown (10YR 5/4). 167.1-167.5' DOLOMITE, hard, light gray (N7) to light olive gray (5Y	-	Smin 8sec (167-170') 3.0' recovery Circ. Loss: None Driller Notes: Rod drop of 6-8" about 6" into run. NOTE: Recovery percentage mislabeled in picture (tray).
	168 — - - -	R-26	(40%)	4.5		6/1), with lenses of medium light gray (N/) to light olive gray (SY 6/1), with lenses of medium light gray (N6) throughout, pitted, some fossils and vugs, medium bedded, fresh to slightly weathered, moderate to strong reaction to 1N HCl when powdered. 167.5-170.0' Alternating beds (0.1-0.3' thick) of DOLOMITE as at 166.2-167.1' and crystalline DOLOMITE.		
	- 169.5 — - -					170.0-175.0' Same as 167.5-170.0' except beds are 0.7-1.0' thick, slightly fractured (horizontal-bedding planes only). 170.0-170.2' Intensely fractured/crushed zone.		Run-27: Drilling Pressure: 200-250 psi Kelly Bar RPM: 196
	171 — - - -					170.2-170.6' Vertical fracture-open.		Engine RPM: 1200-1300 Drill Time: 13min 10sec Circ. Loss: None NOTE: Lots of rig chatter, 0.3' fall- in from above.
	172.5 — - - - -	R-27	94% (46%)	4.7				
	174 — - - -					175.0-178.1' Alternating layer of moderately weathered DOLOMITE		Run-28:
	175.5			L.		and crystalline DOLOMITE as above.		Drilling Pressure: 200 psi Kelly Bar RPM: 197
DATE STARTED: 10/29/09 DATE COMPLETED: 11/2/09 FIELD GEOLOGIST: JLO					GWL: D GWL: D DRILLIN		NOTE	ES: NA
	KED BY: OVED BY	W[JS		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILL	ING CO.:	HUSS						



LNP- (Offset Boi	ring Prog	ram			LOG OF BORING NO. O-6		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	ΈC	SAMPLE NO. OR RUN NO.	& (N) REC. D)	RECOVERY (ft.)	IE .	COORDINATES N 1724065.3 E 457853.4	SYMBOL	
EVAT	DEPTH (FEET)	SAMPLE OR RUN	BLOW/6" & (N OR % REC. & (RQD)	OVE	PROFILE	SURFACE EL: 42.2		REMARKS
크린		SAI	BLC	REC		DESCRIPTION	nscs	
	177 — - 1777 — - - 178.5 — -	R-28	90% (16%)	4.5		178.1-178.7' DOLOMITE, moderately weathered, dark yellowish orange (10YR 6/6) to moderate yellowish brown (10YR 5/4), moderately hard, sandy texture in weathered areas, larger vugsalmost continuous, coarse grained, intensely fractured, strong reaction to 1N HCl when powdered. 178.7-179.0' As above except no vugs. 179.0-180.0' DOLOMITE as at 178.7-179.0' except intensely fractured (rubble-like).		Engine RPM: 1200-1300 Drill Time: 14min 22sec Circ. Loss: None NOTE: Moderate rig chatter in zones during drilling. 0.3' fall-in from above. Last 3-4" of run mechanically broken trying to remove from shoe (destroyed).
	180 — - - - -					180.0-181.6' Alternating layers of moderately weathered DOLOMITE and crystalline DOLOMITE as at 175.1-178.1'.		Run-29: Drilling Pressure: 250 psi Kelly Bar RPM: 185 Engine RPM: 1100-1200 Drill Time: 14min 54sec Circ. Loss: None NOTE: Lots of rig chatter near end
	181.5 — - - - - 183 — -	R-29	96% (40%)	4.8		181.6-182.7' DOLOMITE, moderately hard to moderately soft, coarse grained, medium yellowish brown (10YR 5/4), medium bedded to thinly laminated near the basal contact (mottled with dark yellowish brown (10YR 4/2)), moderately fractured-vertical fracture 181.6-182.4', weak to moderate reaction to 1N HCl when powdered, sandy texture, pitted/porous, moderately weathered. 182.7-184.1' DOLOMITE, hard, fossiliferous, slightly to moderately weathered, medium to thick bedded, unfractured (183.6-183.8' crushed), light gray (N7) to light olive gray (5Y 6/1).		of run.
	- 184.5 — - - -					184.1-184.4' Crystalline DOLOMITE. 184.4-185.6' DOLOMITE as at 182.7-184.1' except thinly laminated (fissile-like).		Run-30: Drilling Pressure: 200 psi Kelly Bar RPM: 211
	186 					185.6-185.9' Fossiliferous DOLOMITE as at 182.7-184.1'. 185.9-188.4' Alternating layers of moderately weathered DOLOMITE and crystalline DOLOMITE as at 180.0' (layers 0.7- 1.3' thick).		Engine RPM: 1300-1400 Drill Time: 14min 50sec Circ. Loss: None NOTE: 0.2' fall-in from above.
DATE FIELD	STARTED COMPLE GEOLOG KED BY:	TED: 11/	0		GWL: [GWL: [DRILLII	9	NOTE	ES: NA
APPR	OVED BY:		-		DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500
DRILL	ING CO.:	HUSS						



LNP-	Offset Bor	ing Prog	ram			LOG OF BORING NO. O-6		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	ΕĒ	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	ILE	COORDINATES N 1724065.3 E 457853.4	SYMBOL	
EVA EET I	DEPTH (FEET)	MPLI	3.W/6' 7.% F 8. (RG	OVE	PROFILE	SURFACE EL: 42.2		REMARKS
 미류		SAI	BLC OF	REC		DESCRIPTION	nscs	
	187.5 — 189.5 — 190.5 — 193.5 — 195 — 196.5 — 196.5 — 196.5 —	R-31	100% (34%)	5.0		188.4-189.9' DOLOMITE, moderately hard, possibly friable, thinly laminated, light olive gray (5Y 6/1), grayish orange (10YR 7/4) and dark yellowish brown (10YR 4/2), slightly to moderately weathered, pitted, no fossils, unfractured, strong reaction to 1N HCl when powdered, sandy/silty texture. 189.9-190.0' Crystalline DOLOMITE as above. 190.0-191.0' Crystalline DOLOMITE as above except moderately weathered. 191.0-192.0' DOLOMITE same as at 188.4-189.9'. 192.0-195.0' DOLOMITE, moderately hard, yellowish gray (5Y 8/1), intensely fractured, slightly weathered, pitted, some fossils, strong reaction to 1N HCl when powdered, few vugs (weathered-out fossils) thick bedded. 195.0-197.5' DOLOMITE, moderately hard, moderately weathered, pitted/porous, coarse grained, fossiliferous, grayish orange (10YR 7/4) to pale yellowish brown (10YR 6/2), moderate to strong reaction to 1N HCl when powdered, thick bedded, with few very thin layers of finer grained DOLOMITE, slightly fractured, intensely fractured from 197.3-197.5'.		Run-31: Drilling Pressure: 250 psi Kelly Bar RPM: 201 Engine RPM: 1200-1300 Drill Time: 6min 36sec Circ. Loss: None Run-32: Drilling Pressure: 400 psi Kelly Bar RPM: 209 Engine RPM: 1300 Drill Time: 9min 15sec Circ. Loss: None
	DATE STARTED: 10/29/09					9	NOTE	ES: NA
ı	COMPLET				GWL: D			
ı	FIELD GEOLOGIST: JLO DRILLING METHOD: Mud Rotary/PQ3 Coring CHECKED BY: WDS							
	APPROVED BY: DRILLER: Eddie Palmer HELPER: Chad/Cody RIG: Failing 1500							
_	ING CO.:			\dashv	\\ILLL	TILLI LIX. Ollad/Oddy		



LNP- (Offset Boi	ring Prog	ram			LOG OF BORING NO. O-6		PROJECT NO. 07-3935
ELEVATION (FEET MSL)	DEPTH (FEET)	SAMPLE NO. OR RUN NO.	BLOW/6" & (N) OR % REC. & (RQD)	RECOVERY (ft.)	PROFILE	COORDINATES N 1724065.3 E 457853.4 SURFACE EL: 42.2 DESCRIPTION	USCS SYMBOL	REMARKS
	198 — - - - -	R-32	(34%)	4.0		197.5-200.0' Crystalline DOLOMITE, very light gray (N8) to light olive gray (5Y 6/1), hard, strong reaction to 1N HCl when dry, intensely fractured, no fossils, medium bedded, fresh to slightly weathered, pitted in bands.		
	199.5 — - - - 201 —					200.0-201.6' Crystalline DOLOMITE as above except moderately to intensely fractured, with few very thin black organic (possibly) laminations.		Run-33: Drilling Pressure: 200 psi Kelly Bar RPM: 193 Engine RPM: 1200 Drill Time: 6min 47sec Circ. Loss: None
		R-33	100% (20%)	5.0		201.6-205.0' DOLOMITE, moderately hard, yellowish gray (5Y 8/1) to light olive gray (5Y 6/1), coarse grained, some fossils to fossiliferous, moderate to strong reaction to 1N HCl when powdered, moderately weathered, moderately to intensely fractured, pitted/porous, sandy texture, thick bedded.		
-162.8	204 —					BOTTOM OF BORING 205'		
	205.5 — - - - - 207 —							
DATE	- - - STARTE) D: 10	/29/09		GWL: D	EPTH: 5.8' DATE/TIME: 10/30/09 @ 0745	NOTE	ES: NA
DATE COMPLETED: 11/2/09 FIELD GEOLOGIST: JLO CHECKED BY: WDS					GWL: DEPTH: 5.7' DATE/TIME: 11/2/09 @ 0845 DRILLING METHOD: Mud Rotary/PQ3 Coring			
	OVED BY: ING CO.:				DRILLE	R: Eddie Palmer HELPER: Chad/Cody	RIG:	Failing 1500